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SERİSİ

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1

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Barbaros Mahallesi Güniz Sokak No: 44/1-2 Kavaklıdere - Ankara / Türkiye
Telefon: +90 312 427 31 74 Faks: +90 312 427 31 64
www.puzayayinlari.com

ÖNSÖZ

Herhangi bir bilgiyi belleğe sağlıklı olarak yerleştirebilmek için en bilinen ve en çok güvenilen yöntem tekrar yapmaktır. Kısa süreli bellekteki bir bilginin uzun süreli belleğe kaydolup geri çağırımının gerçekleşebilmesi için sistemli tekrar yapmak şarttır. Kitabımızdaki konular bu amaç doğrultusunda soru tiplerine ve özelliklerine göre gruplandırılmıştır. Konuya ait tüm özellikler tek tek ele alınmıştır. Ölçülmek istenen bilgi ile ilgili sorular, farklı açılardan sorularak bilginin pekiştirilmesi sağlanmıştır. Böylece öğrenciler bölümdeki soruların çözülmesi için tüm konunun bitmesini beklemeden öğrenilen soru tiplerinin çözümüne başlayabileceklerdir.

Kitabımızı referans alacak değerli meslektaşlarımız da konunun bitimini beklemeden, konunun anlatılan kısmından öğrencilerine ödev verebileceklerdir. Kitaptaki tüm sorular bilgilerin tümevarım yöntemi ile öğrenilmesi için basit soru tiplerinden karmaşık soru tiplerine adım adım geçiş yapılacak şekilde düzenlenmiştir. Bölüm sonu testlerinde üst düzey analiz gerektiren sorulara yer verilmiştir.

Değerli öğretmenlerimize ve sevgili öğrencilerimize yararlı olması dileğiyle...

FOREWORD

The must confident and well known way to put any kind of information into the memory safely is to repeat. For calling back the recorded information into the long term memory that is actually in the short term memory, systematic repetition is essential. The subjects in our book are classified according to the question types and attributes in parallel to this purpose. All the attributes regarding that topic have been considered one by one respectively.

The questions that are related to the information to be tested, are asked from various points of views to consolidate the information. As a result the students have the chance to start solving questions of all question types directly without waiting for the completion of the chapter for solving the questions. Our colleagues have also chance to give their students homework from the completed part without waiting for the full completion of the related chapter. All questions in the book are organized with the induction method that start with the simpler question types and improve into more complex question types. In the chapter final tests there are also question types that require higher level analysis skills. With our best wishes that this work will be useful to both our teachers and dear students...

Uğur PUZA

İÇİNDEKİLER | CONTENTS

TEMEL KAVRAMLAR
BASIC TERMS

■ Rakam *(Numeral)*

{0, 1, 2, 3, 4, 5, 6, 7, 8, 9}

■ Sayma Sayıları *(Counting Numbers)*

$N^+ = \{1, 2, 3, 4, ...\}$

■ Doğal Sayılar *(Natural Numbers)*

$N = \{0, 1, 2, 3, 4, ...\}$

■ Tam Sayılar *(Integers)*

$Z = \{..., -3, -2, -1, 0, 1, 2, 3, ...\}$

■ Negatif Tam Sayılar *(Negative Integers)*

$Z^- = \{-1, -2, -3, -4, ...\}$

■ Pozitif Tam Sayılar *(Positive Integers)*

$Z^+ = \{1, 2, 3, 4, 5, ...\}$

■ Rasyonel Sayılar *(Rational Numbers)*

$$Q = \left\{ \frac{a}{b} \,\middle|\, a, b \in Z, b \neq 0 \right\}$$

■ İrrasyonel Sayılar *(Irrational Numbers)*

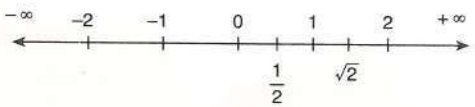
Rasyonel olmayan sayılardır. $\frac{a}{b}$ şeklinde yazılamazlar. $(\sqrt{2}, \sqrt{3}, \pi, e, ...)$ İrrasyonel sayılar Q' ile gösterilir.

Irrational numbers are the numbers, which are not rational numbers.

Cannot be written in the form of $\frac{a}{b}$. $(\sqrt{2}, \sqrt{3}, \pi, e, ...)$ *Irrational numbers are denoted with* Q'.

■ Reel Sayılar *(Real Numbers)*

$R = Q \cup Q'$



$R = (-\infty, +\infty)$

■ Not *(Note)*

$N^+ \subset N \subset Z \subset Q \subset R$

■ Asal Sayılar *(Prime Numbers)*

Yalnızca 1'e ve kendisine bölünebilen 1'den büyük pozitif sayılara asal sayılar denir.

Positive numbers bigger than 1 which are only divisible by 1 and itself are called prime numbers.

2, 3, 5, 7, 11, 13, 17, ...

■ Aralarında Asal Sayılar *(Relatively Prime Numbers)*

1'den başka ortak pozitif böleni olmayan doğal sayılara aralarında asal sayılar denir.

Natural numbers which don't have a common divisor other than 1 are called relatively prime numbers.

Örneğin 8 ve 15 aralarında asal sayılardır. *(For example 8 and 15 are relatively prime numbers)*

ÖZELLİK|Property 1

İşaretleri aynı olan sayılar toplanır. İşaretleri farklı olan sayılarda ise büyük sayıdan küçük sayı çıkartılır. Büyük sayının işareti verilir.

To add signed numbers with the same sign, add the magnitudes of the numbers and kreep the same sign.
To add signed numbers with different signs, subtract the magnitudes of the numbers and use the sign of the number with the greater magnitude.

1. $5-2+4-2=?$

5

2. $6+7-2-3=?$

8

3. $8+9-7+6-2=?$

14

4. $5-2+13-6-3=?$

7

5. $-6-4+11-8+4=?$

−3

6. $-2-6+4-12+8=?$

−8

7. $6-2+3-5-2=?$

0

8. $-7+6-11+8-3=?$

−7

9. $13-7+5-2+6=?$

15

10. $13-7+13+12-6=?$

25

11. $14+12-6+8-6-3=?$

19

12. $-13-6+9-6+21=?$

5

13. $7-8+9-10+11=?$

9

14. $-12-13+10+11-8=?$

−12

15. $-6-7+8-13+22-13=?$

−9

ÖZELLİK | Property 2

Çift işaretli ifadelerde işaretler çarpılarak tek işarete çevrilir.

If the signs are the same, the multiplication (or the quotient) is positive, if the signs are different, the multiplication (or the quotient) is negative)

$+ \cdot + = +$	$+ / + = +$
$+ \cdot - = -$	$+ / - = -$
$- \cdot + = -$	$- / + = -$
$- \cdot - = +$	$- / - = +$

1. $6 - (-3) = ?$

9

2. $-(-2) + 4 = ?$

6

3. $-(-6) - 4 = ?$

2

4. $-8 + (-6) + 3 = ?$

−11

5. $-(-6) - 8 + 4 = ?$

2

6. $-[6 - (-2)] - 5 = ?$

−13

7. $-8 - [-(-2)] = ?$

−10

8. $8 - (-6) - 3 + 6 = ?$

17

9. $-[8 - 2 - (-6)] = ?$

−12

10. $-12 - (-6) - (-4) = ?$

−2

11. $-4 - (-2) - 8 + 2 = ?$

−8

12. $-(-4 - (-2)) = ?$

2

13. $8 - 7 - (-(-2)) = ?$

−1

14. $-(-9) + (-4) - (-2) = ?$

7

15. $8 - [2 - (-6)] - 12 + (-2) = ?$

−14

ÖZELLİK|Property 3

- İşlem Öncelik Sırası
  1. Parantez içi
  2. Üs alma veya veya kök alma
  3. Çarpma işlemi veya bölme işlemi
  4. Toplama işlemi veya çıkarma işlemi

NOT: Bütün işlemler soldan sağa doğru yapılır.

- *Order of Operations (PEMDAS)*
  1. *Inside the Parenthesis*
  2. *Exponentials or radicals*
  3. *Multiplication or division operation*
  4. *Addition or subtraction operation*

NOTE: *All operations are done from left to right.*

1. $(-2)\cdot(3)+4=?$

−2

2. $2\cdot(-4)-2\cdot 3=?$

−14

3. $-2-4\cdot(-2)=?$

6

4. $(-2)\cdot(-4)-2=?$

6

5. $5\cdot(-2)+2\cdot(-3)=?$

−16

6. $6\cdot 3-4\cdot(-3)=?$

30

7. $(-6)\cdot(-5)+2\cdot 6-2\cdot(3)=?$

36

8. $-3\cdot(-2)+6-2\cdot(-4)=?$

20

9. $-4\cdot(3-2\cdot 5)=?$

28

10. $-5+3\cdot[13-2\cdot(-3)]=?$

52

11. $16-2(4-4\cdot 4+4)=?$

32

12. $(8-2+3)\cdot(6-2-3)=?$

9

13. $-8-(-6\cdot 3-8)\cdot 2-(-5)=?$

49

14. $8-6\cdot(1-4\cdot 2)-2\cdot(-5)=?$

60

15. $-3\cdot(-6)-2\cdot[-6-(-3)]=?$

24

ÖZELLİK | Property 4

Rasyonel ifadeler çarpım durumunda SADELEŞTİRİLEBİLİR.

Rational expressions can be simplified only under the multiplication property

$$\frac{a \cdot \cancel{b}}{\cancel{b}} = a$$

Rasyonel ifadeler toplam veya fark durumunda SADELEŞTİRİLEMEZ.

Rational expressions can not be simplified under addition or subtraction property.

$$\frac{a \pm \cancel{b}}{\cancel{b}} \neq a$$

1. $\frac{12}{3} + \frac{8}{4} = ?$ — 6

2. $\frac{15}{3} - \frac{4}{2} = ?$ — 3

3. $\frac{48}{4} + \frac{21}{3} - \frac{10}{5} = ?$ — 17

4. $\frac{42}{6} - \frac{20}{4} + \frac{18}{6} = ?$ — 5

5. $\frac{26}{2} + \frac{72}{6} - \frac{32}{4} = ?$ — 17

6. $\frac{36}{4} - \frac{24}{4} - \frac{44}{4} = ?$ — −8

7. $\frac{42}{3} - \frac{12}{3} + \frac{84}{21} = ?$ — 14

8. $-\frac{45}{15} + \frac{28}{4} - \frac{39}{13} + \frac{48}{6} = ?$ — 9

9. $\frac{6 \cdot 4}{8} + \frac{20 \cdot 3}{6} = ?$ — 13

10. $\frac{8 \cdot 6}{12} - \frac{8 \cdot 5}{10} = ?$ — 0

11. $6 \cdot \frac{4}{12} + 4 \cdot \frac{10}{8} = ?$ — 7

12. $\frac{24 - 12}{6} - \frac{18 - 6}{2} = ?$ — −4

13. $\frac{8 + 4}{4} - \frac{10 + 5}{5} = ?$ — 0

14. $\frac{12 - 6}{3} + \frac{18 - 6}{6} = ?$ — 4

15. $\frac{20 - 5}{5} + \frac{20 + 12}{4} = ?$ — 11

ÖZELLİK|Property 5

Çarpma işleminin toplama işlemi üzerine dağılma özelliği vardır.

Distributive property of multiplication over addition.

$a(x + y) = ax + ay$

1. $2 \cdot (x - 2) + 3 \cdot x = ?$

$5x - 4$

2. $2x - 3(4 - x) = ?$

$5x - 12$

3. $6 - 3(2 - x) + 5x = ?$

$8x$

4. $-9a - 2(a - 2) - 3(3 - a) = ?$

$-8a - 5$

5. $5 - 2(6 - a) - 3(1 - 2a) = ?$

$8a - 10$

6. $\frac{12}{3}(4 - x) - 2(x + 1) = ?$

$14 - 6x$

7. $(2 - 11)x - 3(2x - 6) - 2 = ?$

$-15x + 16$

8. $\frac{12}{(6-2)}(-x + 2) - \frac{3 \cdot 4}{2}(x + 1) = ?$

$-9x$

9. $2(x - y) - 3(x + y) = ?$

$-x - 5y$

10. $2(2x - y) - 3(3x - 4y) = ?$

$-5x + 10y$

11. $\frac{48}{6}(x - 3) - \frac{15}{3}(2 - x) = ?$

$13x - 34$

12. $-\frac{6}{3}(-x + 2) - \frac{42}{2(-3)}(x - 1) = ?$

$9x - 11$

13. $18 - 3(x - 6) - 2(-x) = ?$

$-x + 36$

14. $\frac{2(x-3) - 3(4 - 2x)}{1 - (-1)} = ?$

$4x - 9$

15. $\frac{4(x-3) - 2(x-1)}{2} = ?$

$x - 5$

ÖZELLİK|Property 6

Ortak Paranteze Alma | Common Monomial Factor

- $ax + bx = x \cdot (a + b)$
- $ax + bx + x = x \cdot (a + b + 1)$

Çarpım durumundaki ifadelere terim denir. Terimlerde ortak ifade var ise bu ifade, terimlerden ayrılarak çarpım durumuna getirilir.

The factors of given algebraic expression consist of two or more algebraic expressions which when multiplied together produce the given expression.

Aşağıdaki ifadeleri ortak çarpan parantezine alınız

Take the common factor in parentheses following statements.

1. $3x + mx = ?$

$x(3 + m)$

2. $ay + by - y = ?$

$y(a + b - 1)$

3. $x^2y + y^2x = ?$

$xy(x + y)$

4. $x^3y^2 + xy^3 = ?$

$xy^2(x^2 + y)$

5. $6x^2y^3 + 8x^4y^2 = ?$

$2x^2y^2(3y + 4x^2)$

6. $12a^3b^4 - 20a^2b^3 = ?$

$4a^2b^3(3ab - 5)$

7. $ax^2 + a^2x - ax = ?$

$ax(x + a - 1)$

8. $a(x - y) + 4(x - y) = ?$

$(x - y) \cdot (a + 4)$

9. $3(x - y) + 5(y - x) = ?$

$2(y - x)$

10. $a(x + y) - b(x + y) = ?$

$(a - b) \cdot (x + y)$

11. $4(a - b)^2 + 5(a - b)^3 = ?$

$(a - b)^2 \cdot [4 + 5(a - b)]$

12. $37 \cdot 23 - 37 \cdot 13 = ?$

370

13. $a(x - 3) - (x - 3) = ?$

$(a - 1)(x - 3)$

14. $m(x - y)^3 + n(y - x)^3 = ?$

$(x - y)^3 \cdot (m - n)$

15. $a(x - y)^2 + b(y - x)^2 = ?$

$(x - y)^2 \cdot (a + b)$

ÖZELLİK|Property 7

Rasyonel Sayılarda İşlem
Operations with Fractions

- **Toplama ve Çıkarma İşlemi**
  Adding and Subtracting

$$\frac{a}{\underset{(d)}{b}} \mp \frac{c}{\underset{(b)}{d}} = \frac{ad \mp bc}{bd}$$

- **Çarpma İşlemi** | Multiplying

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$$

- **Bölme İşlemi** | Dividing

$$\frac{a}{b} : \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$$

1. $\frac{1}{3}+\frac{1}{2}=?$ $\boxed{\frac{5}{6}}$

2. $\frac{3}{5}-\frac{1}{2}=?$ $\boxed{\frac{1}{10}}$

3. $\frac{2}{3}+\frac{1}{2}-\frac{1}{6}=?$ $\boxed{1}$

4. $\frac{3}{4}-\frac{6}{5}+\frac{1}{3}=?$ $\boxed{-\frac{7}{60}}$

5. $2+\frac{1}{4}=?$ $\boxed{\frac{9}{4}}$

6. $3-\frac{1}{3}=?$ $\boxed{\frac{8}{3}}$

7. $\frac{6}{5} \cdot \frac{15}{4}=?$ $\boxed{\frac{9}{2}}$

8. $\frac{2}{5}-\frac{8}{3} \cdot \frac{6}{4}=?$ $\boxed{-\frac{18}{5}}$

9. $\frac{20}{3} : \frac{15}{6}=?$ $\boxed{\frac{8}{3}}$

10. $\frac{56}{14} : \frac{18}{7}=?$ $\boxed{\frac{14}{9}}$

11. $\frac{12}{5} : \frac{6}{15}-\frac{3}{2}=?$ $\boxed{\frac{9}{2}}$

12. $\dfrac{\frac{2}{3}}{\frac{4}{15}}=?$ $\boxed{\frac{5}{2}}$

13. $\dfrac{\frac{4}{15}}{\frac{8}{20}}=?$ $\boxed{\frac{2}{3}}$

14. $\dfrac{\frac{12}{20}}{\frac{4}{10}}+\dfrac{\frac{24}{20}}{\frac{8}{15}}=?$ $\boxed{\frac{15}{4}}$

15. $\dfrac{\frac{18}{5}}{\frac{12}{10}}-\frac{6}{15} : \frac{8}{10}=?$ $\boxed{\frac{5}{2}}$

ÖZELLİK | Property 8

Denklem çözümünde bilinen sayılar eşitliğin bir tarafına, bilinmeyen x'li ifadeler eşitliğin diğer tarafına toplanır. Eşitliğin her iki tarafı aynı sayı ile toplanıp çıkarılabilir, çarpılıp bölünebilir.

When solving equations, the known numbers are collected on one side of the equation and unknown expressions involving x are collected on the other side. Both sides of the equation can be added or subtracted, multiplied or divided by the same number.

1. $2x - 5 = 13 \Rightarrow x = ?$

9

2. $3x + 2 = 11 \Rightarrow x = ?$

3

3. $2x - 8 = 6 + x \Rightarrow x = ?$

14

4. $3x + 2 = 17 - 2x \Rightarrow x = ?$

3

5. $6x - 7 + 2x = 5x + 8 \Rightarrow x = ?$

5

6. $5x + 2 - 3x = x + 6 \Rightarrow x = ?$

4

7. $3(x - 1) - 5 = x \Rightarrow x = ?$

4

8. $2 - x = 6 - 2 + 1 \Rightarrow x = ?$

−3

9. $x - 2(-4) = 2(-3) \Rightarrow x = ?$

−14

10. $2(-3) + x - 2 = -3(-4) \Rightarrow x = ?$

20

11. $3x - 4 = 2x + 5(-2) \Rightarrow x = ?$

−6

12. $x - 8 - 2(-x) = x + 2 \Rightarrow x = ?$

5

13. $2x - (-x) + 4 = x + 6 \Rightarrow x = ?$

1

14. $x - (-2) + 3x + 4 = x - 3 \Rightarrow x = ?$

−3

15. $3x + 2 - (-x) = 2x - 4 \Rightarrow x = ?$

−3

ÖZELLİK|Property 9

$\frac{a}{b} = \frac{c}{d}$ denklem sisteminde $ad = bc$

$\frac{a}{b} = \frac{c}{d}$ *in the equation system,* $ad = bc$

1. $\frac{2}{4} = \frac{x}{8}$ $\Rightarrow x = ?$ 4

2. $\frac{12}{x} = 4$ $\Rightarrow x = ?$ 3

3. $\frac{x}{4} = 2$ $\Rightarrow x = ?$ 8

4. $\frac{4}{x+1} = 2$ $\Rightarrow x = ?$ 1

5. $\frac{x+3}{2} = 4$ $\Rightarrow x = ?$ 5

6. $\frac{2x-1}{3} = \frac{x}{2}$ $\Rightarrow x = ?$ 2

7. $\frac{x-1}{2} = x+2$ $\Rightarrow x = ?$ -5

8. $\frac{x+2}{3} = -x-6$ $\Rightarrow x = ?$ -5

9. $\frac{x+1}{2} = \frac{x-1}{3}$ $\Rightarrow x = ?$ -5

10. $\frac{3}{x-2} = 6$ $\Rightarrow x = ?$ $\frac{5}{2}$

11. $\frac{x-(-1)}{2} = 4$ $\Rightarrow x = ?$ 7

12. $\frac{2x-1}{3} = 5$ $\Rightarrow x = ?$ 8

13. $\frac{x+2}{3} = \frac{2x-1}{2}$ $\Rightarrow x = ?$ $\frac{7}{4}$

14. $\frac{2x+3}{2} = \frac{x-1}{4}$ $\Rightarrow x = ?$ $-\frac{7}{3}$

15. $\frac{2(x+1)}{3} = 4$ $\Rightarrow x = ?$ 5

ÖZELLİK|Property 10

$a \in R \quad n \in N^+$

- $a^n = \underbrace{a \cdot a \cdot a \cdot \ldots\ldots \cdot a}_{\text{n tane } (n\text{-times})}$
- $x \neq 0 \qquad x^0 = 1 \qquad 0^x = 0$
- $a^{-1} = \frac{1}{a} \qquad \left(\frac{a}{b}\right)^{-1} = \frac{b}{a} \qquad a^{-n} = \frac{1}{a^n}$

1. $3^3 = ?$

27

2. $2^4 - 3^2 = ?$

7

3. $5^2 - 4^2 = ?$

9

4. $4^3 - 3^2 + 7^0 = ?$

56

5. $\left(\frac{1}{7}\right)^{-1} - 8^0 = ?$

6

6. $\frac{5^2 - 3^2}{5 - (-3)} = ?$

2

7. $4^2 - (-3^0) \cdot 2 = ?$

18

8. $3^2 - (-2)^0 \cdot 3 = ?$

6

9. $-3^2 \cdot 2 + 4 = ?$

−14

10. $(-2)^4 \cdot 3 - 2 = ?$

46

11. $3^2 \cdot (-2)^2 - (-2) = ?$

38

12. $-9^2 - 3^3 + (-8)^2 = ?$

−44

13. $\left(\frac{1}{2}\right)^{-1} + \left(\frac{3}{6}\right)^{-1} = ?$

4

14. $\left(\frac{1}{2}\right)^{-3} + \left(\frac{1}{3}\right)^{-2} = ?$

17

15. $3 \cdot \left(\frac{1}{2}\right)^{-4} - \left(\frac{1}{5}\right)^{-2} = ?$

23

ÖZELLİK|Property 11

İki Kare Farkı | Difference of Two Squares

$$a^2 - b^2 = (a - b) \cdot (a + b)$$

1. $x^2 - y^2 = ?$

$(x - y) \cdot (x + y)$

2. $a^2 - 4 = ?$

$(a - 2) \cdot (a + 2)$

3. $a^4 - 16 = ?$

$(a^2 - 4) \cdot (a^2 + 4)$

4. $4x^2 - y^2 = ?$

$(2x - y) \cdot (2x + y)$

5. $9a^2 - 4b^2 = ?$

$(3a - 2b) \cdot (3a + 2b)$

6. $x^2 - 1 = ?$

$(x - 1) \cdot (x + 1)$

7. $(7 - x) \cdot (7 + x) = ?$

$49 - x^2$

8. $x^2 - \frac{1}{x^2} = ?$

$\left(x - \frac{1}{x}\right) \cdot \left(x + \frac{1}{x}\right)$

9. $16x^2 - \frac{4}{25y^2} = ?$

$\left(4x - \frac{2}{5y}\right) \cdot \left(4x + \frac{2}{5y}\right)$

10. $\frac{1}{9} - \frac{x^2}{4} = ?$

$\left(\frac{1}{3} - \frac{x}{2}\right) \cdot \left(\frac{1}{3} + \frac{x}{2}\right)$

11. $a^6 - 4b^2 = ?$

$(a^3 - 2b) \cdot (a^3 + 2b)$

12. $\frac{9 - 4a^2}{3 - 2a} = ?$

$3 + 2a$

13. $\frac{x^2 - 4}{x + 2} + \frac{x^2 - 9}{x - 3} = ?$

$2x + 1$

14. $\frac{504^2 - 502^2}{505^2 - 501^2} = ?$

$\frac{1}{2}$

15. $(a - b)^2 - 16 = ?$

$(a - b - 4) \cdot (a - b + 4)$

ÖZELLİK|Property 12

$x^2 + ax + b$ gibi İfadeleri Çarpanlarına Ayırma

Factoring Expressions Such as $x^2 + ax + b$

$x^2 + ax + b$ $\quad b = m \cdot n$, $\quad a = m + n$

m n

$\Rightarrow x^2 + ax + b = (x + m)(x + n)$

1. $x^2 + 2x + 1 = ?$

$(x + 1) \cdot (x + 1)$

2. $x^2 + 5x + 6 = ?$

$(x + 3) \cdot (x + 2)$

3. $x^2 - 4x + 3 = ?$

$(x - 3) \cdot (x - 1)$

4. $x^2 - 8x + 12 = ?$

$(x - 6) \cdot (x - 2)$

5. $x^2 - 2x - 8 = ?$

$(x - 4) \cdot (x + 2)$

6. $x^2 - 3x - 10 = ?$

$(x - 5) \cdot (x + 2)$

7. $x^2 + 3x - 10 = ?$

$(x + 5) \cdot (x - 2)$

8. $x^2 + 7x - 18 = ?$

$(x + 9) \cdot (x - 2)$

9. $x^2 + 9x + 20 = ?$

$(x + 5) \cdot (x + 4)$

10. $x^2 - 5x + 6 = ?$

$(x - 3) \cdot (x - 2)$

11. $x^2 + 5x - 6 = ?$

$(x + 6) \cdot (x - 1)$

12. $x^2 + 4x - 12 = ?$

$(x + 6) \cdot (x - 2)$

13. $x^2 - (a + b)x + ab = ?$

$(x - a) \cdot (x - b)$

14. $x^2 + ax + b = (x - 1)(x - 3)$

$\Rightarrow a + b = ?$

-1

15. $x^2 - 16x + 4b = (x - 12) \cdot (x - 4)$

$\Rightarrow b = ?$

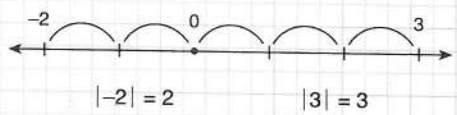
12

ÖZELLİK|Property 13

Mutlak Değer | Absolute Value

Bir sayının mutlak değeri, o sayının "0" (sıfıra) olan uzaklığıdır. Mutlak değer, daima pozitif bir sayıdır veya sıfırdır.

The absolute volue of a number is the distance from the number to the zero on the number line. The absolute volue is always positive or zero.



$|-2| = 2$ $|3| = 3$

1. $|-4| = ?$ — 4

2. $|3-8| = ?$ — 5

3. $|2+(-3)\cdot 2| = ?$ — 4

4. $|-3| + |-4| = ?$ — 7

5. $\big||-6| - |2|\big| = ?$ — 4

6. $|8-4-2-1| = ?$ — 1

7. $|-8| - |-2| + |6| = ?$ — 12

8. $\big|-7-|2|\big| = ?$ — 9

9. $\big||-2|-6\big| = ?$ — 4

10. $\big||4|-13\big| + |6-11| = ?$ — 14

11. $|(2)\cdot(-3)+1| = ?$ — 5

12. $2\cdot|6:(-3)| = ?$ — 4

13. $8-|12-(-3)\cdot(-2)| = ?$ — 2

14. $-8+|6\cdot(-1)+3\cdot 4| = ?$ — −2

15. $3\cdot 2-|1-2\cdot(-3)+4\cdot 2| = ?$ — −9

1. $3 - 2 + 1 - 6 = ?$

A) -6 B) -4 C) -2 D) 0 E) 2

2. $-2 - 5 + 3 - 1 = ?$

A) -6 B) -5 C) -4 D) -2 E) -1

3. $-(-4) - 2 + 8 = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

4. $-12 - (-4) + (-2) = ?$

A) -16 B) -14 C) -12 D) -10 E) -8

5. $6 - [3 - (-2)] - 5 = ?$

A) 6 B) 4 C) 2 D) 0 E) -4

6. $-(-2) + (-6) - [3 - (+1)] = ?$

A) -6 B) -4 C) -2 D) 0 E) 2

7. $(-6) \cdot (2) - 3 = ?$

A) -18 B) -15 C) -12 D) -10 E) -8

8. $(-8) : 2 - 3 \cdot (-2) = ?$

A) -6 B) -4 C) -2 D) 0 E) 2

9. $12 - 3[1 - 2 \cdot (-3)] = ?$

A) 33 B) 24 C) 0 D) -9 E) -12

10. $\frac{15}{5} - \frac{6}{3} = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

11. $\frac{24}{4} + \frac{18}{6} - \frac{10}{5} = ?$

A) 8 B) 7 C) 6 D) 5 E) 4

12. $\frac{16 - (-2)}{2} - \frac{14 - 2 \cdot (-1)}{4} = ?$

A) 8 B) 6 C) 5 D) 4 E) 2

13. $|-6| + |-2| = ?$

A) -8 B) -4 C) 0 D) 4 E) 8

14. $|16| - |-4| = ?$

A) 18 B) 16 C) 12 D) 10 E) 8

15. $|2 \cdot (-3) + 4| = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

16. $|-12 - 4 : 2| = ?$

A) 14 B) 12 C) 10 D) 8 E) 6

1. $2x - 4 = 8$

$\Rightarrow x = ?$

A) 6 B) 4 C) 3 D) 2 E) 1

2. $6 - 3x = 18$

$\Rightarrow x = ?$

A) -6 B) -4 C) -2 D) 2 E) 4

3. $2x - 3 - x = 18$

$\Rightarrow x = ?$

A) 21 B) 18 C) 15 D) 12 E) 6

4. $3x - (-x) + 2 = 2x - 2$

$\Rightarrow x = ?$

A) 6 B) 2 C) 0 D) -2 E) -6

5. $\frac{x}{6} = \frac{5}{2}$

$\Rightarrow x = ?$

A) 20 B) 15 C) 12 D) 10 E) 6

6. $\frac{x}{3} = 2$

$\Rightarrow x = ?$

A) 12 B) 10 C) 8 D) 6 E) 4

7. $\frac{x-1}{2} = \frac{10}{4}$

$\Rightarrow x = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

8. $\frac{x-1}{3} = \frac{x+1}{2}$

$\Rightarrow x = ?$

A) -5 B) -3 C) 0 D) 3 E) 5

9. $\frac{1}{3}-\frac{1}{2}=?$

A) $\frac{-1}{6}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $\frac{2}{3}$ E) $\frac{5}{6}$

10. $\frac{2}{3}+\frac{1}{2}+\frac{1}{6}=?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) 1 D) $\frac{4}{3}$ E) 2

11. $2-\frac{1}{2}=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

12. $3+\frac{1}{2}-\frac{1}{3}=?$

A) $\frac{5}{2}$ B) $\frac{19}{6}$ C) $\frac{23}{6}$ D) $\frac{17}{3}$ E) 6

13. $\frac{15}{4}:\frac{5}{8}=?$

A) 6 B) $\frac{3}{2}$ C) 1 D) $\frac{2}{3}$ E) $\frac{1}{3}$

14. $\frac{12}{5}:\frac{4}{15}-8=?$

A) 1 B) $\frac{7}{3}$ C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

15. $\frac{\frac{2}{3}}{\frac{5}{15}}=?$

A) $\frac{3}{2}$ B) 2 D) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

16. $\frac{\frac{1}{3}-2}{\frac{5}{6}}=?$

A) -2 B) $\frac{-1}{2}$ C) $\frac{1}{2}$ D) 1 E) 2

1. $18 - 6 : 2 - 4 \cdot (-3) = ?$

A) 15 B) 18 C) 24 D) 27 E) 32

2. $6 - 2 \cdot [4 \cdot (2 - 5) : 2] = ?$

A) – 24 B) – 12 C) 18 D) 30 E) 42

3. $8 - (-2) \cdot [-(12 - 7) - (6 - 3)] = ?$

A) –12 B) –8 C) 0 D) 8 E) 24

4. $-\{-(-[2 - 5]) + 7\} - [-(3 - 1)]^2 = ?$

A) – 8 B) – 6 C) 0 D) 6 E) 14

5. $20 \cdot (-2) - (-3) \cdot 6 + 20 : 4 = ?$

A) – 53 B) – 27 C) – 17 D) 17 E) 27

6. $4 - 3 \cdot [5 - 2 \cdot (3 - 6)] = ?$

A) – 30 B) – 29 C) – 5 D) 7 E) 37

7. $6 \cdot 2 - 2 \cdot (5 - 7) - 10 = ?$

A) – 2 B) 0 C) 2 D) 4 E) 6

8. $2 \cdot [(6 - 4) + 2 \cdot (7 + 1)] - 20 = ?$

A) – 8 B) – 2 C) 0 D) 16 E) 36

9. $9-[8-(7-5)-3]-4=?$

A) 6 B) 5 C) 4 D) 2 E) -1

10. $\frac{36\cdot 35\cdot 33}{55\cdot 63}=?$

A) 12 B) 15 C) 20 D) 25 E) 36

11. $\frac{20\cdot 36\cdot 45}{25\cdot 27\cdot 8}=?$

A) 3 B) 6 C) 12 D) 18 E) 30

12. $\frac{(-2)^2+(-3)-(-5)}{-1^2-2}=?$

A) -1 B) -2 C) -3 D) -4 E) -6

13. $\frac{(2\cdot 3)^2}{2\cdot 3^2}+4^0=?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $\frac{(-6)-(-2)^2\cdot(-3)}{-2^2+2}=?$

A) -3 B) -2 C) 0 D) 1 E) 3

15. $\frac{(-16)^0-(-2)+(-3)}{4-3^2}=?$

A) $-\frac{1}{5}$ B) $-\frac{1}{13}$ C) 0 D) $\frac{1}{13}$ E) 2

16. $\frac{(2^0\cdot 3)^2-3}{-[4+(-1)]^0}=?$

A) -6 B) -2 C) 0 D) 2 E) 3

1. $5 \cdot (y - x - 3) + 3 \cdot [2(x - y) + 5] = ?$

A) $x - y$ B) $y + x$ C) $x - y - 30$
D) $y - x$ E) $y - x + 30$

2. $2a + 3 \cdot (a + b) - 2 \cdot (a + b) - b = ?$

A) $3a$ B) $2a+4b$ C) $a+3b$
D) $2a+3b$ E) $3a+4b$

3. $3 \cdot (2x - 3y) + 4 \cdot [2y - 2 \cdot (x + 4)] + 2 \cdot (x + y) = ?$

A) $-2x - y + 16$ B) $x - 16$
C) $y + 16$ D) $y - 32$
E) $2x + y$

4. $3a - 4 + 9b - 5 \cdot (2b - a) - 2 \cdot (3a - 2) = ?$

A) $-8a - b - 8$ B) $-8a - b$ C) $b - a$
D) $2a - b$ E) $2a$

5. $-\{x - [2x - (3x + 4x) - x] - 5x\} + 6x = ?$

A) $2x$ B) $3x$ C) $4x$ D) $5x$ E) $6x$

6. $-2y \cdot [-(4y - 2y + x)] - 2xy = ?$

A) $4y^2$ B) $4y$ C) $-4xy$
D) $4y - 4x$ E) $-4y^2$

7. $2 \cdot (-x + 4x) - \{-[3x + 2x - 3 \cdot (x - 2x)]\} = ?$

A) $-2x$ B) 0 C) $4x$ D) $8x$ E) $14x$

8. $\frac{1}{2} - \frac{5}{6} + \frac{3}{4} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{5}{12}$ D) $\frac{1}{2}$ E) $\frac{7}{12}$

9. $\frac{3}{4}:\left(\frac{3}{4}-\frac{5}{6}-\frac{2}{3}\right)=?$

A) $-\frac{16}{10}$ B) -2 C) -1 D) 2 E) $\frac{4}{3}$

10. $\frac{7}{3}-\left[\left(\frac{5}{3}\right)+\left(-\frac{4}{3}\right)\right]=?$

A) -1 B) $\frac{3}{2}$ C) 1 D) 2 E) $\frac{16}{3}$

11. $\frac{3}{2}-\frac{1}{2}:\frac{3}{5}+\frac{5}{4}\cdot\frac{1}{3}=?$

A) $\frac{3}{4}$ B) $\frac{5}{6}$ C) $\frac{11}{12}$ D) 1 E) $\frac{13}{12}$

12. $\frac{x\cdot y^2}{y^3}-\frac{x}{y}+\frac{x^3}{x}=?$

A) $\frac{y}{x}$ B) $\frac{x}{y}$ C) x D) x^2 E) $\frac{1}{x}$

13. $\frac{x^3\cdot y^2}{x^2y}+\frac{(x+y)\cdot x^3}{x^2}-\frac{xy^3}{y^2}=?$

A) $x\cdot y$ B) $x\cdot y^2$ C) $x\cdot(x+y)$ D) $(x+y)\cdot x-\frac{x}{y}$ E) $x-y$

14. $\frac{x^2\cdot y^2}{y^3}-\frac{(x^2-y)}{y}=?$

A) x^2-y B) -1 C) 0 D) 1 E) $\frac{x^2-y}{y}$

15. $\frac{[(-1)+(-3)]^2-2^2\cdot 3}{4:2}=?$

A) -2 B) -1 C) 0 D) 1 E) 2

16. $\frac{4\cdot[20-(4-7)+27]\cdot(6^2-8)}{(3^2-6^0)\cdot(9^2-11)}=?$

A) 1 B) 2 C) 4 D) 6 E) 10

1. $3^2 - 2^2 = ?$

A) 14 B) 13 C) 9 D) 5 E) 4

2. $2^3 \cdot (-2)^2 - (-1) = ?$

A) 34 B) 33 C) 32 D) – 33 E) – 31

3. $2 \cdot \left(\frac{-1}{3}\right)^{-2} - \left(\frac{1}{2}\right)^{-1} = ?$

A) 18 B) 16 C) –16 D) –18 E) – 20

4. $\frac{2(x-1)}{3} = 4$

$\Rightarrow x = ?$

A) 10 B) 9 C) 7 D) 5 E) 3

5. $2x - 3(x - 1) = ?$

A) –x B) x – 3 C) x + 3

D) – x + 3 E) – x – 3

6. $2(x - 4) - 3(3 - 2x) = ?$

A) 8x – 17 B) 4x – 15 C) – 4x – 17

D) 4x – 17 E) 3x – 6

7. $\frac{2(x-y)+3(y-x)}{x-y} = ?$

A) 2x – 2y B) –1 C) 1

D) x + y E) y – x

8. $3(a - b)^2 - (b - a)^2 = ?$

A) 4(b – a) B) $(b - a)^2$ C) $2(a - b)^2$

D) 2(b – a) E) 2(a – b)

9. $|3 + (-2) \cdot (5)| = ?$

A) 13 B) 7 C) 6 D) 4 E) 3

10. $3x - 6 = 2x - (2) \cdot (-4)$

$\Rightarrow x = ?$

A) 14 B) 12 C) 11 D) 10 E) 8

11. $-2^2 - 3^{-1} + (-5)^0 = ?$

A) $\frac{-10}{3}$ B) $\frac{-1}{3}$ C) $\frac{14}{3}$ D) $\frac{1}{12}$ E) $\frac{5}{12}$

12. $\frac{16}{2}(x-3) + \frac{10}{2}(x-2) = ?$

A) $3x - 5$ B) $13x - 34$ C) $15x - 20$

D) $15x - 33$ E) $10x - 8$

13. $\frac{y(x-2) - (x-2)}{x-2} = ?$

A) $(y-1)(x-2)$ B) $(y-1)(x-3)$ C) $y - 1$

D) $(x-2)$ E) $y + 1$

14. $-2 \cdot (-4) - 3[-3 - (-1)] = ?$

A) 18 B) 16 C) 14 D) 12 E) 10

15. $\frac{2x-1}{3} = \frac{x+1}{2}$

$\Rightarrow x = ?$

A) 8 B) 7 C) 6 D) 5 E) 2

16. $\frac{\frac{5}{6} : \frac{10}{3}}{\frac{1}{2} + 1} = ?$

A) 6 B) 3 C) 1 D) $\frac{1}{3}$ E) $\frac{1}{6}$

TEMEL KAVRAMLAR BASIC TERMS

Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	A	D	E	A	B	E	D	D	B	C	E	C	E	A

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	A	D	B	D	A	A	A	D	C	B	A	A	B	A

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	B	A	C	B	E	D	D	A	B	B	C	A	C	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	A	D	D	C	A	E	C	C	D	E	D	C	D	E	E

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	B	B	C	D	A	B	C	B	A	A	B	C	C	D	E

RASYONEL SAYILAR
RATIONAL NUMBERS

ÖZELLİK | Property 1

Rasyonel Sayılarda İşlem | Operations with Fractions

$$Q = \left\{ \frac{a}{b} \mid a, b \in Z \quad b \neq 0 \right\}$$

Paydalar aynı ise *(with same denominators)*

- $\frac{a}{b} \mp \frac{c}{b} = \frac{a \mp c}{b}$

Paydalar farklı ise *(with not the same denominators)*

- $\frac{a}{b} \mp \frac{c}{d} = \frac{ad \mp bc}{bd}$ (d) (b)

1. $\frac{2}{5} - \frac{1}{2} = ?$ $\boxed{-\frac{1}{10}}$

2. $\frac{3}{2} - \frac{1}{3} = ?$ $\boxed{\frac{7}{6}}$

3. $\frac{7}{5} + \frac{1}{6} = ?$ $\boxed{\frac{47}{30}}$

4. $\frac{4}{5} + \frac{6}{8} = ?$ $\boxed{\frac{31}{20}}$

5. $\frac{7}{18} - \frac{2}{9} = ?$ $\boxed{\frac{1}{6}}$

6. $\frac{7}{8} + \frac{9}{6} = ?$ $\boxed{\frac{19}{8}}$

7. $\frac{5}{7} - \frac{3}{14} = ?$ $\boxed{\frac{1}{2}}$

8. $\frac{1}{7} - \frac{1}{3} = ?$ $\boxed{-\frac{4}{21}}$

9. $\frac{4}{3} + \frac{1}{4} - \frac{1}{2} = ?$ $\boxed{\frac{13}{12}}$

10. $\frac{1}{3} + \frac{3}{4} + \frac{5}{6} = ?$ $\boxed{\frac{23}{12}}$

11. $\frac{1}{2} + \frac{1}{5} - \frac{1}{3} = ?$ $\boxed{\frac{11}{30}}$

12. $\frac{1}{3} - \frac{1}{2} + \frac{1}{5} = ?$ $\boxed{\frac{1}{30}}$

13. $\frac{5}{4} + \frac{1}{2} - \frac{1}{3} = ?$ $\boxed{\frac{17}{12}}$

14. $\frac{2}{5} - \frac{1}{10} + \frac{3}{15} = ?$ $\boxed{\frac{1}{2}}$

15. $\frac{2}{5}+\frac{3}{2}-\frac{1}{4}=?$ $\boxed{\frac{33}{20}}$

16. $\frac{9}{5}-\frac{3}{4}+\frac{7}{10}=?$ $\boxed{\frac{7}{4}}$

17. $\frac{2}{5}+\frac{1}{2}-\frac{2}{4}+\frac{3}{10}=?$ $\boxed{\frac{7}{10}}$

18. $\left(\frac{3}{6}-\frac{1}{4}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)=?$ $\boxed{\frac{5}{12}}$

19. $\left(\frac{1}{2}-\frac{1}{3}\right)+\left(\frac{1}{3}-\frac{1}{4}\right)=?$ $\boxed{\frac{1}{4}}$

20. $\left(\frac{8}{5}-\frac{3}{10}\right)+\left(\frac{1}{4}-\frac{1}{8}\right)=?$ $\boxed{\frac{57}{40}}$

21. $\left(\frac{2}{7}-\frac{3}{5}\right)-\left(\frac{2}{5}+\frac{2}{7}\right)=?$ $\boxed{-1}$

22. $\frac{24}{88}-\frac{42}{77}=?$ $\boxed{-\frac{3}{11}}$

23. $\frac{15}{10}+\frac{16}{20}-\frac{12}{8}=?$ $\boxed{\frac{4}{5}}$

24. $\frac{15}{20}+\frac{42}{30}-\frac{56}{40}=?$ $\boxed{\frac{3}{4}}$

25. $\frac{17}{51}+\frac{19}{57}-\frac{13}{39}=?$ $\boxed{\frac{1}{3}}$

26. $\frac{72}{90}-\frac{24}{40}+\frac{24}{36}=?$ $\boxed{\frac{13}{15}}$

27. $\left(\frac{15}{6}-\frac{20}{16}+\frac{4}{6}\right)+\frac{4}{3}=?$ $\boxed{\frac{13}{4}}$

28. $\left(\frac{1}{3}-\frac{1}{2}+\frac{1}{5}\right)-\left(\frac{1}{3}+\frac{3}{2}-\frac{4}{5}\right)=?$ $\boxed{-1}$

29. $\frac{2}{3}+\frac{2}{4}-\frac{3}{2}-\frac{3}{6}=?$ $\boxed{-\frac{5}{6}}$

30. $\frac{16}{56}+\frac{35}{49}-\frac{14}{35}-\frac{9}{15}=?$ $\boxed{0}$

ÖZELLİK | Property 2

Rasyonel Sayılarda İşlem | Operations with Fractions

- Çarpma *(Multiplication)*

$$\frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}$$

- Bölme *(Division)*

$$\frac{a}{b}:\frac{c}{d}=\frac{a}{b}\cdot\frac{d}{c}=\frac{a\cdot d}{b\cdot c}$$

1. $\frac{3}{4}\cdot\frac{2}{5}=?$ $\boxed{\frac{3}{10}}$

2. $\frac{2}{3}\cdot\frac{15}{4}=?$ $\boxed{\frac{5}{2}}$

3. $\frac{4}{10}\cdot\frac{5}{2}=?$ $\boxed{1}$

4. $\frac{3}{10}\cdot\frac{5}{2}=?$ $\boxed{\frac{3}{4}}$

5. $\frac{21}{48}\cdot\frac{24}{7}=?$ $\boxed{\frac{3}{2}}$

6. $\frac{1}{2}\cdot\frac{3}{4}\cdot\frac{2}{9}=?$ $\boxed{\frac{1}{12}}$

7. $\frac{3}{8}\cdot\frac{4}{9}\cdot\frac{6}{2}=?$ $\boxed{\frac{1}{2}}$

8. $\frac{2}{15}\cdot\frac{5}{3}\cdot\frac{9}{4}=?$ $\boxed{\frac{1}{2}}$

9. $\frac{4}{9}\cdot\frac{3}{7}\cdot\frac{14}{5}=?$ $\boxed{\frac{8}{15}}$

10. $\frac{4}{9}:\frac{2}{3}=?$ $\boxed{\frac{2}{3}}$

11. $\frac{2}{7}:\frac{3}{14}=?$ $\boxed{\frac{4}{3}}$

12. $\frac{16}{15}:\frac{8}{5}=?$ $\boxed{\frac{2}{3}}$

13. $\frac{16}{27}:\frac{4}{9}=?$ $\boxed{\frac{4}{3}}$

14. $\frac{48}{16}:\frac{32}{10}=?$ $\boxed{\frac{15}{16}}$

15. $\dfrac{\frac{15}{10}}{\frac{10}{12}} = ?$ $\boxed{\frac{9}{5}}$

16. $\dfrac{\frac{1}{2}+\frac{2}{3}}{\frac{1}{4}-\frac{1}{6}} = ?$ $\boxed{14}$

17. $\frac{6}{15} - \frac{1}{2} : \frac{3}{4} = ?$ $\boxed{-\frac{4}{15}}$

18. $\frac{2}{7} - \frac{6}{7} : \left(-\frac{6}{5}\right) = ?$ $\boxed{1}$

19. $\frac{5}{11} \cdot \frac{22}{15} : \frac{2}{3} = ?$ $\boxed{1}$

20. $\left(\frac{81}{64} \cdot \frac{8}{9}\right) : \frac{3}{2} = ?$ $\boxed{\frac{3}{4}}$

21. $\frac{1}{3} : \left(\frac{6}{4} \cdot \frac{1}{3} + \frac{1}{2}\right) = ?$ $\boxed{\frac{1}{3}}$

22. $\dfrac{4}{\frac{4}{3}+\frac{1}{3}} = ?$ $\boxed{\frac{12}{5}}$

23. $\frac{3}{4} : \left(\frac{1}{2} - \frac{1}{6}\right) = ?$ $\boxed{\frac{9}{4}}$

24. $\dfrac{\frac{3}{2}+\frac{2}{3}}{\frac{1}{2}:2} = ?$ $\boxed{\frac{26}{3}}$

25. $\dfrac{\frac{3}{2}}{6} - \dfrac{2}{\frac{4}{5}} = ?$ $\boxed{-\frac{9}{4}}$

26. $\left[\left(-\frac{1}{2}\right) + (-3) \cdot \frac{1}{5}\right] : \frac{2}{5} = ?$ $\boxed{-\frac{11}{4}}$

27. $\left(\frac{3}{2} + \frac{1}{2}\right) \cdot \frac{3}{4} + \left(\frac{1}{5} + \frac{2}{5}\right) : \frac{4}{15} = ?$ $\boxed{\frac{15}{4}}$

28. $\left(\frac{1}{3} : \frac{4}{3}\right) - \left(\frac{15}{4} \cdot \frac{3}{20}\right) = ?$ $\boxed{-\frac{5}{16}}$

29. $\left(\frac{4}{3} : \frac{5}{3} - \frac{1}{5}\right) \cdot 10 = ?$ $\boxed{6}$

30. $\left(\frac{1}{3} \cdot 2\right) - \left(2 : \frac{2}{3}\right) = ?$ $\boxed{-\frac{7}{3}}$

ÖZELLİK|Property 3

Tamsayılı Kesir | Mixed Number

$a \geq b > 0$ olmak üzere $\frac{a}{b}$ bileşik kesrinin payı (a), paydası (b) ye bölündüğünde bölüm c, kalan d ise $\frac{a}{b} = c\frac{d}{b}$ olarak yazılır.

Change the improper fraction to a mixed number.
Divide the numerator by the denominator to find the whole number if there is a remainder, write it over the denominator to form the fraction part $\frac{a}{b} = c\frac{d}{b}$ *where c is the quotient remainder is d in order words;*

$$c\frac{d}{b} = c + \frac{d}{b}$$

Örnek | Example

$\frac{11}{5}$ $\quad$ $11 \mid 5$ / $10 \mid 2$ / 1 $\quad$ $\frac{11}{5} = 2\frac{1}{5}$

1. $2\frac{3}{4} = ?$ $\quad$ $\frac{11}{4}$

2. $2\frac{1}{5} + 2\frac{2}{5} = ?$ $\quad$ $\frac{23}{5}$

3. $2\frac{4}{3} - 3 \cdot \frac{1}{6} = ?$ $\quad$ $\frac{17}{6}$

4. $2\frac{3}{4} - \frac{1}{2} + 1 = ?$ $\quad$ $\frac{13}{4}$

5. $\frac{2\frac{1}{2}}{3\frac{1}{3}} = ?$ $\quad$ $\frac{3}{4}$

6. $2\frac{3}{4} - 2\frac{3}{2} + \frac{1}{4} = ?$ $\quad$ $-\frac{1}{2}$

7. $3\frac{6}{11} + 2\frac{5}{11} = ?$ $\quad$ 6

8. $5\frac{2}{27} + 6\frac{25}{27} = ?$ $\quad$ 12

ÖZELLİK|Property 4

Rasyonel ifadeler basamak halinde ise işlem öncelik sırasına dikkat edilir. İlk önce çarpma veya bölme, sonra toplama veya çıkarma işlemi yapılır.

If rational expressions are in the form of step wise, the order of operation is followed firstly multiplication, division, addition and subtraction respectively.

1. $\frac{2}{1 - \frac{1}{3}} = ?$ $\quad$ 3

2. $2 + \frac{1}{2 - \frac{1}{2}} = ?$ $\quad$ $\frac{8}{3}$

3. $\frac{1}{1 - \frac{2}{3 + \frac{1}{2}}} = ?$ $\quad$ $\frac{7}{3}$

4. $\frac{2 - \frac{2}{3}}{2 + \frac{3}{4}} = ?$ $\quad$ $\frac{11}{18}$

5. $3 - \frac{6 - \frac{1 + \frac{1}{2}}{4}}{3} = ?$ $\quad$ $\frac{9}{8}$

6. $2 - \frac{2 - \frac{1}{2}}{1 + \frac{1}{3}} = ?$ $\quad$ $\frac{7}{8}$

7. $1 - \frac{1 + \frac{1 - \frac{1}{2}}{3}}{4} = ?$ $\quad$ $\frac{17}{24}$

8. $3 - \frac{1 + \frac{3}{4}}{1 - \frac{1}{2}} = ?$ $\quad$ $-\frac{1}{2}$

ÖZELLİK|Property 5

Sonsuz İfadeler | Infinive Fractions

$$a+\cfrac{b}{\boxed{a+\cfrac{b}{a+\cfrac{b}{\ddots}}}} = x \text{ olur } (is\ true) \quad \longrightarrow x \text{ denirse } (if\ we\ say\ x)$$

Örnek *(Example)*

$8+\cfrac{9}{8+\cfrac{9}{8+\cfrac{9}{\ddots}}}$ denklemi *(The* $8+\cfrac{9}{8+\cfrac{9}{8+\cfrac{9}{\ddots}}}$ *equation)*

$8+\frac{9}{x}=x$ haline getirilerek çözülür.

($8+\frac{9}{x}=x$ then the equation is solved by simplifying it)

1. $4+\cfrac{4+\cfrac{5}{\ddots}}{4+\cfrac{5}{5}} = ?$ — 5

2. $7+\cfrac{8}{7+\cfrac{8}{7+\cfrac{8}{\ddots}}} = ?$ — 8

3. $1+\cfrac{1+\cfrac{3}{\ddots}}{1+\cfrac{3}{3}} = ?$ — $\frac{3}{2}$

4. $2+\cfrac{8}{2+\cfrac{8}{2+\cfrac{8}{\ddots}}} = ?$ — 4

ÖZELLİK|Property 6

Ondalıklı Sayılar

Paydası 10'un pozitif sayı kuvveti olan rasyonel sayılara ondalıklı sayı denir.

$\frac{a}{b}$ rasyonel sayısında a'nın b'ye bölünmesiyle elde edilen bölüme ondalık açılım denir.

Decimal Numbers

Decimal numbers are another way of writing fractions and mixed numbers.
All numbers to the left of decimal point are whole numbers.
All numbers to the right of the decimal point are fractions with denominators of only powers of 10 notation.

- $\frac{a}{10^n} = 0,\underbrace{0000.....}_{\text{n tane } (times)}a$
- $\frac{a}{10} = 0,a$ $\qquad a,b = \frac{ab}{10} = a+\frac{b}{10}$
- $\frac{a}{100} = 0,0a$ $\qquad a,bc = \frac{abc}{100} = a+\frac{bc}{100}$

$0,x = 0,x0 = 0,x00 = ...$

Aşağıdaki sayıları ondalıklı sayı haline çeviriniz.

Convert the number below to the decimal number.

1. $\frac{1}{2} = ?$ — 0,5

2. $\frac{3}{4} = ?$ — 0,75

3. $\frac{4}{25} = ?$ — 0,16

4. $\frac{3}{5} = ?$ — 0,6

5. $\frac{7}{125} = ?$ — 0,056

6. $\frac{3}{8} = ?$ — 0,375

7. $\frac{13}{4} = ?$ — 3,25

8. $\frac{17}{8} = ?$ — 2,125

ÖZELLİK | Property 7

- **Ondalık Sayılarda Toplama ve Çıkarma İşlemi**
  Adding and Subtracting Decimals

  Ondalıklı sayılarda toplama ve çıkarma işlemi yapılırken virgüller alt alta gelecek şekilde yazılarak işlem yapılır.

  To add or subtract decimals: Write in columns with decimal points aligned. Insert zeros on the right if necessory. Add or subtract. Align the decimal pant in the answer.

- **Ondalık Sayılarda Çarpma İşlemi**
  Multiplying Decimals

  Çarpma işlemi virgüller yokmuş gibi yapılıp virgülden sonraki basamak sayısı kadar virgül kaydırılır.

  Multiply the numbers as if they were whole numbers. Count the number of decimal places in each factor. The total of the decimal places is the number of decimal places in the product. Insert zeros on the left if necessary

- **Ondalık Sayılarda Bölme İşlemi**
  Dividing Decimals

  Bölme işleminde ifade 10'un uygun kuvveti ile genişletilerek virgülden kurtarılır.

  If the divisor is not a whole number, move the decimal point in both the divisor and dividend to the right as many places as necessary to make the divisor a whole number. Place the decimal point in the quotient above the decimal point in the dividend.

1. 0,5 + 7,2 = ?

7,7

2. 3,2 + 5,7 = ?

8,9

3. 2,73 + 35,8 = ?

38,53

4. 25,24 + 7,48 = ?

32,72

5. 2,7 – 1,92 = ?

0,78

6. 14,8 – 10,9 = ?

3,9

7. 3,2 · 2,7 = ?

8,64

8. 1,2 · 3,05 = ?

3,66

9. 2,3 + 3,1 = ?

5,4

10. 23,09 · 0,1 = ?

2,309

11. 3,27 · 2,4 = ?

7,848

12. (2,9 + 3,4) · 1,2 = ?

7,56

13. (12,1 – 2,1) · (32,45) = ?

324,5

14. (2 + 0,43) : (3 – 2,55) = ?

$\frac{27}{5}$

15. $(6{,}4 \cdot 2{,}5) - (2{,}15) = ?$

13,85

16. $(0{,}7 \cdot 0{,}3) + (1{,}4 \cdot 0{,}9) = ?$

1,47

17. $\frac{0{,}0028}{0{,}007} = ?$

$\frac{2}{5}$

18. $\frac{0{,}009}{0{,}081} = ?$

$\frac{1}{9}$

19. $\frac{0{,}042}{0{,}007} = ?$

6

20. $\frac{2{,}1}{0{,}07} = ?$

30

21. $\frac{0{,}39}{1{,}3} + \frac{0{,}2}{0{,}05} = ?$

4,3

22. $\frac{0{,}18}{0{,}06} + \frac{0{,}05}{0{,}20} = ?$

$\frac{13}{4}$

23. $\frac{0{,}4}{0{,}04} + \frac{0{,}06}{0{,}03} + \frac{6}{0{,}6} = ?$

22

24. $\frac{6{,}4}{1{,}6} - \frac{12}{0{,}6} + \frac{0{,}16}{0{,}02} = ?$

-8

25. $\frac{0{,}04}{0{,}012} \cdot \frac{0{,}0036}{0{,}008} = ?$

$\frac{3}{2}$

26. $\frac{0{,}027}{0{,}0008} \cdot \frac{0{,}04}{0{,}03} = ?$

45

27. $\frac{0{,}006}{0{,}064} : \frac{0{,}072}{1{,}6} = ?$

$\frac{25}{12}$

28. $\frac{2{,}42}{0{,}8} : \frac{0{,}11}{0{,}16} = ?$

$\frac{22}{5}$

29. $\frac{0{,}018}{0{,}01} : \frac{0{,}09}{0{,}2} = ?$

4

30. $\frac{0{,}0xy}{0{,}00xy} + \frac{ab}{0{,}ab} = ?$

110

ÖZELLİK|Property 8

■ Devirli Ondalık Sayılar

Bir rasyonel sayı ondalıklı sayı biçiminde yazıldığında sayının ondalık kısmındaki rakamlar belli bir kurala göre tekrar ediyorsa bu sayıya devirli ondalıklı sayı denir ve tekrarlanan kısmın üzeri çizilir.

■ Repeating Periodical Decimals

Every rational number either as a terminating or as a repeating periodically decimal is written in the form of a decimal number and the repeated decimals by the drawing a line segment over the digits which are repeated.

$$0,\overline{x} = 0,xxx...$$

$$x,y\overline{zt} = x,yztztzt...$$

■ Devirli Ondalıklı Sayının Rasyonel Sayıya Dönüştürülmesi

Changing of Repeating Periodical Decimal Number to Rational Number

$$\frac{\text{Sayının tamamı} - \text{Devretmeyen kısım}}{\text{Virgülden sonra devreden rakam sayısı kadar 9 devretmeyen rakam sayısı kadar 0 yazılır.}}$$

$$\frac{\textit{The whole of the number} - \textit{Non-repeating part}}{\textit{After the decimal point as many nines as the number of repeating digits and as many zeros as the number of non-repeating digits are written.}}$$

$$ab,\overline{cde} = \frac{abcde - abc}{990}$$

$$= ab + \frac{cde - c}{990}$$

Devirli ondalıklı sayıda devreden rakam sadece 9 ise 9'un solundaki ilk rakam sayısal değeri bakımından 1 artırılıp 9 atılır.

If the repeating numer is only 9 at repeating decimal number, the first number at the left of 9 is increased 1 in numerical value and 9 is erased.

$$0,\overline{9} = 1$$

$$3,4\overline{9} = 3,5$$

1. $\frac{1}{3} = ?$ $0,\overline{3}$

2. $0,44444... = ?$ $\frac{4}{9}$

3. $3,\overline{7} = ?$ $\frac{34}{9}$

4. $0,\overline{15} = ?$ $\frac{15}{99}$

5. $1,0\overline{2} = ?$ $1\frac{1}{45}$

6. $2,\overline{15} = ?$ $2\frac{5}{33}$

7. $0,\overline{372} = ?$ $\frac{124}{333}$

8. $3,0\overline{42} = ?$ $3\frac{7}{165}$

9. $12,3\overline{5} = ?$ $12\frac{16}{45}$

10. $0,12\overline{13} = ?$ $\frac{1201}{9900}$

11. $2,\overline{612} = ?$ $2\frac{68}{111}$

12. $2,3\overline{12} = ?$

$2\frac{103}{330}$

13. $26,\overline{45} = ?$

$26\frac{5}{11}$

14. $7,0\overline{12} = ?$

$7\frac{2}{165}$

15. $0,\overline{2} + 0,\overline{3} = ?$

$\frac{5}{9}$

16. $2,\overline{1} + 3,\overline{4} = ?$

$5\frac{5}{9}$

17. $1,\overline{3} - 0,\overline{4} = ?$

$\frac{8}{9}$

18. $12,0\overline{7} - 1,6\overline{1} = ?$

$10\frac{7}{15}$

19. $2,8\overline{7} + 24,0\overline{1} = ?$

$26\frac{8}{9}$

20. $1,245454545... = ?$

$\frac{137}{110}$

21. $2,\overline{45} + 3,\overline{54} = ?$

6

22. $0,6\overline{45} + 0,3\overline{54} = ?$

1

23. $\frac{0,2\overline{4} + 2,0\overline{4}}{0,0\overline{8}} = ?$

$\frac{103}{4}$

24. $\frac{2 + 1,\overline{7}}{0,\overline{6} - 0,\overline{4}} = ?$

17

25. $\frac{0,1\overline{4} + 0,\overline{2}}{1,\overline{4} - 1,\overline{2}} = ?$

$\frac{33}{20}$

26. $\frac{(1,\overline{1} + 2,\overline{2} + 3,\overline{3})}{4,\overline{4}} = ?$

$\frac{3}{2}$

27. $\frac{64}{45} = 1,4\overline{a}$

$\Rightarrow a = ?$

2

ÖZELLİK|Property 9

Rasyonel Sayılarda Sıralama
Sorting Rational Numbers

- Verilen rasyonel sayılar uygun sayılarla genişletilerek pay veya paydası eşitlenir.

  Paydaları eşit ise payı en büyük olan büyüktür.

  Payları eşit ise paydası en küçük olan en büyüktür.

The numerator or the denominate is made equal by expanding the given rational numbers with suitable numbers.

If the denominators are equal, the number with the biggest numerator is bigger.

If the numerators are equal, the number with the smallest denominator is bigger.

$\frac{1}{5} < \frac{3}{5} < \frac{4}{5}$, $\frac{2}{7} > \frac{2}{9} > \frac{2}{11}$

- Pay ile payda arasındaki fark sabitse payı büyük olan sayı 1'e daha yakındır.

If the difference between the numerator and the denominator are equal, then the number with larger numerator is closer to 1.

$a = \frac{13}{11}$ $b = \frac{15}{13}$ $c = \frac{17}{15}$

$a = 1 + \frac{2}{11}$ $b = 1 + \frac{2}{13}$ $c = 1 + \frac{2}{15}$

$c < b < a$

$a = \frac{11}{13}$ $b = \frac{13}{15}$ $c = \frac{15}{17}$

$a = 1 - \frac{2}{13}$ $b = 1 - \frac{2}{15}$ $c = 1 - \frac{2}{17}$

$a < b < c$

- Negatif rasyonel sayılarda sıralama yapılıyor ise sayılar pozitif gibi düşünülerek sıralama yapılır ve bulunan sıralamanın tam tersi alınır.

If negative rational numbers are being ordered, they are ordered as if they were positive numbers, and then the obtained sorting is reversed.

1. $a = \frac{3}{7}$ $b = \frac{2}{7}$ $c = \frac{6}{7}$

$\Rightarrow ? < ? < ?$

$b < a < c$

PUZA YAYINLARI

2. $a = -\frac{8}{11}$ $b = -\frac{4}{11}$ $c = -\frac{7}{11}$

$\Rightarrow ? < ? < ?$

$a < c < b$

3. $a = \frac{7}{9}$ $b = \frac{7}{12}$ $c = \frac{7}{10}$

$\Rightarrow ? < ? < ?$

$b < c < a$

PUZA YAYINLARI

4. $a = -\frac{5}{6}$ $b = -\frac{5}{12}$ $c = -\frac{5}{8}$

$\Rightarrow ? < ? < ?$

$a < c < b$

5. $a = \frac{5}{6}$ $b = \frac{3}{4}$ $c = \frac{7}{12}$

$\Rightarrow ? < ? < ?$

$c < b < a$

PUZA YAYINLARI

6. $a = \frac{1}{2}$ $b = \frac{2}{5}$ $c = \frac{3}{7}$

$\Rightarrow ? < ? < ?$

$b < c < a$

7. $a = \frac{3}{4}$ $b = \frac{1}{2}$ $c = \frac{4}{5}$

$\Rightarrow ? < ? < ?$

$b < a < c$

PUZA YAYINLARI

8. $x = \frac{1}{12}$ $y = \frac{4}{11}$ $z = \frac{2}{9}$

$\Rightarrow ? < ? < ?$

$x < z < y$

9. $a = \frac{3}{8}$ $b = \frac{15}{17}$ $c = \frac{6}{13}$

$\Rightarrow ? < ? < ?$

$a < c < b$

10. $a = \frac{5}{7}$ $b = \frac{7}{9}$ $c = \frac{3}{11}$

$\Rightarrow ? < ? < ?$

$c < a < b$

11. $a = \frac{17}{14}$ $b = \frac{23}{20}$ $c = \frac{20}{17}$

$\Rightarrow ? < ? < ?$

$b < c < a$

12. $a = -\frac{39}{34}$ $b = -\frac{101}{96}$ $c = -\frac{73}{68}$

$\Rightarrow ? < ? < ?$

$a < c < b$

13. $a = \frac{2002}{2001}$ $b = \frac{1996}{1995}$ $c = \frac{1008}{1007}$

$\Rightarrow ? < ? < ?$

$a < b < c$

14. $a = \frac{13}{14}$ $b = \frac{108}{109}$ $c = \frac{125}{126}$

$\Rightarrow ? < ? < ?$

$a < b < c$

15. $a = -\frac{1997}{1998}$ $b = -\frac{191}{192}$ $c = -\frac{87}{88}$

$\Rightarrow ? < ? < ?$

$a < b < c$

16. $a = -\frac{121}{124}$ $b = -\frac{1001}{1004}$ $c = -\frac{355}{358}$

$\Rightarrow ? < ? < ?$

$b < c < a$

17. $x < 0$

$a = \frac{x}{8}$ $b = -\frac{x}{12}$ $c = \frac{x}{14}$

$\Rightarrow ? < ? < ?$

$a < c < b$

18. $a < 0 < b < c$

$x = \frac{a}{c}$ $y = \frac{c}{b}$ $z = \frac{a}{b}$

$\Rightarrow ? < ? < ?$

$z < x < y$

19. $x < y < 0 < z$

$a = -\frac{x}{7}$ $b = -\frac{y}{7}$ $c = -\frac{z}{7}$

$\Rightarrow ? < ? < ?$

$c < b < a$

ÖRNEK SORU TÜRLERİ EXAMPLARY QUESTION TYPES

1. $\frac{2}{3}+\frac{22}{33}+\frac{222}{333}=?$

2

2. $\frac{2}{7}+\frac{3}{11}+\frac{5}{13}=x$

$\Rightarrow \frac{3}{7}+\frac{5}{11}+\frac{16}{13}$

toplamının x cinsinden ifadesi nedir?

What is the sum of $\frac{3}{7}+\frac{5}{11}+\frac{16}{13}$ *in terms of x?*

4 – 2x

3. $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=3$

$\Rightarrow \frac{2x+1}{x}+\frac{3y+1}{y}-\frac{4z-1}{z}=?$

4

4. $x, y \in R$

$\frac{2x-3y}{y-4}=0$

$\Rightarrow$ x kaç olamaz?

can not be the value of "x"?

6

5. $a = 7,38\overline{4}$

$b = 7,3\overline{84}$

$c = 7,\overline{384}$

$d = 7,384$

$\Rightarrow ? < ? < ? < ?$

d < c < a < b

6. $x, y \in Z$

$\frac{1}{x-3}+\frac{1}{x+y-4}=1$

$\Rightarrow x + y = ?$

6

7. $a, b, c \in Z$

$a+\frac{1}{b+\frac{1}{c}}=\frac{15}{4}$

$\Rightarrow a + b + c = ?$

7

8. $2+\frac{2-\frac{2+\frac{2-\frac{\cdot\cdot\cdot}{3}}{3}}{3}}{3}=?$

$\frac{12}{5}$

ÖRNEK SORU TÜRLERİ EXAMPLARY QUESTION TYPES

9. $x \in Z^+$

$0,7\overline{9} \cdot x \in Z^+$

$\Rightarrow \min(x) = ?$

5

10. $\left(1+\frac{1}{2}\right)\cdot\left(1+\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\cdot\ldots\cdot\left(1+\frac{1}{a}\right) = 10$

$\Rightarrow a = ?$

19

11. $x = 0,52 + 0,052 + 0,0052 + \ldots$

$y = \frac{2}{10^2} + \frac{2}{10^3} + \frac{2}{10^4} + \ldots$

$\Rightarrow x + y = ?$

0,6

12. $x, y \in Z^+$

$x + \frac{y}{11} = 18,\overline{27}$

$\Rightarrow \min(x + y) = ?$

21

13. $\dfrac{1901\frac{17}{6} - 1900\frac{5}{6}}{2021\frac{2}{9} - 2023\frac{20}{9}} = ?$

$-\frac{3}{4}$

14. $\frac{x}{y} = \frac{2}{3}$

$a = 0,\overline{xy}$

$b = 0,\overline{yx}$

$\Rightarrow \min(a - b) = ?$

$-\frac{3}{11}$

15. $\dfrac{\frac{4}{7} - \frac{3}{8} + \frac{15}{13}}{\frac{12}{28} - \frac{9}{32} + \frac{45}{52}} = ?$

$\frac{4}{3}$

16. $\left(1-\frac{1}{16}\right)\cdot\left(1-\frac{1}{25}\right)\cdot\left(1-\frac{1}{36}\right)\cdot\ldots\cdot\left(1-\frac{1}{3600}\right) = ?$

$\frac{61}{80}$

1. $\frac{2}{3}-\frac{1}{2}:\frac{3}{4}-\frac{1}{4}=?$

A) $-\frac{1}{36}$ B) $-\frac{1}{18}$ C) $-\frac{1}{12}$ D) $-\frac{1}{6}$ E) $-\frac{1}{4}$

2. $\left(\frac{7}{5}+\frac{3}{2}\right)-\left(\frac{7}{5}+\frac{5}{2}\right)=?$

A) -4 B) -3 C) -2 D) -1 E) 0

3. $\left(\frac{1}{3}+\frac{1}{2}:\frac{3}{4}\right)\cdot\frac{2}{7}+\frac{5}{7}=?$

A) 0 B) 1 C) 2 D) $\frac{6}{7}$ E) $\frac{9}{7}$

4. $\frac{3+\frac{1}{3}}{3-\frac{1}{3}}:\left(2-\frac{1}{2}\right)=?$

A) $\frac{1}{3}$ B) $\frac{4}{3}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) $\frac{5}{6}$

5. $1+\frac{1+\frac{1}{2}}{1+\frac{1}{3}}=?$

A) $\frac{11}{6}$ B) $\frac{17}{8}$ C) $\frac{3}{2}$ D) $\frac{1}{2}$ E) $\frac{1}{6}$

6. $\left(-\frac{3}{5}+\frac{3}{2}:\frac{5}{6}\right)-\frac{1}{5}+2=?$

A) 0 B) 1 C) 2 D) 3 E) 4

7. $\frac{\frac{2}{3}}{7}-\frac{2}{\frac{3}{7}}=?$

A) 0 B) -1 C) $-\frac{32}{21}$ D) $-\frac{32}{7}$ E) $-\frac{36}{7}$

8. $\frac{3}{2}+\frac{4}{6}-\frac{5}{9}+\frac{1}{4}=?$

A) $\frac{67}{36}$ B) $\frac{11}{6}$ C) $\frac{65}{36}$ D) $\frac{16}{9}$ E) $\frac{7}{4}$

9. $\dfrac{\left(6+\frac{5}{4}\right)-\left(2-\frac{3}{4}\right)}{1-\left(\frac{3}{4}+\frac{1}{3}\right)-\left(\frac{2}{3}-\frac{7}{4}\right)}=?$

A) 1 B) 6 C) 12 D) 14 E) 16

10. $\left[\left(-\frac{1}{3}\right)+(-2)\cdot\left(-\frac{1}{5}\right)\right]:\frac{2}{5}-1=?$

A) -1 B) $-\frac{5}{6}$ C) $-\frac{1}{2}$ D) $-\frac{1}{3}$ E) $-\frac{1}{9}$

11. $\dfrac{2-\frac{3}{2-\frac{1}{5}}}{4-\frac{10}{3}}=?$

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{4}$ D) $\frac{1}{5}$ E) $\frac{1}{6}$

12. $\dfrac{2}{1-\frac{1}{3}}+\dfrac{\frac{1}{3}-1}{2}=?$

A) $\frac{5}{3}$ B) 2 C) $\frac{7}{3}$ D) $\frac{8}{3}$ E) 3

13. $\dfrac{\frac{2}{7}}{3}-\dfrac{3}{1-\frac{5}{\frac{7}{2}}}=?$

A) $-\frac{10}{7}$ B) 0 C) $\frac{10}{7}$ D) $\frac{55}{7}$ E) $\frac{60}{7}$

14. $\dfrac{\left(\frac{2}{3}+11\right)-\left(11-\frac{7}{3}\right)}{\left(5-\frac{7}{2}\right)+\left(\frac{1}{2}-1\right)}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\left(\frac{3}{13}-\frac{2}{7}+\frac{5}{11}\right)-\left(\frac{5}{7}-\frac{6}{11}-\frac{10}{13}\right)=?$

A) -2 B) -1 C) 1 D) 2 E) 3

16. $1+\dfrac{1}{1-\frac{1}{1+\frac{1}{3}}}=?$

A) $\frac{7}{4}$ B) $\frac{11}{3}$ C) 5 D) $\frac{11}{2}$ E) $\frac{29}{4}$

1. $\frac{3}{5}+\frac{1}{2}:\left(\frac{5}{4}\cdot\frac{1}{5}-\frac{1}{5}\right)-9=?$

A) $\frac{7}{5}$ B) $\frac{8}{5}$ C) $\frac{9}{5}$ D) $\frac{11}{5}$ E) $\frac{13}{5}$

2. $\frac{\frac{3}{2}}{5}-\frac{7}{\frac{2}{5}}=?$

A) $-19,4$ B) $-18,3$ C) $-17,2$ D) $-15,2$ E) $-13,4$

3. $\frac{1}{2}+\frac{1+\frac{1}{3}}{1-\frac{1}{1+\frac{1}{2}}}=?$

A) $\frac{9}{2}$ B) 4 C) $\frac{7}{2}$ D) 3 E) $\frac{5}{2}$

4. $\frac{1+2:\left(\frac{1}{2}\right)}{2:4+(1+3\cdot 2)}=?$

A) $\frac{3}{5}$ B) $\frac{7}{9}$ C) $\frac{2}{3}$ D) $\frac{13}{11}$ E) $\frac{15}{13}$

5. $\frac{1}{2}+\frac{7}{5}\cdot\left(\frac{4}{3}:\frac{5}{3}+\frac{21}{5}\right)=?$

A) $\frac{17}{30}$ B) 1 C) 3 D) $\frac{15}{2}$ E) 8

6. $\left(\frac{\frac{21}{4}}{7}+\frac{6}{\frac{8}{3}}\right)=?$

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) 2 D) 3 E) 6

7. $\left(\frac{3}{2-\frac{7}{5}}+\frac{\frac{7}{3}-1}{4}\right):\frac{2}{3}=?$

A) $\frac{17}{2}$ B) 8 C) $\frac{15}{2}$ D) 7 E) $\frac{13}{2}$

8. $\frac{2-\frac{\frac{6}{5}}{3}}{1+\frac{7}{\frac{14}{3}}}=?$

A) $\frac{16}{25}$ B) $\frac{4}{25}$ C) 2 D) 4 E) 6

9. $\dfrac{3-\frac{5}{3}}{1-\frac{\frac{1}{4}}{5-\frac{1}{2}}} = ?$

A) $\frac{1}{3}$ B) 1 C) $\frac{5}{3}$ D) $\frac{34}{27}$ E) $\frac{24}{17}$

10. $\left.\begin{array}{l} A = 1-\frac{2}{3}:\frac{8}{3} \\ B = \left(2-\frac{2}{3}\right)\cdot\frac{\frac{2}{5}}{\frac{8}{15}} \end{array}\right\} \Rightarrow A-B+\frac{3}{4} = ?$

A) $-\frac{16}{9}$ B) $-\frac{8}{3}$ C) $\frac{2}{9}$ D) $\frac{1}{2}$ E) $\frac{16}{9}$

11. $3\frac{1}{2}-3\cdot\frac{1}{2} = ?$

A) 0 B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

12. $2\frac{3}{7}+1\frac{4}{7} = ?$

A) $\frac{3}{7}$ B) $\frac{9}{7}$ C) 2 D) 3 E) 4

13. $999\frac{1}{2}-998\frac{1}{3} = ?$

A) $\frac{2}{3}$ B) $\frac{5}{6}$ C) 1 D) $\frac{7}{6}$ E) $\frac{4}{3}$

14. $\dfrac{1\frac{1}{2}+2\frac{1}{3}}{2+2:\frac{1}{2}-5} = ?$

A) $\frac{23}{6}$ B) $\frac{23}{18}$ C) $\frac{7}{6}$ D) $\frac{7}{18}$ E) $\frac{21}{16}$

15. $\dfrac{4\frac{5}{12}-2\frac{17}{12}}{1-\frac{3}{4}} = ?$

A) $-\frac{1}{4}$ B) $\frac{1}{4}$ C) 1 D) 4 E) 5

16. $\dfrac{2\frac{3}{4}-2\frac{3}{2}+\frac{1}{4}}{3:\frac{3}{2}-\frac{5}{2}} = ?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{1}{2}$ E) 1

1. $\frac{0,0034}{0,17} = ?$

A) 100 B) 25 C) 0,4 D) 0,02 E) 0,01

2. $(3 + 0,42) : (2 - 0,86) = ?$

A) 0,2 B) 0,3 C) 1 D) 3 E) 4

3. $(2 - 0,31) : (1 - 0,87) = ?$

A) 6 B) 8 C) 12 D) 13 E) 15

4. $(1,376 + 0,624) \cdot (2,92 + 0,08) = ?$

A) 0 B) 1 C) 2 D) 6 E) 9

5. $\frac{0,2}{0,02} + \frac{0,08}{0,04} + \frac{3}{0,3} = ?$

A) 13 B) 22 C) 50 D) 112 E) 130

6. $\frac{0,1 + 0,64 + 0,26}{1 + \frac{3}{5}} = ?$

A) 0 B) $\frac{5}{8}$ C) $\frac{8}{5}$ D) $\frac{5}{4}$ E) $\frac{16}{7}$

7. $\frac{0,064}{0,128} + \frac{4,2}{0,63} = ?$

A) $\frac{1}{6}$ B) 1 C) $\frac{7}{6}$ D) $\frac{43}{6}$ E) $\frac{47}{6}$

8. $\frac{0,02}{0,14} + \frac{4,5}{4,2} - \frac{0,6}{2,8} = ?$

A) -1 B) 0,3 C) 1 D) $\frac{16}{5}$ E) 10

9. $\frac{0,2456}{0,1}+\frac{0,1088}{0,2}=?$

A) 0,3 B) $\frac{3}{2}$ C) 3 D) 30 E) 300

10. $\frac{0,04}{0,002}+\frac{0,21}{0,07}\cdot\frac{0,09}{2,7}=?$

A) 20 B) 20,1 C) 21 D) 20,5 E) 30

11. $\frac{0,1}{0,01}+\frac{0,04}{0,02}+\frac{2}{0,2}=?$

A) 11 B) 15 C) 16 D) 22 E) 24

12. $\frac{2,2}{0,11}-\frac{4,2}{0,21}+\frac{1,5}{0,03}=?$

A) – 230 B) – 130 C) 20 D) 50 E) 230

13. $\frac{0,2}{0,02}+\frac{0,06}{0,03}+\frac{5}{0,5}=?$

A) 22 B) 20 C) 18 D) 12 E) 8

14. $\frac{5,1}{1,7}-\frac{16}{0,8}+\frac{9,2}{0,23}=?$

A) 18 B) 21 C) 23 D) 25 E) 27

15. $\frac{2,8}{0,07}-\frac{0,16}{0,02}+\frac{20}{0,4}=?$

A) 80 B) 82 C) 90 D) 98 E) 100

16. $\frac{0,0036-0,0015}{0,0001-0,00003}=?$

A) 30 B) 21 C) 12 D) 6 E) 3

1. $\dfrac{0,2+\dfrac{4}{5}}{2,3-2,05}=?$

A) $\frac{3}{2}$ B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

2. $\dfrac{\dfrac{0,3}{\dfrac{4}{5}}-\dfrac{\dfrac{3}{5}}{0,4}+0,1=?$

A) $-\frac{41}{40}$ B) $-\frac{19}{40}$ C) $\frac{3}{8}$ D) $\frac{19}{40}$ E) $\frac{41}{40}$

3. $\dfrac{\dfrac{4}{0,3}-12}{0,42+0,78}=?$

A) 1 B) $\frac{10}{9}$ C) $\frac{8}{5}$ D) 2 E) $\frac{16}{5}$

4. $0,15-\left(0,7-\dfrac{3}{5}\right)=?$

A) $-\frac{1}{5}$ B) 0 C) $\frac{1}{50}$ D) $\frac{1}{20}$ E) $\frac{1}{5}$

5. $\dfrac{\dfrac{5}{0,4}+\dfrac{0,6}{0,08}}{0,\overline{5}}=?$

A) $\frac{55}{72}$ B) $\frac{99}{40}$ C) $\frac{50}{9}$ D) 18 E) 36

6. $\dfrac{\dfrac{4}{0,25}+\dfrac{6}{0,15}}{0,5}=?$

A) 13 B) 23 C) 56 D) 112 E) 120

7. $\dfrac{(0,5)+\dfrac{3}{4}-\dfrac{5}{12}}{(2,4)\cdot(0,5)}=?$

A) $\frac{6}{5}$ B) $\frac{5}{6}$ C) $\frac{25}{36}$ D) 1 E) $\frac{36}{25}$

8. $\dfrac{\dfrac{1}{0,2}-\dfrac{2}{0,4}+\dfrac{4}{0,8}}{\dfrac{2}{0,4}-\dfrac{3}{0,5}+\dfrac{4}{0,8}}=?$

A) 0,5 B) 0,75 C) 1,25 D) 1,75 E) 2,25

9.
$$\begin{array}{r} 0,x \\ 0,yy \\ +\ z,zzz \\ \hline a,964 \end{array}$$

$\Rightarrow x - y + z - a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $0,x4 + 1,x2 + 0,11 = 2,17$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

11. $\frac{xy}{x,y} + \frac{x,yz}{0,0xyz} = ?$

A) 11 B) 101 C) 110 D) 111 E) 1010

12. $\frac{0,bc}{0,0bc} + \frac{bc}{0,bc} - \frac{bc0}{b,c} = ?$

A) 0,1 B) 1 C) 10 D) 110 E) 190

13. $(x,2) - [(x,y) - (2,y)] = ?$

A) $-1,8$ B) $-0,8$ C) 0 D) 1,8 E) 2,2

14. $2 - \frac{444 - \frac{4}{0,04}}{\frac{4}{0,04} - 444} = ?$

A) $\frac{1}{2}$ B) 1 C) 2 D) $\frac{7}{3}$ E) 3

15. $0,6 + 0,06 + 0,006 + \ldots = ?$

A) $\frac{2}{3}$ B) $\frac{7}{9}$ C) $\frac{8}{9}$ D) 1 E) $\frac{3}{2}$

16. $1,4999\ldots = ?$

A) $\frac{3}{2}$ B) 2 C) $\frac{5}{2}$ D) $\frac{17}{10}$ E) 4

1. $2,1666..... = ?$

A) $\frac{25}{12}$ B) $\frac{13}{6}$ C) $\frac{9}{4}$ D) $\frac{7}{3}$ E) $\frac{29}{12}$

2. $0,824242424... = ?$

A) $\frac{275}{330}$ B) $\frac{271}{330}$ C) $\frac{130}{165}$ D) $\frac{134}{165}$ E) $\frac{136}{165}$

3. $0,\overline{7} + 0,1\overline{2} = ?$

A) 0,5 B) 0,6 C) 0,7 D) 0,8 E) 0,9

4. $0,5\overline{3} + 0,2\overline{6} = ?$

A) 0,7 B) 0,8 C) 0,9 D) 1 E) 1,1

5. $0,6\overline{4} + 0,3\overline{5} = ?$

A) 1 B) 0,9 C) 0,8 D) 0,7 E) 0,6

6. $0,\overline{3} + 0,0\overline{2} + 0,00\overline{4} = ?$

A) $0,35\overline{8}$ B) 0,369 C) 0,36 D) $0,\overline{4}$ E) 1

7. $0,6 \cdot (2 - 1,1\overline{6}) = ?$

A) $-\frac{3}{2}$ B) 0 C) $\frac{1}{2}$ D) $\frac{3}{4}$ E) $\frac{3}{2}$

8. $\frac{0,54}{\frac{9}{5}} + (0,\overline{4} + 0,\overline{3}) \cdot 0,9 = ?$

A) 1 B) $\frac{6}{5}$ C) $\frac{8}{5}$ D) 2 E) 3

9. $\frac{0,\overline{2}}{0,0\overline{4}} - \frac{0,\overline{5}}{1,\overline{6}} = ?$

A) $\frac{14}{9}$ B) 2 C) $\frac{14}{3}$ D) 4 E) $\frac{75}{16}$

10. $\frac{0,1\overline{8} + 1,\overline{4}}{2,\overline{3} - 1,\overline{4}} = ?$

A) $\frac{141}{80}$ B) $\frac{143}{80}$ C) $\frac{147}{80}$ D) $\frac{15}{8}$ E) 2

11. $\frac{0,\overline{4} + 2,4\overline{5}}{1,3\overline{6} - 0,4\overline{6}} = ?$

A) $\frac{28}{9}$ B) $\frac{29}{9}$ C) $\frac{29}{8}$ D) $\frac{7}{2}$ E) 4

12. $x = 1,333...$
$y = 2,121212...$
$\Rightarrow x : y = ?$

A) $\frac{2}{5}$ B) $\frac{4}{7}$ C) $\frac{22}{35}$ D) $\frac{27}{35}$ E) 5

13. $m = 0,\overline{3}$
$n = 0,\overline{4}$
$\Rightarrow \frac{1}{m} + \frac{1}{n} = ?$

A) $\frac{7}{9}$ B) $\frac{18}{9}$ C) 4 D) 5 E) $\frac{21}{4}$

14. $y = x + \frac{1,\overline{3}}{0,\overline{8}}$
$y \in Z$
$\Rightarrow$ x aşağıdakilerden hangisi olabilir?
Which one of the following can be x?

A) 5,25 B) 6,5 C) 7,75 D) 8,2 E) 9,6

15. $\frac{73}{30} = 2,4\overline{a}$
$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

16. $\frac{79}{45} = 1,7\overline{x}$
$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 8

1. $a = \dfrac{3}{1-\frac{2}{3}} \quad b = \dfrac{4}{2+\frac{1}{2}} \quad c = \dfrac{2-\frac{1}{2}}{4}$

$\Rightarrow ? < ? < ?$

A) $a < b < c$ B) $a < c < b$ C) $b < c < a$
D) $b < a < c$ E) $c < b < a$

2. $a = \dfrac{37}{30} \quad b = -\dfrac{71}{32} \quad c = -\dfrac{135}{43}$

$\Rightarrow ? < ? < ?$

A) $a < b < c$ B) $b < a < c$ C) $c < a < b$
D) $a < c < b$ E) $c < b < a$

3. $a = \dfrac{2}{3} \quad b = \dfrac{7}{15} \quad c = \dfrac{10}{21}$

$\Rightarrow ? < ? < ?$

A) $b < c < a$ B) $b < c = a$ C) $c < b < a$
D) $c = b < a$ E) $a < c = b$

4. $a = -0,23$
$b = -0,235$
$c = -0,2035$
$\Rightarrow ? < ? < ?$

A) $c < a < b$ B) $b < c < a$ C) $b < a < c$
D) $c < b < a$ E) $a < c < b$

5. $a = \dfrac{13}{16}, \; b = \dfrac{18}{21}, \; c = \dfrac{17}{20} \Rightarrow ? < ? < ?$

A) $a < c < b$ B) $b < c < a$ C) $a < b < c$
D) $b < a < c$ E) $c < a < b$

6. $a = \dfrac{100}{99}, \; b = \dfrac{1000}{999}, \; c = \dfrac{10000}{9999} \Rightarrow ? < ? < ?$

A) $a < b < c$ B) $c < b < a$ C) $a < c < b$
D) $c < a < b$ E) $b < a < c$

7. $a = \dfrac{2008}{2009}, \; b = \dfrac{2009}{2010}, \; c = \dfrac{2010}{2011} \Rightarrow ? < ? < ?$

A) $c < b < a$ B) $a < b < c$ C) $c < a < b$
D) $a < c < b$ E) $b < a < c$

8. $a = \dfrac{10}{11}, \; b = \dfrac{100}{101}, \; c = \dfrac{1000}{1001} \Rightarrow ? < ? < ?$

A) $c < a < b$ B) $c < b < a$ C) $a < b < c$
D) $b < a < c$ E) $b < c < a$

9. $x < 0$

$a = -\frac{x}{7}$ $\quad b = -\frac{x}{11}$ $\quad c = -\frac{x}{9}$

$\Rightarrow ? < ? < ?$

A) $b < c < a$ B) $b < a < c$ C) $c < a < b$

D) $a < b < c$ E) $a < c < b$

10. $a < b < 0 < c$

$$\left.\begin{array}{l} x = \frac{a}{b} \\ y = \frac{b}{a} \\ z = \frac{c}{a} \end{array}\right\} \Rightarrow ? < ? < ?$$

A) $x < z < y$ B) $z < y < x$ C) $x < y < z$

D) $z < x < y$ E) $y < x < z$

11. $a, b, c \in Z^-$

$\frac{a}{0,11} = \frac{b}{0,7} = \frac{c}{0,53}$

$\Rightarrow ? < ? < ?$

A) $a < c < b$ B) $b < c < a$ C) $a < b < c$

D) $b < a < c$ E) $c < a < b$

12. $a = 5,74$

$b = 5,\overline{74}$

$c = 5,796\overline{6}$

$d = 5,7\overline{8}$

$\Rightarrow ? < ? < ?$

A) $d < a < b < c$ B) $d < a < c < b$

C) $a < b < c < d$ D) $a < b < d < c$

E) $b < a < c < d$

13. $\left(1+\frac{1}{2}\right)\cdot\left(1+\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\cdot\left(1+\frac{1}{5}\right) = ?$

A) 2 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

14. $\left(1+\frac{1}{2}\right)\cdot\left(1+\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\cdot \ldots\ldots \cdot\left(1+\frac{1}{x}\right) = 10$

$\Rightarrow x = ?$

A) 18 B) 19 C) 20 D) 21 E) 22

15. $\left(1-\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1-\frac{1}{4}\right)\cdot \ldots\ldots \cdot\left(1-\frac{1}{10}\right) = ?$

A) -1 B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{1}{10}$ E) $\frac{9}{10}$

16. $\left(1-\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1-\frac{1}{4}\right)\cdot \ldots\ldots \cdot\left(1-\frac{1}{50}\right) = ?$

A) 100 B) 50 C) 25 D) $\frac{1}{50}$ E) $\frac{1}{100}$

1. $2+\cfrac{2+\cfrac{2+\ddots}{3}}{3}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $1+\cfrac{1+\cfrac{1+\ddots}{x}}{x}=4$

$\Rightarrow x=?$

A) $\frac{4}{5}$ B) $\frac{3}{4}$ C) $\frac{7}{8}$ D) $\frac{4}{3}$ E) $\frac{3}{2}$

3. $1+\cfrac{6}{1+\cfrac{6}{1+\cfrac{6}{1+\ddots}}}=?$

A) -2 B) -1 C) 1 D) 2 E) 3

4. $1+\cfrac{1-\cfrac{1+\cfrac{1-\ddots}{2}}{2}}{2}=?$

A) $\frac{8}{7}$ B) $\frac{7}{6}$ C) $\frac{6}{5}$ D) $\frac{5}{4}$ E) $\frac{4}{3}$

5. $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=2$

$\Rightarrow \frac{2a+1}{a}+\frac{3b+1}{b}+\frac{4c+1}{c}=?$

A) 10 B) 11 C) 12 D) 13 E) 14

6. $\frac{5}{8}+\frac{7}{17}+\frac{3}{11}=x$

$\Rightarrow \frac{3}{8}+\frac{10}{17}+\frac{8}{11}=?$

A) 3 B) $3-x$ C) $3+x$ D) $x-3$ E) $3x$

7. $x=\frac{4}{7}+\frac{5}{11}+\frac{6}{13}$

$\Rightarrow \frac{6}{7}+1\frac{1}{11}+1\frac{1}{13}=?$

A) $6-2x$ B) $6+2x$ C) $2x-6$ D) $2x+6$ E) $2x$

8. $\frac{3}{5}+\frac{12}{7}+\frac{20}{11}=x$

$\Rightarrow \frac{1}{5}+\frac{1}{7}+\frac{1}{11}=?$

A) $\frac{2-x}{5}$ B) $\frac{5+x}{2}$ C) $5+2x$ D) $5-2x$ E) $\frac{5-x}{2}$

9. $0,7\overline{43} + 0,2\overline{56} = ?$

A) 0,89 B) 0,9 C) 0,98 D) 0,987 E) 1

10. $x = 0,\overline{2}$ $y = 0,\overline{5}$

$\Rightarrow \frac{1}{x} + \frac{1}{y} = ?$

A) $\frac{7}{9}$ B) $\frac{18}{7}$ C) $\frac{21}{4}$ D) 7 E) $\frac{63}{10}$

11. $\frac{17}{15} = 1,1\overline{a} \Rightarrow a = ?$

A) 2 B) 3 C) 5 D) 6 E) 7

12. $x, y \in N$

$\frac{x}{y} = 0,2\overline{4}$

$\Rightarrow \min(x + y) = ?$

A) 41 B) 42 C) 56 D) 57 E) 58

13. $a, b \in Z$

$$a + \frac{1}{b + \frac{1}{2}} = \frac{9}{7}$$

$\Rightarrow a + b = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

14. $a, b, c \in Z^+$

$$a + \frac{1}{b + \frac{1}{c}} = \frac{27}{5}$$

$\Rightarrow a + b - c = ?$

A) 9 B) 5 C) 3 D) 2 E) 1

15. $a, b \in Z$

$$\frac{1}{a - 2b} + \frac{1}{b - 2} = 1$$

$\Rightarrow a \cdot b = ?$

A) 14 B) 20 C) 24 D) 36 E) 40

16. $\left(x + \frac{48}{75}\right) \in Z$

$\Rightarrow x = 2,bc = ?$

A) 2,36 B) 2,54 C) 2,48 D) 2,64 E) 2,76

1. $\frac{1}{6}+\frac{11}{66}+\frac{111}{666}+\frac{1111}{6666}=?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{5}{6}$ E) 1

2. $x+y+z=10$

$\Rightarrow x,yz+y,zx+z,xy=?$

A) 1 B) 1,11 C) 10 D) 11,1 E) 110

3. $a, b \in Q$

$(a+1)+b\sqrt{2}+3\sqrt{2}=\frac{3}{2}+5\sqrt{2}$

$\Rightarrow a+b=?$

A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

4. $\frac{271\frac{3}{5}+28\frac{2}{5}}{77\frac{11}{9}-18\frac{2}{9}}=?$

A) 5 B) 4 C) 3 D) 2 E) 1

5. $\frac{0,\overline{a}+0,\overline{b}}{a,\overline{a}+b,\overline{b}}=?$

A) 0,1 B) 1,1 C) 10 D) 0,9 E) 0,99

6. $x<0$

$a=\frac{23x}{20}$ $b=\frac{43x}{40}$ $c=\frac{13x}{10}$

$\Rightarrow ?<?<?$

A) $a<c<b$ B) $c<a<b$ C) $c<b<a$

D) $b<c<a$ E) $b<a<c$

7. $\frac{x}{y}=\frac{1}{4}$

$a=0,\overline{xy}$ $b=0,\overline{yx}$

$\Rightarrow \min(a-b)=?$

A) $-\frac{6}{11}$ B) $-\frac{3}{11}$ C) $-\frac{1}{11}$ D) $\frac{3}{11}$ E) $\frac{6}{11}$

8. $x, y, z \in N$

$x+\frac{y}{z}=\frac{17}{3}$

$\Rightarrow \min(x+y+z)=?$

A) 8 B) 9 C) 10 D) 11 E) 12

9. $\frac{6a-2b}{a-5}=0$

⇒ b aşağıdakileden hangisi olamaz?

Which one of the following can not be the value of b?

A) 3 B) 5 C) 10 D) 15 E) 20

10. a, b, c ∈ Z

$a+\frac{1}{b+\frac{1}{c}}=\frac{37}{16}$

⇒ a + b + c = ?

A) 6 B) 7 C) 8 D) 9 E) 10

11. $\frac{1}{x}+\frac{2}{y}+\frac{3}{z}=7$

$\Rightarrow \frac{x-2}{x}+\frac{y-4}{y}-\frac{3z+6}{z}=?$

A) − 15 B) − 14 C) − 13 D) − 12 E) − 11

12. $\frac{\frac{4}{21}+\frac{10}{33}-\frac{6}{39}}{\frac{2}{7}+\frac{5}{11}-\frac{3}{13}}=?$

A) $\frac{3}{2}$ B) $\frac{2}{3}$ C) $\frac{1}{2}$ D) $\frac{1}{3}$ E) $\frac{1}{6}$

13. $a=3,47\overline{8}$

$b=3,4\overline{78}$

$c=3,\overline{478}$

d = 3,478

⇒ ? < ? < ? < ?

A) d < b < a < c B) d < a < b < c

C) d < c < b < a D) a < b < c < d

E) b < a < c < d

14. $x=m+\frac{7}{8}$

x ∈ Z

m = (a,bcd)

⇒ b + c + d = ?

A) 5 B) 6 C) 7 D) 8 E) 9

15. $\left(1-\frac{1}{4}\right)\cdot\left(1-\frac{1}{9}\right)\cdot\left(1-\frac{1}{16}\right)\cdot\ldots\cdot\left(1-\frac{1}{400}\right)=?$

A) $\frac{2}{5}$ B) $\frac{9}{20}$ C) $\frac{19}{40}$ D) $\frac{1}{2}$ E) $\frac{21}{40}$

16. x, y ∈ Z

$\frac{1}{x+y-6}+\frac{1}{x+3}=1$

⇒ y = ?

A) 10 B) 9 C) 8 D) 7 E) 6

RASYONEL SAYILAR RATIONAL NUMBERS

Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	E	B	D	D	A	B	B	A	D	D	C	C	C

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	A	C	D	D	B	A	E	D	C	E	D	A	D	E

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	D	D	D	B	B	D	C	C	B	D	D	A	C	B	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	A	B	D	E	D	E	C	A	D	C	C	E	E	A	A

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	E	E	B	A	C	C	A	C	C	B	C	E	B	C	D

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	E	A	C	A	B	B	C	A	B	B	D	C	B	D	D

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	E	C	B	B	A	E	E	E	B	C	B	B	E	A

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	D	A	A	B	A	C	D	E	A	B	C	D	E	B

BİRİNCİ DERECEDEN DENKLEMLER

FIRST DEGREE EQUATIONS

ÖZELLİK|Property 1

Birinci Dereceden Denklemler

a ve b sabit olmak üzere;

ax + b = 0 şeklindeki eşitliğe birinci dereceden bir bilinmeyenli denklem denir. Denklemi sağlayan x değerine denklemin kökü, köklerden oluşan kümeye de denklemin çözüm kümesi denir.

$x = \frac{-b}{a}$ → Denklemin kökü

$\left\{\frac{-b}{a}\right\}$ → Denklemin çözüm kümesi (Ç.K.)

First Degree Equations

A linear equation in one variable has the form ax + b = 0, where a and b are constants and a ≠ 0, the value of x satisfies the exuation which is named as the root of the equation, and the set of all consisting roots of the equation are konwn as the solution set of the equation.

$x = \frac{-b}{a}$ → *The root of the equation*

$\left\{\frac{-b}{a}\right\}$ → *The smybolic representation of the solution set of the equation (SS)*

1. 2x – 8 = 4
⇒ x = ?

6

2. 3x – 8 = x + 2
⇒ x = ?

5

3. 4x – 2 – x = 5x – 10
⇒ x = ?

4

4. 5x – 2x – 7 = x – 3
⇒ x = ?

2

5. – 2 – (– 8) – 11x = 13x – 42
⇒ x = ?

2

6. 7x – 3(x – 1) + 5 = – (– 6x) + 2
⇒ x = ?

3

7. 3x – 2x + 1 = – 2x – x + 9
⇒ x = ?

2

8. 2(x – 1) – (x + 2) = 3x – 6
⇒ x = ?

1

9. 4x – 3(x + 1) = 7x – 4x + 2
⇒ x = ?

$-\frac{5}{2}$

10. 2(a – 1) + 2(a + 2) = 3a – 6
⇒ a = ?

– 8

11. 3(1 – x) + 2(3 – 2x) = 2
⇒ x = ?

1

12. 5(7 – x) + 6(x + 2) = 28
⇒ x = ?

– 19

13. – 2(x + 1) – 4(x – 3) = 3(x + 1)
⇒ x = ?

$\frac{7}{9}$

14. 6(x – 3) – 3(2x + 1) = 2x – 3
⇒ x = ?

– 9

15. 2x + 3 – 2(x – 4) = 3x – 1
⇒ x = ?

4

ÖZELLİK|Property 2

Orantı Özelliği | Law of Proportion

$$\frac{a}{b} = \frac{c}{d} \Rightarrow a \cdot d = b \cdot c$$

1. $\frac{x-1}{4} = 3$
$\Rightarrow x = ?$

13

2. $\frac{6}{x+1} = 2$
$\Rightarrow x = ?$

2

3. $\frac{3}{x-2} = \frac{4}{x+2}$
$\Rightarrow x = ?$

14

4. $\frac{2x-1}{3} = \frac{x+5}{2}$
$\Rightarrow x = ?$

17

5. $\frac{3x+2}{4} = \frac{2x+1}{2}$
$\Rightarrow x = ?$

0

6. $\frac{5x-12}{3} = 2x+3$
$\Rightarrow x = ?$

-21

7. $\frac{3x-5}{2} = 4x-3$
$\Rightarrow x = ?$

$\frac{1}{5}$

8. $\frac{6x+1}{3} = \frac{5x-2}{2}$
$\Rightarrow x = ?$

$\frac{8}{3}$

9. $\frac{3x+2}{3} = \frac{6x-2}{5}$
$\Rightarrow x = ?$

$\frac{16}{3}$

10. $\frac{2x-8}{x-3} = \frac{3}{2}$
$\Rightarrow x = ?$

7

11. $\frac{3x-1}{2x+1} = 2$
$\Rightarrow x = ?$

-3

12. $\frac{7x+5}{2x-1} = 3$
$\Rightarrow x = ?$

-8

13. $\frac{4x-11}{3} = 2(x-2)$
$\Rightarrow x = ?$

$\frac{1}{2}$

14. $\frac{2x+3}{4} = \frac{3x-6}{3}$
$\Rightarrow x = ?$

$\frac{11}{2}$

15. $\frac{4x-4}{2} = \frac{3x-6}{3}$
$\Rightarrow x = ?$

0

ÖZELLİK|Property 3

Rasyonel ifadelerde paydalar eşitlenir.

In rational expressions the denominators are made equal.

1. $\frac{x}{3}+\frac{x}{2}=5$

$\Rightarrow x=?$

6

2. $\frac{x-1}{3}+\frac{x+1}{4}=\frac{17}{6}$

$\Rightarrow x=?$

5

3. $\frac{2x+1}{5}-\frac{x+1}{2}=-1$

$\Rightarrow x=?$

7

4. $\frac{x-2}{4}+\frac{2x+3}{3}=2$

$\Rightarrow x=?$

$\frac{18}{11}$

5. $\frac{x}{3}+\frac{x}{2}-\frac{x}{4}=7$

$\Rightarrow x=?$

12

6. $\frac{1}{3}(x+1)+\frac{1}{2}(x-1)=\frac{7}{3}$

$\Rightarrow x=?$

3

7. $\frac{2}{3}(x-1)+\frac{1}{2}(2x-1)=\frac{13}{6}$

$\Rightarrow x=?$

2

8. $4-\frac{2}{x}=\frac{4}{x}$

$\Rightarrow x=?$

$\frac{3}{2}$

9. $\frac{2}{5}-3\left(\frac{x}{3}-\frac{1}{5}\right)=x+3$

$\Rightarrow x=?$

-1

10. $\frac{3}{7}-5\left(\frac{x}{10}+\frac{2}{7}\right)=3$

$\Rightarrow x=?$

-8

11. $\frac{x}{x-2}+x-6=\frac{2}{x-2}$

$\Rightarrow x=?$

5

12. $\frac{1}{x-1}+\frac{2}{x-2}+5=x+\frac{x}{x-1}+\frac{x}{x-2}$

$\Rightarrow x=?$

3

13. $\frac{x}{x-3}+\frac{x-2}{3}=\frac{x-3}{2}+\frac{3}{x-3}$

$\Rightarrow x=?$

11

14. $\frac{3x-1}{2-x}+\frac{x+3}{x-2}=x$

$\Rightarrow x=?$

-2

15. $\frac{x+2}{x+5}+2(x-1)=3-\frac{3}{x+5}$

$\Rightarrow x=?$

2

ÖZELLİK|Property 4

Denklemlerde sadeleştirme işlemi yapılırken sadeleştirilen ifade "0" a eşitlenir. Bulunan değer çözüm kümesinin elemanıdır. Rasyonel ifadelerde paydayı sıfır yapan değer çözüm kümesinden çıkarılır.

While doing simplification in equations, the expression is made equal to zero. The value of unknown variable is the element of the solution set. In rational expressions, the value that makes the denominator exual to zero is discarded from the solution set. This root is known as extraneous root of the equation.

Örnek *(Example)*

- $\frac{(x-3)(x+5)}{x-3} = 1 \Rightarrow$ S.S. = {– 4}
- $(x-3)(x+5) = (x-3) \Rightarrow$ S.S. = {3, – 4}

1. $(x-2)(x-4) = (x-2)$
$\Rightarrow$ S.S. = ? {2, 5}

2. $(x+1)(x-2) = (x+1)$
$\Rightarrow$ S.S. = ? {–1, 3}

3. $x^2 - 4 = (x+2)$
$\Rightarrow$ S.S. = ? {–2, 3}

4. $\frac{(x-3)(x+1)}{(x-3)} = 1$
$\Rightarrow$ S.S. = ? {0}

5. $\frac{x^2-4}{x-2} = 1$
$\Rightarrow$ S.S. = ? {–1}

6. $(x-3)(x-4) = (2x-6)$
$\Rightarrow$ S.S. = ? {3, 6}

7. $x^2 - 9 = (x-3)$
$\Rightarrow$ S.S. = ? {3, – 2}

8. $x^2 - 16 = x - 4$
$\Rightarrow$ S.S. = ? {4, – 3}

9. $\frac{(x-3)(x-2)}{(x-3)} = 1$
$\Rightarrow$ S.S. = ? Ø

10. $\frac{(x+6)(x+4)}{(x+6)} = -2$
$\Rightarrow$ S.S. = ? Ø

11. $(x+1)(x+5) = (x+5)$
$\Rightarrow$ S.S. = ? {– 5, 0}

12. $(x-2)(x-3) = (x-3)$
$\Rightarrow$ S.S. = ? {3}

13. $\frac{(x-5)(x+2)}{(x+2)} = 1$
$\Rightarrow$ S.S. = ? {6}

14. $\frac{(x-4)(x+1)}{(x+1)} = 1$
$\Rightarrow$ S.S. = ? {5}

15. $(x^2 - 9) = (3x+9)$
$\Rightarrow$ S.S. = ? {– 3, 6}

ÖZELLİK|Property 5

Birinci Dereceden İki Bilinmeyenli Denklemler

$a_1, a_2, b_1, b_2, c_1, c_2$ sıfırdan farklı reel sayılar olmak üzere;

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

şeklinde iki bilinmeyenden oluşan sisteme iki bilinmeyenli denklem sistemi denir. Bu denklem sisteminin çözüm kümesi bulunurken genel olarak yok etme metodu kullanılır. Yok etme metodu; denklem sisteminde x veya y'den birinin katsayıları zıt işaretli olarak eşitlenip bu denklemler taraf tarafa toplanarak değişkenlerden biri yok edilir.

First Degree with Two Unknown Equation

Let $a_1, a_2, b_1, b_2, c_1, c_2$ be non-zero real numbers;

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

The system consisting of two unknowns is called a system of equation with two unknowns. Generally the elimination method is used to find the solution of pair of values for x and y (x, y) In the elimination method, the coefficients of x or y in the system of exuations are equalized with opposite signs, and one of the variables is eliminated by adding these equations on each side of the equal sign.

$$2x + 3y = 18$$
$$5x + 2y = 23$$

$$-2 \,/\, 2x + 3y = 18$$
$$3 \,/\, 5x + 2y = 23$$

$$-4x - 6y = -36$$
$$+\ 15x + 6y = \partial 9$$
$$11x = 33$$
$$x = 3$$

x değeri verilen herhangi bir denklemle yazılarak y değeri de bulunur.

Then, the x value is inserted in any of the equations to find the y value.

$$2x + 3y = 18$$
$$2 \cdot 3 + 3y = 18$$
$$3y = 12$$
$$y = 4$$
$$S.S. = \{(3, 4)\}$$

1. $a - b = 6$
$a + b = 14$
$\Rightarrow a = ?$

10

2. $2a - b = 12$
$a + b = 3$
$\Rightarrow b = ?$

-2

3. $2a + 3b = 17$
$a - b = 1$
$\Rightarrow a = ?$

4

4. $3a - 2b = 11$
$2a + b = 12$
$\Rightarrow b = ?$

2

5. $4x - 3y = 8$
$2x + 4y = 26$
$\Rightarrow x = ?$

5

6. $3x + 2y = 1$
$4x + 3y = 1$
$\Rightarrow x = ?$

1

7. $5x - 3y = 9$
$2x + 2y = 10$
$\Rightarrow x \cdot y = ?$

6

8. $\frac{2}{x} - \frac{3}{y} = 0$
$\frac{1}{x} + \frac{1}{y} = 5$
$\Rightarrow x = ?$

$\frac{1}{3}$

9. $\frac{2}{x} + \frac{3}{y} = 12$
$\frac{4}{x} + \frac{1}{y} = 9$
$\Rightarrow x = ?$

$\frac{2}{3}$

10. $\frac{2}{x} + \frac{3}{y} = 2$
$\frac{2}{x} + \frac{6}{y} = 3$
$\Rightarrow x = ?$

2

ÖZELLİK|Property 6

İki Lineer Denklem Eşitliği
The Equality of Two First Degree Equations

$ax + b = cx + d$ denkleminde a, b, c, d sabit ve $a \neq 0$, $c \neq 0$ dır. Çözümünde iki durum vardır.

$ax + b = cx + d$, where a, b, c, d are constants and $a \neq 0$, $c \neq 0$ we have two conditions:

- $a = c$ ve *(and)* $b = d \Leftrightarrow$ S.S. = R
- $a = c$ ve *(and)* $b \neq d \Leftrightarrow$ S.S. = Ø

1. $2x - \{-3(2x + 1)\} = mx + 8$ S.S. = Ø
$\Rightarrow m = ?$ — 8

2. $4x + 3(x + 2) = mx + 9$ S.S. = Ø
$\Rightarrow m = ?$ — 7

3. $3(x - 2) + 4x = 7x + k$ S.S. = R
$\Rightarrow k = ?$ — −6

4. $-2(x - 3) - 3(x + 1) = -5x + k$ S.S. = R
$\Rightarrow k = ?$ — 3

5. $2x + 4y = k$ $(x, y) = (1, 3)$
$\Rightarrow k = ?$ — 14

6. $3x - y + k = 0$ $(x, y) = (-2, 1)$
$\Rightarrow k = ?$ — 7

7. $3y - 2x - k = 0$ $(x, y) = (1, -3)$
$\Rightarrow k = ?$ — −11

ÖZELLİK|Property 7

Birinci Dereceden İki Bilinmeyenli Denklem
Is First Degree Equations with Two Unknowns

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

denklem sisteminde üç durum vardır;
we have three possibilities;

- $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
  $\Rightarrow$ denklem sisteminin çözüm kümesi sonsuz elemanlıdır. (denklemler lineer bağımlı) Doğrular çakışıktır.
  then the solution set has infinitely many solutions. The graphs are the same line (coincidence of the lines)
- $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
  $\Rightarrow$ denklem sisteminin çözüm kümesi boş kümedir. Doğrular paraleldir.
  then the solution set has no solution. The graphs are two parallel lines
- $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$
  $\Rightarrow$ denklem sisteminin çözüm kümesi tek elemanlıdır. Doğrular tek noktada kesişir.
  then the solution set has one solution. The graphs are intersecting at a single point

1. $2x + ay = 6$
$4x - 6y = 12$ n(S.S.) = ∞
$\Rightarrow a = ?$ — −3

2. $2x - 4y = 6$
$x + ky = 5$ S.S. = Ø
$\Rightarrow k = ?$ — −2

3. $3x + 2y = 11$
$-6x + ky = 4$ S.S. = Ø
$\Rightarrow k = ?$ — −4

4. $a \in R^+$
$ax + 4y = 2$
$9x + ay = 7$ S.S. = Ø
$\Rightarrow a = ?$ — 6

5. $2x + y = 6$
$4x - ky = 12$ n(S.S.) = ∞
$\Rightarrow k = ?$ — −2

6. $x - 2y = 2$
$3x + ky = 6$ n(S.S.) = ∞
$\Rightarrow k = ?$ — −6

ÖZELLİK|Property 8

Bir denklem sisteminde n farklı değişken varsa bu değişkenlerin her birinin tek çözümünün olması için birbirinden bağımsız (lineer bağımsız) n farklı denklem verilmesi gerekir.

If there are n distinct variables in a system of equations, n different equations which are independent (linearly independent) must be given for each variable to have a single solution.

1. $2xy - x + y - 4 = 0$

$\Rightarrow x = ?$

$\frac{4-y}{2y-1}$

2. $2x - y + xy - 8 = 0$

$\Rightarrow y = ?$

$\frac{8-2x}{x-1}$

3. $3ab - b + 2a = 0$

$\Rightarrow a = ?$

$\frac{b}{3b+2}$

4. $4ab - 2a + b = 0$

$\Rightarrow b = ?$

$\frac{2a}{4a+1}$

5. $2xy - 3x + 4y - 8 = 0$

$\Rightarrow y = ?$

$\frac{8+3x}{2x+4}$

6. $x + y = 8$

$y + z = 6$

$x + z = 2$

$\Rightarrow x + y + z = ?$

8

7. $x + y = 11$

$y + z = 13$

$x + z = 8$

$\Rightarrow x + y + z = ?$

16

8. $x, y, z \in Z^+$

$x \cdot y = 20$

$y \cdot z = 35$

$x \cdot z = 28$

$\Rightarrow z = ?$

7

9. $x, y, z \in Z^-$

$x \cdot y = 24$

$y \cdot z = 18$

$x \cdot z = 12$

$\Rightarrow y = ?$

-6

10. $x + y = 6$

$x \cdot z = 2$

$y \cdot z = 10$

$\Rightarrow z = ?$

2

11. $x + y = 8$

$x \cdot z = 13$

$y \cdot z = 11$

$\Rightarrow z = ?$

3

12. $x - y = 1$

$x \cdot z = 8$

$y \cdot z = 6$

$\Rightarrow z = ?$

2

13. $a - b = 12$

$a \cdot c = 20$

$b \cdot c = -28$

$\Rightarrow c = ?$

4

14. $x - y = 12$

$y + z = 7$

$x - z = 13$

$x = ?$

16

15. $x - y = 14$

$x + z = 10$

$y - z = -6$

$\Rightarrow x = ?$

9

16. $3x + y + 2z = 18$

$2x + 4y - 3z = 20$

$x + y - 3z = 12$

$\Rightarrow x - y + z = ?$

5

17. $\left.\begin{array}{l} \frac{x \cdot z}{y} = \frac{21}{2} \\ \frac{y \cdot z}{x} = \frac{25}{14} \\ \frac{x \cdot y}{z} = \frac{16}{15} \end{array}\right\} \Rightarrow x \cdot y \cdot z = ?$

20

18. $a, b, c \in R^+$

$a \cdot b = 9 \cdot c$

$b \cdot c = 16 \cdot a$

$\Rightarrow b = ?$

12

19. $7m - 2n = 38$

$m + 4n = 14$

$\Rightarrow m^2 - n^2 = ?$

32

20. $\frac{6}{b} - \frac{a \cdot c - x^2}{a \cdot x} = \frac{7x - b \cdot c}{b \cdot x}$

$\Rightarrow x = ?$

$\frac{a}{b}$

21. $a \neq b$

$3a + \frac{5}{a} = 3b + \frac{5}{b}$

$\Rightarrow a \cdot b = ?$

$\frac{5}{3}$

22. $x > 0$

$y > 0$

$\frac{x+y}{15} = \frac{x-y}{5}$

$x^2 - y^2 = 243$

$\Rightarrow x = ?$

18

23. $x, y, z \in R^+$

$\left.\begin{array}{l} x^3 \cdot y^2 = 4z \\ y^3 \cdot z = 2x \\ z^4 \cdot x^2 = 32y \end{array}\right\} \Rightarrow x \cdot y \cdot z = ?$

4

ÖRNEK SORU TÜRLERİ ÖRNEK SORU TÜRLERİ

1. $\frac{0,03+x}{0,02} = \frac{0,7-x}{0,4}$

$\Rightarrow x = ?$

$\frac{1}{210}$

2. $\frac{x}{x-7} + 3x = \frac{7}{x-7} + 16$

$\Rightarrow x = ?$

5

3. $9 + \cfrac{12}{7 - \cfrac{20}{3 + \cfrac{6}{x-1}}} = 15$

$\Rightarrow x = ?$

7

4. $x, y \in N^+$

$x^2 - y^2 = 13$

$\Rightarrow x \cdot y = ?$

42

5. $\frac{6}{x} + \frac{2}{y} = 2$

$\frac{1}{x} - \frac{3}{y} = 2$

$\Rightarrow y = ?$

-2

6. $x, y \in R$

$(x - y + 3)^2 + (x - 5)^2 = 0$

$\Rightarrow x \cdot y = ?$

40

7. $\left.\begin{array}{l} \frac{3}{x} + y = 7 \\ \frac{3}{y} + x = 2 \end{array}\right\} \Rightarrow \frac{x}{y} = ?$

$\frac{2}{7}$

8. $2x + 3y + 4z = 9$

$4x + 3y + 2z = 15$

$\Rightarrow x + y + z = ?$

4

ÖRNEK SORU TÜRLERİ ÖRNEK SORU TÜRLERİ

9. $\left.\begin{array}{l} x - z = 8 \\ x \cdot y = 64 \\ y \cdot z = 24 \end{array}\right\} \Rightarrow y = ?$

5

10. $x, y, z \in R^+$

$\left.\begin{array}{l} x \cdot y = 12 \\ y \cdot z = 30 \\ x \cdot z = 20 \end{array}\right\} \Rightarrow y = ?$

$\Rightarrow y = ?$

$3\sqrt{2}$

11. $x, y, z \in R^+$

$\left.\begin{array}{l} x \cdot y = \frac{1}{4} \\ y \cdot z = \frac{2}{15} \\ x \cdot z = \frac{3}{10} \end{array}\right\} \Rightarrow y = ?$

$\frac{1}{3}$

12. $\left.\begin{array}{l} a + b = 12 \\ b + c = 8 \\ c + a = 10 \end{array}\right\} \Rightarrow a = ?$

7

13. $a - b = 23$

$b + c = 9$

$c - d = 6$

$\Rightarrow a - 2b - 2c + d = ?$

8

14. $\frac{x+y}{x} = 6$

$\frac{z-x}{x} = 3$

$x + y + z = 50$

$\Rightarrow z = ?$

20

15. $a, b, c \in Z^+$

$2a - 3b = 13$

$a - c = 4$

$4c + 3b = 37$

$\Rightarrow a = ?$

11

16. $\left.\begin{array}{l} \frac{x \cdot y}{x+y} = \frac{1}{7} \\ \frac{y \cdot z}{y+z} = \frac{1}{9} \\ \frac{x \cdot z}{x+z} = \frac{1}{4} \end{array}\right\} \Rightarrow x = ?$

1

1. $3x + 4 = 2x - 7$

$\Rightarrow x = ?$

A) -5 B) -7 C) -9 D) -11 E) -13

2. $2x - (4 - x) = x + 18$

$\Rightarrow x = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

3. $3x - (x - 2) = 2 \cdot (x + 5)$

$\Rightarrow$ S.S. = ?

A) 0 B) Ø C) R

D) $R - \{0\}$ E) $\{1\}$

4. $5x - 3 + 2x = 3x + 13$

$\Rightarrow x = ?$

A) -4 B) -2 C) 0 D) 4 E) 6

5. $6 - (4 + x) + 3x = x - 8$

$\Rightarrow x = ?$

A) -10 B) $-\frac{10}{3}$ C) 2 D) 3 E) $\frac{10}{3}$

6. $3x - 2 \cdot (x + 7) = 8x - 7 \cdot (x + 2)$

$\Rightarrow$ S.S. = ?

A) 0 B) Ø C) R D) {3} E) {5}

7. $2 \cdot (a - 3) + 4 \cdot (a + 2) - a + 13 = 0$

$\Rightarrow a = ?$

A) -4 B) -3 C) -2 D) -1 E) 0

8. $6 - 2 \cdot (x - 5) + 4 = 4 \cdot (4 - x)$

$\Rightarrow x = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

9. $3-\{2\cdot[x-7]-3\cdot[4-x]\}=2\cdot(14-3x)$
$\Rightarrow x=?$

A) $\frac{27}{7}$ B) $\frac{1}{11}$ C) 0 D) -1 E) $-\frac{27}{7}$

10. $3\cdot(1-a)+4\cdot(a-2)=0$
$\Rightarrow a=?$

A) 1 B) $\frac{11}{7}$ C) 5 D) 11 E) 12

11. $5\cdot(a+2)-3\cdot(2a-1)+2\cdot(a-1)=0$
$\Rightarrow a=?$

A) -11 B) -2 C) 0 D) 1 E) 5

12. $3\cdot(x-4)+5\cdot(2-x)=2\cdot(x+5)$
$\Rightarrow x=?$

A) -3 B) -2 C) 1 D) 4 E) 10

13. $6x-[-5\cdot(3+x)]=4\cdot(3x+4)$
$\Rightarrow x=?$

A) $-\frac{3}{2}$ B) -1 C) $-\frac{1}{2}$ D) $\frac{5}{2}$ E) 3

14. $5x-[-3x-(2x-\{x-9\})]=0$
$\Rightarrow x=?$

A) 9 B) $\frac{9}{2}$ C) 3 D) 0 E) -1

15. $\frac{x}{3}-2=x+4$
$\Rightarrow x=?$

A) -10 B) -9 C) -8 D) -7 E) -6

16. $\frac{x+1}{5}=\frac{x-4}{4}$
$\Rightarrow x=?$

A) 6 B) 9 C) 12 D) 18 E) 24

1. $\frac{x}{3}+\frac{x-1}{2}=\frac{2x}{6}-\frac{x-1}{3}$

$\Rightarrow x=?$

A) 1 B) 2 C) 3 D) 4 E) 6

2. $\frac{2x-1}{3}=\frac{x+1}{2}$

$\Rightarrow x=?$

A) $\frac{1}{7}$ B) $\frac{5}{7}$ C) 3 D) 4 E) 5

3. $\frac{6}{2x-6}=\frac{5}{1+x}$

$\Rightarrow x=?$

A) –6 B) –4 C) $\frac{9}{4}$ D) 9 E) 10

4. $\frac{x}{3}-\left(\frac{x}{2}-\frac{x}{3}+1\right)=0$

$\Rightarrow x=?$

A) 1 B) 3 C) 4 D) 6 E) 8

5. $5-\frac{x}{2}=\frac{x}{4}-4$

$\Rightarrow x=?$

A) – 36 B) – 8 C) $\frac{4}{3}$ D) 2 E) 12

6. $\frac{x+2}{4}-\frac{x-1}{3}=\frac{x}{12}$

$\Rightarrow x=?$

A) $-\frac{1}{3}$ B) 0 C) 5 D) 6 E) 8

7. $\frac{2x}{5}-\frac{3\cdot(x-1)}{4}=\frac{x-1}{5}+\frac{2x+2}{10}$

$\Rightarrow x=?$

A) 0 B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

8. $\frac{x-4}{4}+\frac{x+10}{5}-10=0$

$\Rightarrow x=?$

A) 9 B) 10 C) 20 D) 24 E) 25

9. $3\cdot\frac{x}{2}-2\cdot\frac{x}{3}=30$

$\Rightarrow x=?$

A) 0 B) 1 C) 3 D) 12 E) 36

10. $\frac{1}{2}(x+1)-\frac{1}{3}(x-2)=6$

$\Rightarrow x=?$

A) -7 B) 5 C) 17 D) 29 E) 32

11. $\frac{2}{3}(x-1)-\frac{1}{4}(x+2)=3$

$\Rightarrow x=?$

A) 4 B) 6 C) 8 D) 10 E) 12

12. $\frac{1}{3}(x-4)+\frac{1}{4}(2-x)=\frac{1}{6}(x-1)$

$\Rightarrow x=?$

A) -8 B) $-\frac{4}{3}$ C) $\frac{4}{3}$ D) 4 E) 8

13. $x\cdot\left(5-\frac{3}{x}\right)=4\cdot(3-x)$

$\Rightarrow x=?$

A) -15 B) $-\frac{5}{3}$ C) 1 D) $\frac{5}{3}$ E) 15

14. $\frac{3}{7}-4\cdot\left(\frac{x}{3}-\frac{1}{7}\right)=2\cdot\left(\frac{5x}{6}+3\right)$

$\Rightarrow x=?$

A) $-\frac{5}{3}$ B) $-\frac{2}{3}$ C) $\frac{1}{2}$ D) $\frac{2}{3}$ E) $\frac{5}{6}$

15. $\left[\frac{x}{3}+\frac{2x}{5}-\frac{3x}{2}\right]+\left[\frac{x}{2}+\frac{2x}{3}-\frac{7x}{5}\right]=4$

$\Rightarrow x=?$

A) -8 B) -4 C) $-\frac{5}{2}$ D) $-\frac{1}{2}$ E) 0

16. $\frac{x}{2}-\left[\frac{x}{3}+\frac{x}{2}\cdot\left(1-\frac{2}{3}\right)-\frac{x}{6}\right]=-\frac{1}{2}$

$\Rightarrow x=?$

A) 0 B) -1 C) -2 D) -3 E) -6

1. $\frac{4}{x-2} = \frac{x+10}{2x+4}$

$\Rightarrow x = ?$

A) -2 B) 2 C) 3 D) 5 E) 6

2. $\frac{1}{2x} - \frac{1}{3x} = \frac{1}{24}$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 6 E) 12

3. $\frac{1}{3x} + \frac{2}{5x} - \frac{1}{x} = \frac{1}{15}$

$\Rightarrow x = ?$

A) -6 B) -4 C) $-\frac{4}{15}$ D) $\frac{1}{15}$ E) $\frac{1}{5}$

4. $\frac{1}{6x} + \frac{1}{2x} + \frac{1}{3x} = \frac{1}{5}$

$\Rightarrow x = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{5}{3}$ D) $\frac{25}{6}$ E) 5

5. $\frac{7}{x+7} - 2 = x - \frac{x}{x+7}$

$\Rightarrow x = ?$

A) -2 B) -1 C) 0 D) 1 E) 7

6. $\frac{x}{0,2} - \frac{x}{0,5} = -15$

$\Rightarrow x = ?$

A) 5 B) 3 C) 1 D) -3 E) -5

7. $\frac{0,05+x}{0,04} = \frac{0,3-x}{0,2}$

$\Rightarrow x = ?$

A) $\frac{1}{15}$ B) $\frac{1}{30}$ C) $\frac{1}{60}$ D) $\frac{1}{120}$ E) $\frac{1}{240}$

8. $\frac{x}{0,4} + \frac{x}{0,3} - \frac{x}{0,6} = -25$

$\Rightarrow x = ?$

A) -8 B) -6 C) 0 D) 2 E) 4

9. $\frac{0,x}{0,04} - \frac{0,0x}{0,005} + \frac{0,x}{0,02} = 33$

$\Rightarrow x = ?$

A) 0,1 B) 1 C) 3 D) 5 E) 6

10. $\frac{5 \cdot (0,0x + 0,x)}{0,x + x} + x = 2$

$\Rightarrow x = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) 3

11. $\frac{x+3}{x-1} = \frac{x+5}{x+3}$

$\Rightarrow x = ?$

A) -14 B) -7 C) 2 D) 4 E) 6

12. $\frac{x+2}{x-3} = \frac{x+1}{x-2}$

$\Rightarrow$ S.S. = ?

A) $\left\{\frac{1}{2}\right\}$ B) {1} C) {2} D) Ø E) R

13. $3x - \{-2 \cdot [5x + 2]\} = mx + 5$

S.S. = Ø

$\Rightarrow m = ?$

A) -7 B) -2 C) 5 D) 8 E) 13

14. $7x + 2 \cdot (x + 9) = ax + 7$

S.S. = Ø

$\Rightarrow a = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

15. $3 \cdot (x - 4) + 5x = 2 \cdot (x - ax - 6)$

S.S. = R

$\Rightarrow a = ?$

A) -4 B) -3 C) 2 D) 3 E) 4

16. $ax + 18 = 5x - 3 \cdot (x + b)$

S.S. = R

$\Rightarrow a + b = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

1. $\frac{x}{x-5}+x=\frac{5}{x-5}+5$

$\Rightarrow x=?$

A) 3 B) 4 C) 5 D) 10 E) 25

2. $\frac{x}{x-2}+\frac{x-2}{3}=\frac{x-3}{2}+\frac{2}{x-2}$

$\Rightarrow x=?$

A) 11 B) 9 C) 6 D) 3 E) 2

3. $\frac{4x+1}{x-1}+4=\frac{3x+2}{x-1}+x$

$\Rightarrow x=?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\frac{3-x}{2x-3}+\frac{x}{3-2x}=x+6$

$\Rightarrow x=?$

A) -8 B) -7 C) -6 D) -5 E) -4

5. $\frac{2x+4}{x-2}+\frac{14-3x}{2-x}=3$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) {2}
D) {(1, 2)} E) {3, 4}

6. $\frac{x+1}{x+5}+2\cdot(x-2)=\frac{4}{-5-x}+7$

$\Rightarrow x=?$

A) -4 B) -2 C) 1 D) 4 E) 5

7. $\frac{2x+1}{x-1}+\frac{5x+7}{1-x}=3$

$\Rightarrow x=?$

A) $-\frac{1}{2}$ B) $-\frac{1}{3}$ C) $-\frac{1}{6}$ D) $\frac{1}{5}$ E) $\frac{1}{7}$

8. $\frac{x(x-7)}{x-2}+\frac{x+3}{x-3}+\frac{2x-3}{x+1}-\frac{3x}{x+2}=0$

$\Rightarrow x=?$

A) -2 B) -1 C) 2 D) 3 E) 4

9. $2x+1+\frac{7}{x-9}=3x-5-\frac{7}{9-x}$

$\Rightarrow x=?$

A) -1 B) 2 C) 3 D) 6 E) 9

10. $\frac{10}{3x-1}-3\cdot\left(4+\frac{x+3}{3x-1}\right)=x-10$

$\Rightarrow x=?$

A) -4 B) -3 C) 2 D) 10 E) 20

11. $\frac{2x}{2x+4}-\frac{x}{5}-\frac{x}{3}=2-\left[\frac{2x}{5}+\frac{x}{3}+\frac{4}{2x+4}\right]$

$\Rightarrow x=?$

A) 1 B) 2 C) 5 D) 15 E) 20

12. $\frac{2x+7}{x-1}+\frac{3x+6}{1-x}=1$

$\Rightarrow$ S.S. $=?$

A) R B) Ø C) $R\setminus\{1\}$ D) $\{1\}$ E) $\{0\}$

13. $4+\cfrac{12}{2+\cfrac{16}{5+\cfrac{6}{x-9}}}=7$

$\Rightarrow x=?$

A) 6 B) 7 C) 8 D) 10 E) 11

14. $7-\cfrac{6}{10-\cfrac{16}{5-\cfrac{9}{x+1}}}=4$

$\Rightarrow x=?$

A) -3 B) 1 C) 2 D) 4 E) 5

15. $1+\cfrac{12}{2+\cfrac{24}{5+\cfrac{14}{x+9}}}=4$

$\Rightarrow x=?$

A) -5 B) -6 C) -7 D) -8 E) -9

16. $\cfrac{\cfrac{\cfrac{x+11}{2}+4}{\cfrac{5}{2}}+4}{+4=5}$

$\Rightarrow x=?$

A) -39 B) -17 C) -10 D) 17 E) 30

1. $\left.\begin{matrix} x+y=10 \\ x-y=4 \end{matrix}\right\} \Rightarrow x=?$

A) 8 B) 7 C) 6 D) 4 E) 3

2. $\left.\begin{matrix} 3x+y=11 \\ 2x+y=8 \end{matrix}\right\} \Rightarrow y=?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\left.\begin{matrix} x-y=2 \\ 2x+3y=14 \end{matrix}\right\} \Rightarrow$ S.S. = {(x, y)} = ?

A) {(4, 2)} B) {(3, 1)} C) {(5, 3)}
D) {(1, 3)} E) {(5, 4)}

4. $\left.\begin{matrix} x+y=\frac{7}{3} \\ x-y=\frac{5}{3} \end{matrix}\right\} \Rightarrow x=?$

A) 12 B) 8 C) 4 D) 2 E) $\frac{2}{3}$

5. $\left.\begin{matrix} x-y=8 \\ -(x+y)=6 \end{matrix}\right\} \Rightarrow x=?$

A) −2 B) −1 C) 0 D) 1 E) 2

6. $\left.\begin{matrix} 5x+4y=12 \\ 5y-5x=6 \end{matrix}\right\} \Rightarrow x=?$

A) 5 B) $\frac{4}{5}$ C) $\frac{1}{2}$ D) $-\frac{1}{2}$ E) −2

7. $\left.\begin{matrix} 4x+y=10 \\ 5x-2y=6 \end{matrix}\right\} \Rightarrow \frac{x}{y}=?$

A) 1 B) 2 C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

8. $\left.\begin{matrix} 2x-3y=17 \\ x+3y=10 \end{matrix}\right\} \Rightarrow y=?$

A) 9 B) 3 C) $\frac{1}{3}$ D) 0 E) −1

9. $\left.\begin{matrix} 4x - 3y = 9 \\ x + y = 4 \end{matrix}\right\} \Rightarrow x \cdot y = ?$

A) $\frac{3}{2}$ B) 2 C) 3 D) $\frac{7}{2}$ E) $\frac{9}{2}$

10. $\left.\begin{matrix} 7x - 2y = 5 \\ 5y - 4x = 4 \end{matrix}\right\} \Rightarrow x + y = ?$

A) $\frac{1}{3}$ B) 1 C) 3 D) 4 E) 5

11. $\left.\begin{matrix} 2x + 3y = 12 \\ 3x + 2y = 13 \end{matrix}\right\} \Rightarrow x \cdot y = ?$

A) -4 B) 3 C) 6 D) 12 E) 18

12. $\left.\begin{matrix} 2x - y = 2 \\ 3x - 2y = 9 \end{matrix}\right\} \Rightarrow x \cdot y = ?$

A) 20 B) 30 C) 42 D) 60 E) 75

13. $\left.\begin{matrix} 4x + 3y = -8 \\ 3x + 4y = -13 \end{matrix}\right\} \Rightarrow \frac{y}{x} = ?$

A) -4 B) -1 C) 1 D) 4 E) 5

14. $\left.\begin{matrix} x - y = 2xy \\ x + y = 10xy \end{matrix}\right\} \Rightarrow x \cdot y = ?$

A) $\frac{1}{6}$ B) $\frac{1}{12}$ C) $\frac{1}{18}$ D) $\frac{1}{24}$ E) $\frac{1}{48}$

15. $\left.\begin{matrix} ax + by = 3 \\ bx + 2ay = 5 \\ (x, y) = (1, -1) \end{matrix}\right\} \Rightarrow (a, b) = ?$

A) (8, 5) B) (5, 8) C) $(-8, -11)$ D) (3, 2) E) (4, 7)

16. $\left.\begin{matrix} ax - by = 4 \\ 2bx + 4ay = 4 \\ (x, y) = (2, -1) \end{matrix}\right\} \Rightarrow b = ?$

A) 2 B) 3 C) $\frac{7}{2}$ D) $\frac{9}{2}$ E) 5

1. $xy + x - y + 3 = 0$

$\Rightarrow x = ?$

A) $\frac{y+3}{y+1}$ B) $\frac{y-3}{y+1}$ C) $\frac{y+1}{y-3}$

D) $\frac{y-3}{y-1}$ E) 2

2. $4 - 3x + 4xy + y = 0$

$\Rightarrow x = ?$

A) $\frac{4+y}{3-y}$ B) $\frac{y-3}{4+y}$ C) $\frac{3-4y}{4+y}$

D) $\frac{4+y}{3-4y}$ E) $\frac{3-y}{4+y}$

3. $2ab - b + 8a + ab = 6$

$\Rightarrow b = ?$

A) $\frac{3a-1}{6-8a}$ B) $\frac{-2a}{3a-1}$ C) $\frac{3a-1}{2a}$

D) $\frac{6-8a}{3a-1}$ E) $4a - 3$

4. $\left.\begin{array}{l} \frac{7}{x}+\frac{3}{y}=5 \\ \frac{2}{x}-\frac{1}{y}=\frac{8}{3} \end{array}\right\} \Rightarrow x = ?$

A) 1 B) 2 C) 7 D) 11 E) 13

5. $\left.\begin{array}{l} \frac{5}{x}+\frac{2}{y}=7 \\ \frac{3}{x}-\frac{1}{y}=2 \end{array}\right\} \Rightarrow x \cdot y = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $\left.\begin{array}{l} \frac{4}{x}+\frac{6}{y}=4 \\ \frac{1}{x}+\frac{3}{y}=\frac{3}{2} \end{array}\right\} \Rightarrow x \cdot y = ?$

A) 6 B) 9 C) 12 D) 18 E) 24

7. $\left.\begin{array}{l} \frac{3}{x}+\frac{2}{y}=\frac{7}{3} \\ \frac{2}{x}+\frac{3}{y}=-4 \end{array}\right\} \Rightarrow x = ?$

A) -3 B) -1 C) $\frac{1}{3}$ D) 3 E) 15

8. $\left.\begin{array}{l} \frac{5}{x}-\frac{2}{y}=-5 \\ \frac{4}{y}+\frac{10}{x}=6 \end{array}\right\} \Rightarrow y = ?$

A) $\frac{1}{2}$ B) $\frac{5}{6}$ C) 1 D) $\frac{6}{5}$ E) 2

9. $\left.\begin{matrix} x + 2y = 5 \\ 3x + 6y = 10 \end{matrix}\right\} \Rightarrow$ S.S. = ?

A) {(1, 2)} B) R C) Ø

D) {(3, 1)} E) $\left\{\left(4, \frac{1}{2}\right)\right\}$

10. $\left.\begin{matrix} x - 3y = 4 \\ 3x - 9y = 5 \end{matrix}\right\} \Rightarrow$ S.S. = ?

A) {(1, 3)} B) {(3, 4)} C) {(3, 2)}

D) R E) Ø

11. $\left.\begin{matrix} 2x - 5y = 2 \\ -6x + 15y = 8 \end{matrix}\right\} \Rightarrow$ S.S. = ?

A) {(1, 3)} B) {(2, 4)} C) {(2, 1)}

D) R E) Ø

12. $ax + 3y = 7$

$2x - y = 11$

S.S. = Ø

$\Rightarrow a = ?$

A) – 2 B) – 3 C) – 4 D) – 6 E) – 9

13. $2x + ay = 4$

$4x - 6y = 8$

$n(S.S.) = \infty$

$\Rightarrow a = ?$

A) – 3 B) – 2 C) 1 D) 2 E) 4

14. $2x - y + z = 3$

$y - z + ax = 4$

S.S. = Ø

$\Rightarrow a = ?$

A) – 2 B) – 1 C) 2 D) 4 E) 7

15. $6x + z = 4$

$12x + az = 8$

$n(S.S.) = \infty$

$\Rightarrow a = ?$

A) – 3 B) – 2 C) 2 D) 3 E) 4

16. $ax + 2y = 4$

$8x + 4ay = -11$

S.S. = Ø

$\Rightarrow a^2 = ?$

A) 2 B) 3 C) 4 D) 8 E) 16

1. $\left.\begin{array}{l} x+y=5 \\ y+z=11 \\ x+z=8 \end{array}\right\} \Rightarrow x \cdot y \cdot z = ?$

A) 18 B) 20 C) 24 D) 28 E) 30

2. $\left.\begin{array}{l} x-y=7 \\ y+z=4 \\ x-z=5 \end{array}\right\} \Rightarrow x+y+z = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

3. $\left.\begin{array}{l} 2x-y=15 \\ 2x+3z=12 \\ z+5y=-3 \end{array}\right\} \Rightarrow x+y+z = ?$

A) 7 B) 6 C) 5 D) 2 E) 1

4. $x, y, z \in R^+$

$\left.\begin{array}{l} x \cdot y = 12 \\ y \cdot z = 14 \\ x \cdot z = 42 \end{array}\right\} \Rightarrow x = ?$

A) 2 B) 4 C) 6 D) 7 E) 12

5. $x, y, z \in R^-$

$\left.\begin{array}{l} x \cdot y = 32 \\ y \cdot z = 48 \\ x \cdot z = 24 \end{array}\right\} \Rightarrow z = ?$

A) 6 B) 4 C) –1 D) –2 E) –6

6. $x, y, z \in Z^-$

$\left.\begin{array}{l} x \cdot z = 21 \\ x \cdot y = 14 \\ z \cdot y = 6 \end{array}\right\} \Rightarrow x = ?$

A) –7 B) –3 C) –2 D) 3 E) 7

7. $x, y, z \in Z$

$z > x > y$

$\left.\begin{array}{l} x \cdot y = 12 \\ y \cdot z = -8 \\ x \cdot z = -6 \end{array}\right\} \Rightarrow x+y+z = ?$

A) –19 B) –5 C) 1 D) 5 E) 19

8. $3a + 4b + c = 20$

$5a + 4b + 7c = 36$

$\Rightarrow a + b + c = ?$

A) 5 B) 6 C) 7 D) 8 E) 10

9. $\left.\begin{array}{l} a-b+3c=6 \\ 3a+5b+c=10 \end{array}\right\} \Rightarrow a+b+c=?$

A) 2 B) 4 C) 7 D) 10 E) 16

10. $\left.\begin{array}{l} 2x-y+3z=4 \\ 6z+4x+2y=12 \end{array}\right\} \Rightarrow y=?$

A) -2 B) 1 C) $\frac{3}{2}$ D) 2 E) 4

11. $\left.\begin{array}{l} x-y+3z=7 \\ 3x-3y+z=-11 \end{array}\right\} \Rightarrow z=?$

A) -1 B) 1 C) 2 D) 3 E) 4

12. $\left.\begin{array}{l} 2x+y+2z=9 \\ 5\cdot(x+z)+6y=12 \end{array}\right\} \Rightarrow y=?$

A) -7 B) -3 C) 1 D) 2 E) 7

13. $\left.\begin{array}{l} 2a-b+3c=13 \\ 4a+b+5c=37 \end{array}\right\} \Rightarrow a+b+c=?$

A) 9 B) 10 C) 11 D) 12 E) 13

14. $\left.\begin{array}{l} 7x+5y+z=3 \\ 3x+y-3z=4 \end{array}\right\} \Rightarrow x+y+z=?$

A) $-\frac{7}{2}$ B) $-\frac{1}{4}$ C) 1 D) $\frac{1}{4}$ E) $\frac{7}{2}$

15. $\left.\begin{array}{l} 2x+3y-3z=3 \\ x-y-z=4 \end{array}\right\} \Rightarrow 4x+y-5z=?$

A) 3 B) 4 C) 5 D) 7 E) 11

16. $\left.\begin{array}{l} 2a-b+7c=6 \\ 3a+8c=15 \end{array}\right\} \Rightarrow a+b+c=?$

A) 3 B) 4 C) 7 D) 9 E) 10

1. $\left.\begin{array}{l} 2b-c+d=3 \\ b-2c+2d=7 \end{array}\right\} \Rightarrow b+c-d=?$

A) -10 B) -7 C) -4 D) 4 E) 10

2. $\left.\begin{array}{l} a\cdot x\cdot y=10 \\ b\cdot x\cdot y=4 \\ a+b=7 \end{array}\right\} \Rightarrow x\cdot y=?$

A) 2 B) 4 C) 6 D) 7 E) 10

3. $\left.\begin{array}{l} a\cdot x=12 \\ a\cdot y=18 \\ x+y=10 \end{array}\right\} \Rightarrow a=?$

A) -3 B) -2 C) -1 D) 2 E) 3

4. $\left.\begin{array}{l} a\cdot x=8 \\ a\cdot y=6 \\ x-y=2 \end{array}\right\} \Rightarrow a=?$

A) 1 B) 2 C) 3 D) 6 E) 8

5. $x, a, b, c \in R$

$\left.\begin{array}{l} x\cdot a=6 \\ x\cdot b=10 \\ x\cdot c=14 \\ a+b=-8 \end{array}\right\} \Rightarrow c=?$

A) -14 B) -7 C) -2 D) -1 E) 1

6. $x, y, z \in R^+$

$\left.\begin{array}{l} x\cdot y=4\cdot z \\ y\cdot z=9\cdot x \end{array}\right\} \Rightarrow y=?$

A) 1 B) 2 C) 4 D) 6 E) 9

7. $\left.\begin{array}{l} \frac{3}{a}+b=2 \\ \frac{3}{b}+a=3 \end{array}\right\} \Rightarrow \frac{a}{b}=?$

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{2}$ D) 2 E) 3

8. $\left.\begin{array}{l} \frac{4}{a}+b=2 \\ \frac{4}{b}+a=7 \end{array}\right\} \Rightarrow \frac{a}{b}=?$

A) -2 B) -1 C) 1 D) $\frac{7}{2}$ E) 4

9. $x, y \in Z^+$

$3x + 7y = 42$

$\Rightarrow x = ?$

A) 3 B) 6 C) 7 D) 14 E) 21

10. $x, y \in Z^+$

$13x + 5y = 49$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $x, y, z \in Z^+$

$x > y > z$

$3x + 5y + 7z = 29$

$\Rightarrow x - y + z = ?$

A) -1 B) 1 C) 2 D) 3 E) 4

12. $x, y, z \in Z^+$

$7x + 4y + 5z = 20$

$\Rightarrow y = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $a \neq b$

$ax + a^2 = bx + b^2$

$\Rightarrow x = ?$

A) $a + b$ B) $a - b$ C) $-a - b$ D) $b - a$ E) $a \cdot b$

14. $x \neq y$

$5x - y^2 = 5y - x^2$

$\Rightarrow x + y = ?$

A) -5 B) -4 C) 4 D) 5 E) 10

15. $a \neq b$

$3a + \frac{7}{a} = 3b + \frac{7}{b}$

$\Rightarrow a \cdot b = ?$

A) $\frac{3}{7}$ B) $\frac{7}{3}$ C) 4 D) 10 E) 21

16. $a \neq b$

$4b - \frac{8}{a} = 4a - \frac{8}{b}$

$\Rightarrow a \cdot b = ?$

A) $\frac{1}{2}$ B) 2 C) 3 D) 4 E) 6

1. $\frac{a \cdot b}{a+b} = \frac{1}{3}$

$\Rightarrow \frac{1}{a} + \frac{1}{b} = ?$

A) -3 B) -2 C) $\frac{1}{2}$ D) $\frac{1}{3}$ E) 3

2. $x, y \in N^+$

$x^2 - y^2 = 19$

$\Rightarrow x \cdot y = ?$

A) 45 B) 56 C) 72 D) 90 E) 99

3. $3 - \frac{9 - \frac{1 + \frac{x}{7}}{2}}{5} = 2 \Rightarrow x = ?$

A) 21 B) 28 C) 35 D) 42 E) 49

4. $x \cdot y = 1$

$x^3y^2 + y^4x^3 = 5$

$\Rightarrow x + y = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $(x - y + 4)^3 - (x + y - 6)^3 = 0$

$\Rightarrow y = ?$

A) -10 B) -5 C) 0 D) 5 E) 10

6. $x, y \in R$

$(x + y - 8)^2 + (x - y - 10)^4 = 0$

$\Rightarrow x = ?$

A) 10 B) 9 C) 8 D) 7 E) 1

7. $(x - 3) \cdot (x + 5) = (x - 3) \Rightarrow$ S.S. = ?

A) $\{-4\}$ B) $\{3\}$ C) $\{-5\}$ D) $\{-4, 3\}$ E) $\{-3\}$

8. $(x^2 - 4) \cdot (x + 2) = (x - 2) \cdot 9$

$\Rightarrow$ S.S. = ?

A) R B) $\{-5, 1\}$ C) $\{1\}$ D) $\{-5\}$ E) $\{-5, 1, 2\}$

9. $(x^3 - x) = (x^2 + x)$

$\Rightarrow$ S.S. = ?

A) R B) Ø C) {–1, 0, 2}

D) {–1, 0} E) R \ {2}

10. $x - y - z = 0$

$\Rightarrow \dfrac{(x-y)\cdot(z-x)\cdot(y+z)}{x\cdot y\cdot z} = ?$

A) 3 B) 1 C) $\frac{1}{3}$ D) 0 E) –1

11. $2x - y - z = 0$

$\Rightarrow \dfrac{z-x}{x-y} = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

12. $5x - 5y + z = 0$

$\Rightarrow \dfrac{z}{x-y}\cdot\dfrac{5y-z}{x} = ?$

A) – 25 B) – 5 C) 1 D) 5 E) 25

13. $a \cdot b \cdot c \neq 0$

$\left.\begin{array}{l} 2ab = 3c \\ 10ac = 6b \\ 3bc = 5a \end{array}\right\} \Rightarrow a \cdot b \cdot c = ?$

A) $\frac{1}{15}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{2}{3}$ E) $\frac{3}{2}$

14. $x \neq 0$

$y \neq 0$

$\left.\begin{array}{l} 2xy + y^2 = 3y \\ 3xy - 2x^2 = 5x \end{array}\right\} \Rightarrow x = ?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) 4

15. $x, y \in Z^+$

$2x \neq y$

$2x^3 - yx^2 - 2xy^2 + y^3 = 10x - 5y$

$\Rightarrow x + y = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $\left.\begin{array}{l} \dfrac{4}{x\cdot y} - \dfrac{5}{y\cdot z} = 7 \\ \dfrac{10}{y\cdot z} + \dfrac{2}{x\cdot y} = -12 \end{array}\right\} \Rightarrow x \cdot y = ?$

A) 10 B) 5 C) 3 D) 1 E) $\frac{1}{3}$

BİRİNCİ DERECEDEN DENKLEMLER
FIRST DEGREE EQUATIONS

Yanıt Anahtarı
Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	B	D	A	C	B	B	D	C	A	A	B	E	B	E

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	E	D	D	E	C	B	C	E	D	D	A	D	A	B	D

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	C	B	E	B	E	D	B	E	C	B	A	E	E	B	B

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	A	E	B	A	E	A	E	D	B	C	B	E	C	C	A

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	A	D	D	B	A	C	C	C	C	D	A	D	C	A

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	D	A	A	A	C	A	C	E	E	D	A	A	C	C

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	E	B	C	E	A	B	C	B	B	E	B	D	B	E	D

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	E	A	B	D	C	D	C	C	D	B	C	A	B	B

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	E	E	D	B	D	E	C	E	B	A	E	A	E	B

ÜSLÜ İFADELER
EXPONENTIAL EXPRESSIONS

ÖZELLİK|Property 1

Üslü İfadeler | Exponents

n pozitif tamsayı, a da gerçel sayı ise a^n, n tane a'nın çarpımıdır.

If n is positive integer, and a is e real number, a^n represents the product of n factors each of which is a.

$$a^n = \underbrace{a \cdot a \cdot a \cdot \ldots \cdot a}_{\text{n tane } (n\text{-times})}$$

$x \neq 0$

$0^x = 0$

$x^0 = 1$

$0^0 \rightarrow$ belirsiz *(undefined)*

1. $2^5 = ?$ — 32

2. $3^3 = ?$ — 27

3. $6^3 + 0^2 = ?$ — 216

4. $8^2 + 2^0 = ?$ — 65

5. $4^3 = ?$ — 64

6. $3^2 + 2^3 = ?$ — 17

7. $5^3 - 6^2 = ?$ — 89

8. $4^2 + 3^3 = ?$ — 43

9. $4^3 + 7^2 = ?$ — 113

10. $5^2 - 8^2 = ?$ — −39

11. $2^4 + 3^3 + 4^2 = ?$ — 59

12. $11^2 + 10^2 - 9^2 = ?$ — 140

13. $13^2 - 2^6 = ?$ — 105

14. $7^3 - 5^3 = ?$ — 218

15. $10^2 + 6^3 = ?$ — 316

ÖZELLİK|Property 2

$a \in R \qquad n, k \in Z$

$a^n \cdot a^k = a^{n+k}$

1. $2^2 \cdot 2^4 = ?$

2^6

2. $3^2 \cdot 3^3 \cdot 3^4 = ?$

3^9

3. $5^3 \cdot 5^2 \cdot 5^5 = ?$

5^{10}

4. $7^2 \cdot 7^3 \cdot 7^1 = ?$

7^6

5. $6^4 \cdot 6^{-3} = ?$

6

6. $11^5 \cdot 11^{-2} = ?$

11^3

7. $5^3 \cdot 5^2 \cdot 5^{-8} = ?$

5^{-3}

8. $6^2 \cdot 6^{-4} \cdot 6^5 \cdot 6^{-3} = ?$

1

9. $5^3 \cdot 5^2 \cdot 5^7 \cdot 5^{-8} = ?$

5^4

10. $2^5 \cdot 2^x \cdot 2^2 = 2^{13}$

$\Rightarrow x = ?$

6

11. $5^4 \cdot 5^2 \cdot 5^1 = 5^x$

$\Rightarrow x = ?$

7

12. $3^2 \cdot 3^4 \cdot 3^4 = 3^x$

$\Rightarrow x = ?$

10

13. $5^5 \cdot 5^{-2} \cdot 5^1 = 5^x$

$\Rightarrow x = ?$

4

14. $7^3 \cdot 7^4 \cdot 7^x = 7^{10}$

$\Rightarrow x = ?$

3

15. $9^3 \cdot 9^4 \cdot 9^x = 9^5$

$\Rightarrow x = ?$

-2

ÖZELLİK|Property 3

$a \in R \qquad n, k \in Z$

$$\frac{a^n}{a^k} = a^{n-k}$$

1. $\frac{7^4}{7^3} = ?$

7

2. $\frac{6^8}{6^3} = ?$

6^5

3. $\frac{11^5}{11^2} = ?$

11^3

4. $\frac{6^4 \cdot 6^5}{6^3} = ?$

6^6

5. $\frac{3^4 \cdot 3^5}{3^2} = ?$

3^7

6. $\frac{5^4 \cdot 5^5 \cdot 5^1}{5^3} = ?$

5^7

7. $\frac{3^4 \cdot 3^{-2}}{3^2} = ?$

1

8. $\frac{7^4 \cdot 7^{-2} \cdot 7^5}{7^3} = ?$

7^4

9. $\frac{13^6 \cdot 13^4 \cdot 13^{-7}}{13^2} = ?$

13

10. $\frac{5^3 \cdot 5^6 \cdot 5^{-2}}{5^{-1}} = ?$

5^8

11. $\frac{2^5}{2^2} = 2^x$

$\Rightarrow x = ?$

3

12. $\frac{3^8 \cdot 3^4}{3^2} = 3^x$

$\Rightarrow x = ?$

10

13. $\frac{5^4 \cdot 5^6}{5^5} = 5^x$

$\Rightarrow x = ?$

5

14. $\frac{6^7 \cdot 6^{-2}}{6^4} = 6^x$

$\Rightarrow x = ?$

1

15. $\frac{3^4 \cdot 3^5}{3^{-2}} = 3^x$

$\Rightarrow x = ?$

11

ÖZELLİK|Property 4

$a \in R \qquad n, k \in Z$

$(a^n)^k = a^{n \cdot k}$

$(a^n)^k = (a^k)^n$

1. $(2^3)^2 = ?$

2^6

2. $(3^4)^3 = ?$

3^{12}

3. $(7^2)^4 = ?$

7^8

4. $\left((5^{-3})^2\right)^4 = ?$

5^{-24}

5. $((-2)^2)^3 = ?$

2^6

6. $(-2^2)^3 = ?$

-2^6

7. $(-3^5)^2 = ?$

3^{10}

8. $(-3^2)^5 = ?$

-3^{10}

9. $(7^2)^4 = 7^x$

$\Rightarrow x = ?$

8

10. $\dfrac{(27)^3}{(9)^2} = ?$

3^5

11. $(32)^{\frac{2}{5}} = ?$

2^2

12. $(25)^3 = 5^x$

$\Rightarrow x = ?$

6

13. $\left(\left(\frac{1}{8}\right)^{-2}\right)^3 = 2^x$

$\Rightarrow x = ?$

18

14. $((-2)^{-2})^3 = 4^x$

$\Rightarrow x = ?$

-3

15. $((-3)^2)^{-4} \cdot 27^3 = ?$

3

ÖZELLİK|Property 5

$a, b \in R \qquad n \in N$

- $a^{-1} = \frac{1}{a}$
- $\left(\frac{a}{b}\right)^{-1} = \frac{b}{a}$
- $a^{-n} = \frac{1}{a^n}$
- $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{n}$

1. $3^{-1} = ?$ $\boxed{\frac{1}{3}}$

2. $5^{-1} = ?$ $\boxed{\frac{1}{5}}$

3. $-2^{-1} = ?$ $\boxed{-\frac{1}{2}}$

4. $2^{-2} = ?$ $\boxed{\frac{1}{4}}$

5. $(-5)^{-2} = ?$ $\boxed{\frac{1}{25}}$

6. $-5^{-2} = ?$ $\boxed{-\frac{1}{25}}$

7. $\left(\frac{3}{5}\right)^{-1} = ?$ $\boxed{\frac{5}{3}}$

8. $\left(\frac{1}{7}\right)^{-1} = ?$ $\boxed{7}$

9. $\left(\frac{3}{8}\right)^{-1}$ $\boxed{\frac{8}{3}}$

10. $\left(\frac{5}{9}\right)^{-1}$ $\boxed{\frac{9}{5}}$

11. $\left(\frac{2}{7}\right)^{-2}$ $\boxed{\frac{49}{4}}$

12. $\left(\frac{3}{5}\right)^{-2} = ?$ $\boxed{\frac{25}{9}}$

13. $\left(\frac{2}{3}\right)^{-2} = ?$ $\boxed{\frac{9}{4}}$

14. $2^{-3} = ?$ $\boxed{\frac{1}{8}}$

15. $-2^{-2} = ?$ $\boxed{-\frac{1}{4}}$

16. $(-2)^{-2} = ?$ $\boxed{\frac{1}{4}}$

17. $(-3^{-1})^{-2} = ?$ $\boxed{9}$

18. $(-3^{-2})^{-1} = ?$

-9

19. $(-2^{-3})^{-1} = ?$

-8

20. $(-5^{-2})^{-1} = ?$

-25

21. $-1^{-1} + 3^{-1} = ?$

$-\frac{2}{3}$

22. $\frac{2^{-1}}{5} = ?$

$\frac{1}{10}$

23. $\frac{2^{-2}}{3} = ?$

$\frac{1}{12}$

24. $2^{-4} + 4^{-2} = ?$

$\frac{1}{8}$

25. $\left(\frac{4}{9}\right)^{-1} + 4^{-2} = ?$

$\frac{37}{16}$

26. $\left(\frac{2}{5}\right)^{-1} + \frac{2^{-1}}{5} = ?$

$\frac{13}{5}$

27. $\left(\frac{1}{3}\right)^{-2} - 2^{-2} = ?$

$\frac{35}{4}$

28. $\frac{1}{2} \cdot 6^{-1} + \frac{4^{-1}}{3} = ?$

$\frac{1}{6}$

29. $\left(\frac{2}{3}\right)^{-3} \cdot 2^4 = ?$

54

30. $(-4)^3 \cdot (-8)^{-2} + (-1)^5 = ?$

-2

31. $(-3^2)^{-2} + \frac{9^{-2}}{2^{-3}} = ?$

$\frac{1}{9}$

32. $2^{-4} + \left(\frac{16}{15}\right)^{-1} = ?$

1

33. $\left(\frac{2}{7}\right)^{-2} \cdot \left(\frac{1}{4}\right)^{-1} = ?$

49

ÖZELLİK | Property 6

$a \in R \qquad a \notin \{1, -1, 0\}$

$a^n = a^k \Rightarrow n = k$

1. $2^x = 4$

$\Rightarrow x = ?$

2

2. $3^x = 81$

$\Rightarrow x = ?$

4

3. $5^{x+2} = 125$

$\Rightarrow x = ?$

1

4. $2^3 \cdot 2^5 \cdot 2^4 = 2^x$

$\Rightarrow x = ?$

12

5. $3^6 \cdot 3^4 \cdot 3^8 = 9^x$

$\Rightarrow x = ?$

9

6. $(3^2)^4 = 3^x$

$\Rightarrow x = ?$

8

7. $6^{2x-1} = 216$

$\Rightarrow x = ?$

2

8. $9^4 \cdot 3^2 \cdot 27^2 = 3^x$

$\Rightarrow x = ?$

16

9. $[(4)^{-2}]^6 = 2^x$

$\Rightarrow x = ?$

-24

10. $4^{x+1} = 2^{x-1}$

$\Rightarrow x = ?$

-3

11. $9^{x+1} = 27^{x-1}$

$\Rightarrow x = ?$

5

12. $2^{8x} = 4^{x+1}$

$\Rightarrow x = ?$

$\frac{1}{3}$

13. $5^{x-2} = 25^{x+1}$

$\Rightarrow x = ?$

-4

14. $8^x = 2^{x-2}$

$\Rightarrow x = ?$

-1

15. $32^{\frac{2}{5}} \cdot 16^{\frac{1}{2}} \cdot 8^{\frac{2}{3}} = 2^x$

$\Rightarrow x = ?$

6

ÖZELLİK|Property 7

$a, b \in R \qquad n \in Z$

$a^n \cdot b^n = (a \cdot b)^n$

1. $2^4 \cdot 3^4 = ?$

6^4

2. $3^2 \cdot 4^2 = ?$

12^2

3. $2^3 \cdot 3^3 \cdot 5^3 = ?$

30^3

4. $2^5 \cdot 7^5 = 14^x$

$\Rightarrow x = ?$

5

5. $-3^2 \cdot 5^2 = ?$

-15^2

6. $(-3)^2 \cdot (5)^2 = ?$

15^2

7. $2^6 \cdot 3^6 \cdot 5^6 = x^6$

$\Rightarrow x = ?$

30

ÖZELLİK|Property 8

$a, b \in R \qquad n \in Z$

$\frac{a^n}{b^n} = \left(\frac{a}{b}\right)^n$

1. $\frac{6^2}{3^2} = ?$

2^2

2. $\frac{30^4}{10^4} = ?$

3^4

3. $\frac{5^4}{7^4} = \left(\frac{5}{7}\right)^x$

$\Rightarrow x = ?$

4

4. $\frac{10^3}{6^3} = \left(\frac{5}{3}\right)^x$

3

5. $\left(\frac{6}{5}\right)^x = \frac{6^x}{25}$

$\Rightarrow x = ?$

2

6. $\left(\frac{3}{2}\right)^2 = \frac{9}{4^x}$

$\Rightarrow x = ?$

1

7. $\left(\frac{12}{5}\right)^x = 12^x \cdot 25$

$\Rightarrow x = ?$

-2

ÖZELLİK|Property 9

Üslü ifadelerde toplam durumundaki ifadeler ortak çarpan parantezine alınır, çarpım haline getirilir ve çözüm yapılır.

In exponential expressions, the expressions which are to be added are performed within parenthesis and transformed into a multiplication, then solved.

Örnek | Example

$$2^x + 2^{x+1} = 24$$
$$2^x + 2^x \cdot 2 = 24$$
$$2^x \cdot (1 + 2) = 24$$
$$3 \cdot 2^x = 24$$
$$2^x = 8$$
$$2^x = 2^3$$
$$\Rightarrow x = 3$$

1. $3^x + 3^x = 18$
$\Rightarrow x = ?$

2

2. $3 \cdot 2^x + 2^x = 32$
$\Rightarrow x = ?$

3

3. $3 \cdot 5^x - 5^x + 2 \cdot 5^x = 100$
$\Rightarrow x = ?$

2

4. $2^4 + 2^4 + 2^4 + 2^4 = ?$

64

5. $4 \cdot 3^2 + 6 \cdot 3^2 - 3^2 = ?$

3^4

6. $5^{x+1} + 2 \cdot 5^x - 3 \cdot 5^x = 20$
$\Rightarrow x = ?$

1

7. $2^{x+2} - 3 \cdot 2^x + 2^{x+1} = 48$
$\Rightarrow x = ?$

4

8. $3^x + \dfrac{4}{3^{-x}} = 45$
$\Rightarrow x = ?$

2

9. $5^{x+1} - 2 \cdot 5^x = 75$
$\Rightarrow x = ?$

2

10. $6^{x+2} + 2 \cdot 6^x - 3 \cdot 6^{x+1} = 20$
$\Rightarrow x = ?$

0

11. $3^{x+1} + 3^{x+2} = 36$
$\Rightarrow x = ?$

1

12. $\dfrac{3^{x+3} + 54}{3^x + 2} = ?$

27

13. $\dfrac{2^{x+1} - 2^x}{2^{x-1} + 2^x} = ?$

$\dfrac{2}{3}$

14. $\dfrac{2^x \cdot 2^x \cdot 2^x \cdot 2^x}{2^x + 2^x + 2^x + 2^x} = 2$
$\Rightarrow x = ?$

1

15. $\dfrac{6^{68} + 6^{69} + 6^{70}}{6^{69} + 6^{70} + 6^{71}} = ?$

$\dfrac{1}{6}$

ÖZELLİK|Property 10

$n \in N^+$

2n çift sayı, (2n – 1) tek sayı

2n is even number, (2n – 1) is odd number

$a \in R^+ \Rightarrow a^n \in R^+$

$a \in R^- \Rightarrow a^{2n} \in R^+$ ve *(and)* $a^{2n-1} \in R^-$

$$(-1)^m = \begin{cases} -1 & \text{m tek ise } \textit{(if m is odd)} \\ 1 & \text{m çift ise } \textit{(if m is even)} \end{cases}$$

1. $(-2)^3 + (-2)^2 = ?$ — -4

2. $(-1)^{100} + (-1)^{303} - (-1)^{23} = ?$ — 1

3. $(-1^{20}) + (-1^3) + (-1^{-20}) = ?$ — -3

4. $999^0 - (-2)^2 - (-3)^2 - (-5^0) = ?$ — -11

5. $0^3 + (-3)^0 - 2^{-2} = ?$ — $\frac{3}{4}$

6. $(-1)^{999} - (-1^{32}) + (-1^{-1}) = ?$ — -1

7. $(-333)^0 - (-1^{-333}) - \left(-\frac{1}{3}\right)^{-2} = ?$ — -7

8. $-2^{-2} + 3^{-1} + 2^{-3} = ?$ — $\frac{5}{24}$

9. $\left(-\frac{1}{9}\right)^{-6} \cdot 27^{-5} = ?$ — $\frac{1}{27}$

10. $\left(2\frac{1}{2}\right)^{-3} - (5 \cdot 2^{-1})^{-3} + \left(1\frac{1}{3}\right)^{-2} - 2^{-4} = ?$ — $\frac{1}{2}$

11. $n \in Z^+$

$(-2)^{2n+1} - (-2)^{2n+2} + 2^{2n+3} = ?$ — 2^{2n+1}

12. $(-9)^0 - (-2)^4 \cdot (-2) + (-3^2) = ?$ — 24

13. $((-2)^3)^2 \cdot ((-2)^2)^{-3} \cdot (-2)^{2^3}$ — 256

14. $\left(-\frac{1}{8}\right)^{-\frac{2}{3}} - (9)^{\frac{3}{2}} = ?$ — -23

15. $(-1)^{2016} + (-1999)^0 - (-2)^3 = ?$ — 10

ÖZELLİK Property 11

$a, b \in R$

$a \notin \{1, -1, 0\}$ ve *(and)* $b \notin \{1, -1, 0\}$

$$a^n = b^n \Rightarrow \begin{cases} a = b & n \text{ tek sayı } \textit{(n is odd number)} \\ a = \mp b & n \text{ çift sayı } \textit{(n is even number)} \end{cases}$$

1. $(2x + 1)^7 = (x - 2)^7$
$\Rightarrow x = ?$

-3

2. $(x - 2)^3 = (3x + 4)^3$
$\Rightarrow x = ?$

-3

3. $(2x)^5 = (x - 3)^5$
$\Rightarrow x = ?$

-3

4. $(5x - 2)^6 = (x + 4)^6$
$\Rightarrow$ S.S. = ?

$\left\{\frac{3}{2}, -\frac{1}{3}\right\}$

5. $(-x + 7)^4 = (-2x - 3)^4$
$\Rightarrow$ S.S. = ?

$\left\{-10, \frac{4}{3}\right\}$

6. $(x)^6 = (2x - 1)^6$
$\Rightarrow$ S.S. = ?

$\left\{1, \frac{1}{3}\right\}$

7. $x^4 = (x + 2)^2$
$\Rightarrow$ S.S. = ?

$\{2, -1\}$

8. $(4x + 3)^5 = (3x - 2)^5$
$\Rightarrow x = ?$

-5

9. $(7x + 2)^{13} = (5x + 10)^{13}$

4

10. $x^3 = (9 - 2x)^3$

3

11. $27x^3 = (x - 12)^3$

-6

12. $(7 - x)^2 = (2x - 8)^2$
$\Rightarrow$ S.S = ?

$\{1, 5\}$

13. $(x^2 + 2)^2 = (x + 8)^2$
$\Rightarrow$ S.S = ?

$\{-2, 3\}$

14. $x^2 + 2x + 1 = (3x - 3)^2$
$\Rightarrow$ S.S = ?

$\left\{\frac{1}{2}, 2\right\}$

15. $(-x + 13)^4 = (2x - 5)^4$
$\Rightarrow$ S.S = ?

$\{-8, 6\}$

ÖZELLİK|Property 12

$$A(x)^{B(x)} = 1$$

- $B(x) = 0$ ve *(and)* $A(x) \in R \setminus \{0\}$
- $A(x) = 1$ ve *(and)* $B(x) \in R$
- $A(x) = -1$ ve *(and)* B(x) çift sayı *(even number)*

1. $4^x = 1$
$\Rightarrow x = ?$

0

2. $2^{x+7} = 1$
$\Rightarrow x = ?$

-7

3. $4^{2x-4} = 1$
$\Rightarrow x = ?$

2

4. $12^{3x-12} = 1$
$\Rightarrow x = ?$

4

5. $7^{-x-4} = 1$
$\Rightarrow x = ?$

-4

6. $(3x-2)^7 = 1$
$\Rightarrow x = ?$

1

7. $(2x-1)^8 = 1$
$\Rightarrow$ S.S. = ?

{0, 1}

8. $(4x-3)^6 = 1$
$\Rightarrow$ S.S. = ?

$\left\{\frac{1}{2}, 1\right\}$

9. $(2x-5)^{-4} = 1$
$\Rightarrow x = ?$

{2, 3}

10. $(x-2)^{2x} = 1$
$\Rightarrow$ S.S. = ?

{0, 1, 3}

11. $(x+1)^{2x+1} = 1$
$\Rightarrow$ S.S. = ?

$\left\{\frac{-1}{2}, 0\right\}$

12. $(x+5)^{x-2} = 1$
$\Rightarrow$ S.S. = ?

{−6, −4, 2}

13. $(x-3)^{x+6} = 1$
$\Rightarrow$ S.S. = ?

{−6, 2, 4}

14. $(2x-3)^{x-2} = 1$
$\Rightarrow$ S.S. = ?

{2}

15. $(x-2)^{(x^2-4)} = 1$
$\Rightarrow$ S.S. = ?

{−2, 3}

ÖZELLİK|Property 13

$a \in R \setminus \{0, 1, -1\}$

$b \in R \setminus \{0, 1, -1\}$

$$\left.\begin{matrix} a^x = b^y \\ a^m = b^n \end{matrix}\right\} \Rightarrow \frac{x}{m} = \frac{y}{n}$$

1. $2^x = 3^4$

$2^6 = 3^y$

$\Rightarrow x \cdot y = ?$

24

2. $5^x = 6^4$

$6^{6y} = 5^{15}$

$\Rightarrow x \cdot y = ?$

10

3. $4^x = 3^6$

$8^y = 3^4$

$\Rightarrow \frac{x}{y} = ?$

$\frac{9}{4}$

4. $25^x = 7^8$

$5^y = 7^4$

$\Rightarrow \frac{x}{y} = ?$

1

5. $125^x = 64$

$8^y = 25$

$\Rightarrow x \cdot y = ?$

$\frac{4}{3}$

6. $2^x = 5^4$

$2^9 = 5^x$

$\Rightarrow x = ?$

6

7. $81 = 125^x$

$5^y = 3$

$\Rightarrow \frac{x}{y} = ?$

$\frac{4}{3}$

ÖZELLİK|Property 14

Üslü İfadelerde Sıralama

Ordering in Exponential Expressions

- $a > 1$

  $a^x < a^y \Rightarrow x < y$

- $0 < a < 1$

  $a^x < a^y \Rightarrow x > y$

Aşağıdaki ifadeleri sıralayınız.

Ordering of the expressions below.

1. $a = 2^{-3}$

$b = 2^{-1}$

$c = 2^{-7}$

$c < a < b$

2. $x = \left(\frac{1}{3}\right)^{10}$

$y = \left(\frac{1}{3}\right)^{12}$

$z = \left(\frac{1}{3}\right)^{20}$

$z < y < x$

3. $x = (-2^4)^3$

$y = (-2^3)^4$

$z = -2^{(4^3)}$

$z < x < y$

4. $x = \left(\frac{1}{2}\right)^{\frac{1}{3}}$

$y = \left(\frac{1}{2}\right)^{\frac{1}{5}}$

$z = \left(\frac{1}{2}\right)^{\frac{1}{7}}$

$x < y < z$

5. $a = 5^{28}$

$b = 3^{42}$

$c = 2^{56}$

$c < a < b$

Aşağıdaki ifadeleri sıralayınız.
Ordering of the expressions below.

1. $a = 5^2$
$b = 5^4$
$c = 5^8$

$a < b < c$

2. $a = (-3)^2$
$b = (-3)^4$
$c = (-3)^5$

$c < a < b$

3. $a = 2^{-7}$
$b = 2^5$
$c = 2^{-3}$

$a < c < b$

4. $a = (-4)^{-2}$
$b = (-4)^2$
$c = (-4)^3$

$c < a < b$

5. $a = \left(\frac{2}{7}\right)^{-1}$
$b = \left(\frac{2}{7}\right)^{2}$
$c = \left(\frac{2}{7}\right)^{5}$

$a > b > c$

6. $a = \left(\frac{1}{6}\right)^{-3}$
$b = \left(\frac{1}{6}\right)^{-5}$
$c = \left(\frac{1}{6}\right)^{-10}$

$a < b < c$

7. $a = 3^{30}$
$b = 3^{45}$
$c = 3^{75}$

$a < b < c$

8. $a = (2^3)^5$
$b = 2^{(2^3)}$
$c = (2^3)^{12}$

$b < a < c$

9. $a = 2^{60}$
$b = 3^{80}$
$c = 5^{40}$

$a < c < b$

10. $2^a = 17$
$3^b = 12$
$5^c = 138$

$b < c < a$

11. $4^a = 67$
$5^b = 30$
$7^c = 14$

$c < b < a$

12. $15^{3x-1} = 230$
$\Rightarrow ? < x < ?$

$1 < x < \frac{4}{3}$

13. $a \in Z^+$
$\left(\frac{4}{7}\right)^{2a+5} < \left(\frac{4}{7}\right)^{17-a}$
$\Rightarrow \min(a) = ?$

5

14. $a \in Z$
$\left(\frac{1}{3}\right)^{3a-7} < 3^{a-9}$
$\Rightarrow \min(a) = ?$

5

15. $a \in Z^-$
$\left(\frac{2}{5}\right)^{4-a} > \left(\frac{25}{4}\right)^{a+4}$
$\Rightarrow \max(a) = ?$

-13

13. $a \in Z^-$
$8^{a+2} < 2^{2a+13}$
$\Rightarrow \max(a) = ?$

-1

ÖZELLİK|Property 15

- $n \in N^+$

$10^1 = 10$

$10^2 = 10 \cdot 10 = 100$

$10^3 = 10 \cdot 10 \cdot 10 = 1000$

$\vdots$

$10^n = 10 \cdot 10 \cdot 10 \cdot \ldots \cdot 10 = \underbrace{1000\ldots0}_{\text{n tane } (n\text{-times})}$

- $n \in N$

$10^{-1} = \frac{1}{10} = 0,1$

$10^{-2} = \frac{1}{10} \cdot \frac{1}{10} = \frac{1}{100} = 0,01$

$10^{-3} = \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} = \frac{1}{1000} = 0,001$

$\vdots$

$10^{-n} = \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \ldots \cdot \frac{1}{10} = \frac{1}{1000\ldots0} = 0,\underbrace{000\ldots.1}_{\substack{\text{n tane} \\ n\text{-times}}}$

Örnek | Example

$365000 = 365 \cdot 10^3 = 36,5 \cdot 10^4 = 3,65 \cdot 10^5$

$0,0000365 = 365 \cdot 10^{-7} = 36,5 \cdot 10^{-6} = 3,65 \cdot 10^{-5}$

1. $3 \cdot 10^4 + 2 \cdot 10^4 = ?$

$5 \cdot 10^4$

2. $0,0021 - 0,0020 = ?$

10^{-4}

3. $0,3 \cdot 10^4 + 2,1 \cdot 10^4 = ?$

$2,4 \cdot 10^4$

4. $32 \cdot 10^4 + 2 \cdot 10^5 = ?$

$5,2 \cdot 10^5$

5. $7 \cdot 10^{-2} + 3 \cdot 10^2 = ?$

300,07

6. $17 \cdot 10^{-2} + 15 \cdot 10^{-2} = ?$

0,32

7. $2,8 \cdot 10^{-3} + 120 \cdot 10^{-5} = ?$

$4 \cdot 10^{-3}$

8. $2 \cdot (0,2)^2 + (0,3)^3 = ?$

$107 \cdot 10^{-3}$

9. $\frac{3}{0,2} - (0,25)^{-1} = ?$

11

10. $0,2 \cdot 10^6 + 2 \cdot 10^5 = ?$

$4 \cdot 10^5$

11. $2 \cdot 10^{-13} + 0,4 \cdot 10^{-12} = ?$

$6 \cdot 10^{-13}$

12. $3,2 \cdot 10^{-3} - 0,21 \cdot 10^{-2}$

$11 \cdot 10^{-4}$

13. $\frac{1}{0,0001} \cdot (0,06 + 0,14) = ?$

2000

14. $2 \cdot 10^{-11} \cdot 3 \cdot 10^{15} = ?$

$6 \cdot 10^4$

15. $7 \cdot 10^{-12} \cdot 3 \cdot 10^{-7} = ?$

$21 \cdot 10^{-19}$

16. $5 \cdot 10^{16} \cdot 4 \cdot 10^{-12} = ?$

$2 \cdot 10^5$

17. $0{,}800 + \left(0{,}2 + \frac{1}{5}\right) \cdot 2 = ?$

1,6

18. $4 + \frac{5}{100} + \frac{4}{10^3} = ?$

4,054

19. $\frac{6{,}8}{0{,}0017} = ?$

$4 \cdot 10^3$

20. $\frac{0{,}00040 + 0{,}0029}{0{,}66} = ?$

$5 \cdot 10^{-3}$

21. $\frac{0{,}24 \cdot 10^{-4}}{3 \cdot 10^3} = ?$

$8 \cdot 10^{-9}$

22. $\frac{0{,}5 \cdot 10^{13}}{5 \cdot 10^{-2}} = ?$

10^{14}

23. $\frac{(0{,}03)^3 \cdot (0{,}05)}{5400} = ?$

$25 \cdot 10^{-11}$

24. $\frac{0{,}1}{0{,}01} + \frac{0{,}01}{0{,}001} - \frac{0{,}001}{0{,}0001} = ?$

10

25. $\frac{51 \cdot 10^{-19}}{0{,}17 \cdot 10^{-19}} = ?$

$3 \cdot 10^2$

26. $(0{,}00025)^3 \cdot (80.000)^2 = ?$

0,1

27. $\frac{3 \cdot 10^{-4} - 1{,}1 \cdot 10^{-3}}{10^{-5}} = ?$

− 80

28. $\frac{8 \cdot 10^{-6} + 6 \cdot 10^{-5}}{3{,}4 \cdot 10^{-4}} + \frac{5 \cdot 10^{-3} + 40 \cdot 10^{-4}}{0{,}09 \cdot 10^{-1}} = ?$

1,2

29. $0,\underbrace{000\ldots0}_{\text{n tane}\ /\ n\ times}6 = 0{,}006 \cdot 10^{-9}$

− 13

ÖRNEK SORU TÜRLERİ Exemplary Question Types

1. Bu soruda ilk önce ifadenin işareti bulunur.

In this question, firstly determine the sign of the expression.

$$\frac{(-2)^7 \cdot (-2^4) \cdot (-2^{-2})}{-2^6 \cdot (-2)^{-2}} = ?$$

32

2. $$\frac{360000 \cdot 10^{-12}}{0{,}0012 \cdot 10^{-4}} = ?$$

3

3. $(x-4)^2 + (3x-y-1)^4 = 0$

$\Rightarrow x \cdot y = ?$

44

4. $x, y \in Z$

$7^{x-2} = 5^{y+5}$

$\Rightarrow x \cdot y = ?$

−10

5. $$\frac{11}{1+17^3} + \frac{11}{1+17^{-3}} = ?$$

11

6. $9^a = 5$

$25^b = 2$

$8^c = 3$

$\Rightarrow a \cdot b \cdot c = ?$

$\frac{1}{12}$

7. $3^x = 5^y$

$9^{\frac{x}{y}} - 25^{\frac{y}{x}} = ?$

16

8. $\frac{a}{b} = \frac{2}{3}$

$a^b = b^a$

$\Rightarrow b - a = ?$

$\frac{9}{8}$

ÖRNEK SORU TÜRLERİ Exemplary Question Types

9. $3^x = a$

$2^x = b$

$\Rightarrow 108^x$in a ve b türünden değeri nedir?

What is the value of 108^x in terms of a and b?

a^3b^2

10. $m, n \in Z$

$\left(\frac{1}{m}\right)^{-n} = \frac{1}{81}$

$\Rightarrow \min(m + n) = ?$

-11

11. $x = 9 \cdot 10^{-5}$

$\Rightarrow (0{,}03) \cdot (0{,}0003) \cdot (0{,}009) = ?$

$10 \cdot x^2$

12. $3^x \cdot 5^y \cdot 7^z = 9$

$6^x \cdot 10^y \cdot 14^z = 144$

$\Rightarrow x + y + z = ?$

4

13. $x^x + x^x + x^x + x^x = 2^{26}$

$\Rightarrow x = ?$

8

14. $x = 5^a - 5^{-a}$

$y = 5^a + 5^{-a}$

$\Rightarrow y^2 - x^2 = ?$

4

15. $x^{a+b} = 9$

$x^{a-b} = 4$

$\Rightarrow x^a + x^b = ?$

$\frac{15}{2}$

16. $(x - 3)^{(x-5)} + 3 = x$

$\Rightarrow$ S.S. = ?

{2, 3, 4, 6}

1. $(-2)^7 \cdot (-2^2) \cdot (-2^{-4}) = ?$

A) -8 B) -16 C) -32 D) 32 E) 64

2. $(-3^2)^{-4} \cdot 9^3 = ?$

A) $-\frac{1}{9}$ B) $-\frac{1}{3}$ C) $\frac{1}{9}$ D) 1 E) 9

3. $\frac{[1+(-1)^{302}]^0 \cdot (-2)^4}{-2^2} = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

4. $(-5)^{2010} \cdot (+5)^{-2011} = ?$

A) -5 B) $-\frac{1}{5}$ C) 0 D) $\frac{1}{5}$ E) 5

5. $A = 8^8$ $B = 4^4$

$\Rightarrow \frac{A}{B} = ?$

A) 2^2 B) 2^4 C) 2^8 D) 2^{16} E) 2^{20}

6. $(-1)^{2009} - 1^{2010} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

7. $(-1)^{-2003} + (-1)^{42} - (-1^{2004}) = ?$

A) -1 B) 0 C) 1 D) 2 E) 3

8. $40 \cdot (3^{-2} + 7^0)^{-1} = ?$

A) 20 B) 24 C) 28 D) 36 E) 64

9. $[(-2^5)\cdot(-2^2)]^3 = ?$

A) -2^{30} B) -2^{21} C) 2^{21} D) 2^{30} E) 2^{60}

10. $(-2)^{2009}\cdot(-2)^{-2010} = ?$

A) -2 B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\frac{1}{4}$ E) 2

11. $(3^{-1}+3^0)^{-2}\cdot 2^4 = ?$

A) 1 B) 3 C) 4 D) 8 E) 9

12. $\left(\frac{1}{3}+1\right)^{-2}\cdot\left(\frac{1}{3}-1\right)^2 = ?$

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{9}$ D) $\frac{1}{12}$ E) $\frac{1}{16}$

13. $(-3^{-1})+\left(-\frac{1}{3}\right)^{-2}\cdot(3^{-3}) = ?$

A) -3 B) -1 C) 0 D) 1 E) 3

14. $\frac{(-8)^3}{-2^{-2}} = ?$

A) 2^{11} B) 2^9 C) 2^7 D) -2^7 E) -2^{11}

15. $(-2^{-2})^{-3} = ?$

A) -64 B) -32 C) 16 D) $\frac{1}{32}$ E) $\frac{1}{16}$

16. $(-3^2)^{-3}\cdot\left(\frac{1}{5^{2009}}\right)^0 = ?$

A) 3^{-6} B) 3^{-5} C) -3^{-1} D) -3^{-5} E) -3^{-6}

1. $3^{-3} \cdot (-3)^{-3} \cdot 3^3 \cdot (-3^4) = ?$

A) -3^{-1} B) 3^{-1} C) 3 D) 3^2 E) 3^4

2. $\left(2+\frac{1}{7}\right)^2 \cdot \left(2-\frac{3}{5}\right)^2 = ?$

A) 1 B) 3 C) 9 D) 16 E) 25

3. $\left[\left(\frac{3}{2}\right)^{-2} + \left(\frac{9}{5}\right)^{-1}\right]^{-3} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $-5^2 \cdot \left(\frac{1}{25}\right)^{-2} \cdot (-5^2)^{-3} = ?$

A) $\frac{1}{25}$ B) 1 C) 5^2 D) 5^6 E) 5^{12}

5. $\frac{3^0+3^1-3^2}{3^3-3^2-3^1} = ?$

A) $-\frac{1}{15}$ B) $-\frac{1}{3}$ C) 1 D) $\frac{1}{15}$ E) 5

6. $\left[2^{-1}+\left(\frac{4}{3}\right)^{-1}\right] \cdot \left(-\frac{2^2}{5}\right) = ?$

A) –1 B) 0 C) 1 D) $\frac{3}{2}$ E) 3

7. $\left[\left(-\frac{1}{4}\right)^{-2}\right]^{-\frac{3}{4}} = ?$

A) $-\frac{1}{16}$ B) $-\frac{1}{8}$ C) $\frac{1}{8}$ D) 4 E) 16

8. $\left[2+\left(-\frac{1}{2}\right)^{-1}\right]^2 = ?$

A) $-\frac{1}{16}$ B) $-\frac{1}{4}$ C) 0 D) $\frac{1}{4}$ E) 4

9. $\left(\frac{2^{17}}{4^8}\right)^2 : \left(\frac{2^{15}}{8^4}\right)^4 = ?$

A) $\frac{1}{1024}$ B) $\frac{1}{512}$ C) $\frac{1}{256}$ D) $\frac{1}{64}$ E) 64

10. $\frac{(20)^{-3} \cdot (8)}{(25)^{-2} \cdot \frac{1}{8}} = ?$

A) 2 B) 4 C) 5 D) 20 E) 25

11. $\left[\frac{2}{5} + 5^{-1}\right] \cdot \left[\left(-\frac{5}{3}\right)^{-2}\right]^{-\frac{1}{2}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

12. $\left[\left(-\frac{1}{27}\right)^{-2}\right]^{\frac{1}{3}} = ?$

A) $-\frac{1}{9}$ B) $-\frac{1}{3}$ C) $\frac{1}{3}$ D) 3 E) 9

13. $\frac{2^2 \cdot 4^4 \cdot 8^8}{(32)^6} = ?$

A) 2 B) 4 C) 8 D) 16 E) 32

14. $\frac{9 \cdot 3^3 \cdot 3^6}{(81)^2} = ?$

A) 3 B) 9 C) 27 D) 81 E) 243

15. $\frac{(15)^4 \cdot (12)^6}{(27)^3 \cdot (20)^4} = ?$

A) 50 B) 48 C) 45 D) 36 E) 30

16. $\frac{(21)^3 \cdot (15)^2 \cdot (35)^2}{7^4 \cdot (5^{-4})^{-1} \cdot 3^4} = ?$

A) 15 B) 21 C) 25 D) 35 E) 49

1. $\frac{3^{1001}+9^{500}}{27^{333}}=?$

A) 3 B) 4 C) 6 D) 9 E) 12

2. $\frac{16^{100}+4^{200}}{2^{399}}=?$

A) $\frac{1}{2}$ B) 1 C) 2 D) 4 E) 8

3. $\frac{3^{2004}-3^{2002}}{3^{2003}+3^{2002}}=?$

A) 1 B) 2 C) 9 D) 81 E) 243

4. $\frac{480000\cdot 10^{-16}}{0,00012\cdot 10^{-7}}=?$

A) 400 B) 40 C) 4 D) 0,4 E) 0,04

5. $\frac{0,0005\cdot 10^{6}}{0,00125\cdot 10^{4}}=?$

A) 0,1 B) 0,5 C) 0,25 D) 8 E) 40

6. $\frac{3\cdot 10^{-4}+4\cdot 10^{-5}}{5\cdot 10^{-6}}=?$

A) 3,4 B) 6,8 C) 34 D) 68 E) 72

7. $(0,004)^{-3}\cdot(0,005)^{3}\cdot\frac{4}{5}=?$

A) $\frac{4}{5}$ B) 1 C) $\frac{25}{16}$ D) 4 E) 5

8. $(0,01)^{2}\cdot(0,4)^{3}\cdot(0,02)^{-3}=?$

A) $16\cdot 10^{-3}$ B) 0,08 C) 0,8 D) $8\cdot 10^{2}$ E) $64\cdot 10^{2}$

9. $(0{,}00001)^{-(0,1)} = ?$

A) $-\frac{1}{10}$ B) $\frac{1}{10}$ C) $10^{-\frac{1}{2}}$ D) $10^{\frac{1}{2}}$ E) 10

10. $\left.\begin{array}{l} A = (-3^2)^{-1} \\ B = \left(\frac{1}{81}\right)^{-\frac{1}{4}} \end{array}\right\} \Rightarrow A \cdot B = ?$

A) -9 B) $-\frac{1}{3}$ C) -1 D) $\frac{1}{9}$ E) $\frac{1}{3}$

11. $16^{\frac{3}{4}} \cdot 8^{\frac{2}{3}} \cdot 2 = ?$

A) 2^5 B) 2^6 C) 2^8 D) 2^{10} E) 2^{12}

12. $(0{,}008)^{-\frac{5}{3}} \cdot 10^{-5} \cdot 4^2 = ?$

A) $\frac{1}{64}$ B) $\frac{1}{32}$ C) $\frac{1}{16}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

13. $(0{,}04)^{\frac{3}{2}} \cdot 10^3 = ?$

A) 4 B) 8 C) 12 D) 16 E) 32

14. $(1{,}44)^{\frac{5}{2}} \cdot 10^4 = ?$

A) 1 B) 1,2 C) $12^5 \cdot 10^{-1}$ D) 24 E) 144

15. $(0{,}02)^{\frac{1}{2}} \cdot (0{,}5)^{\frac{1}{2}} \cdot 10 = ?$

A) 0,1 B) 0,2 C) 1 D) 2 E) 5

16. $(1{,}44)^{\frac{3}{2}} \cdot (0{,}2)^{-3} = ?$

A) 9 B) 18 C) 36 D) 144 E) 216

1. $\dfrac{2^3 \cdot 2^3 \cdot 2^3 \cdot 2^3}{2^3 + 2^3 + 2^3 + 2^3} = ?$

A) 2^7 B) 2^2 C) 2 D) 1 E) $\frac{1}{2}$

2. $\dfrac{10^3 + 15^3 + 20^3}{2^3 + 3^3 + 4^3} = ?$

A) 5 B) 25 C) 100 D) 125 E) 150

3. $\dfrac{7^{77} + 7^{78} + 7^{79}}{7^{78} + 7^{77} + 7^{76}} = ?$

A) $\frac{1}{7}$ B) 1 C) 7 D) 49 E) 343

4. $\dfrac{3^5 + 3^5 + 3^5 + 3^5}{9^2 + 9^2 + 9^2 + 9^2} = ?$

A) 1 B) 3 C) 3^2 D) 3^4 E) 3^5

5. $\dfrac{3^{-3} + 3^{-3} + 3^{-3}}{2^{-2} + 2^{-2}} = ?$

A) $\frac{2}{9}$ B) $\frac{2}{3}$ C) $\frac{3}{2}$ D) $\frac{9}{4}$ E) $\frac{9}{2}$

6. $\dfrac{(12)^2 + (15)^2 + (21)^2}{(8)^2 + (10)^2 + (14)^2} = ?$

A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{9}{4}$ E) 16

7. $\dfrac{4^{-1} + 4^{-1} + 4^{-1} + 4^{-1}}{3^{-1} + 3^{-1} + 3^{-1} + 3^{-1}} = ?$

A) $\frac{1}{3}$ B) $\frac{3}{4}$ C) $\frac{4}{3}$ D) $\frac{16}{3}$ E) $\frac{16}{9}$

8. $\dfrac{8^2 + 8^2 + 8^2 + 8^2 + 8^2 + 8^2}{2^8 + 2^8 + 2^8} = ?$

A) $\frac{1}{8}$ B) $\frac{1}{6}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

9. $\dfrac{3^{2005}+3^{2004}+3^{2003}}{3^{2004}+3^{2003}+3^{2002}} = ?$

A) 1 B) 3 C) 9 D) 13 E) 3^{2004}

10. $\dfrac{2^x \cdot 2^x \cdot 2^x \cdot 2^x}{2^x+2^x+2^x+2^x} = 128$

$\Rightarrow x = ?$

A) –3 B) –2 C) –1 D) 2 E) 3

11. $\dfrac{\left(\frac{1}{14}\right)^2+\left(\frac{1}{18}\right)^2+\left(\frac{1}{6}\right)^2}{\left(\frac{1}{3}\right)^2+\left(\frac{1}{7}\right)^2+\left(\frac{1}{9}\right)^2} = ?$

A) $\frac{1}{16}$ B) $\frac{1}{4}$ C) 2 D) 4 E) 16

12. $\dfrac{x^{a+3} \cdot x^{b-1}}{x^{a+b}} = ?$

A) x B) x^2 C) x^3 D) x^4 E) x^5

13. $(-x^3)^2 \cdot (-x^4) \cdot (x^{-3})^{-1} \cdot (-x^2)^{-2} = ?$

A) $-x^9$ B) $-x^7$ C) 1 D) x^7 E) x^9

14. $\dfrac{(x^{a-2})^2 \cdot (x^{a-b})^3}{x^{5a-3b-5}} = ?$

A) x^{-2} B) x^{-1} C) x D) x^{a+b} E) x^{a-b}

15. $\dfrac{3^{x+2}+18}{3^x+2} = ?$

A) 1 B) 2 C) 3 D) 6 E) 9

16. $12 \cdot 3^2 + 7 \cdot 3^2 + 8 \cdot 3^2 = 3^x$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

1. $3^{x+1} = 27$

$\Rightarrow 2^x = ?$

A) 2 B) 4 C) 8 D) 16 E) 32

2. $\frac{2^{x-1}}{4^{x+3}} = 16^{2x-1}$

$\Rightarrow x = ?$

A) 1 B) $\frac{1}{3}$ C) $-\frac{1}{3}$ D) -1 E) -2

3. $27^{3x-1} = 81^{2x+3}$

$\Rightarrow x = ?$

A) $-\frac{2}{3}$ B) $\frac{1}{3}$ C) 4 D) 9 E) 15

4. $8^{2x} = 16^{x+1}$

$\Rightarrow 7^{x-1} = ?$

A) 0 B) $\frac{1}{49}$ C) $\frac{1}{7}$ D) 1 E) 7

5. $8^{x+7} = 32^{x-3}$

$\Rightarrow x = ?$

A) 12 B) 15 C) 18 D) 24 E) 28

6. $\frac{8^{3n+2}}{2^{9n+3}} = 2^{m-7}$

$\Rightarrow m = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

7. $4^{a-1} = 2^{3a+1}$

$\Rightarrow 3^a = ?$

A) $\frac{1}{27}$ B) $\frac{1}{9}$ C) $\frac{1}{3}$ D) 1 E) 3

8. $\left(\frac{1}{8}\right)^{x-2} = 4^{x+2}$

$\Rightarrow x = ?$

A) 0,4 B) 0,6 C) 1 D) 1,2 E) 1,4

9. $\left(\frac{1}{8}\right)^{1-a} = \frac{1}{4}$

$\Rightarrow a = ?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) 1 D) 2 E) 3

10. $5^{x+1} = 5^{x-2} \cdot a$

$\Rightarrow a = ?$

A) 1 B) 5 C) 25 D) 125 E) 625

11. $\frac{12^x \cdot 20^x}{15^x} = 64$

$\Rightarrow x = ?$

A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

12. $\frac{4^{\frac{3}{4}} \cdot 16^{\frac{1}{8}}}{a^{-2}} = 2^x$

$\Rightarrow x = ?$

A) 1 B) 2 C) 4 D) 8 E) 16

13. $\frac{9^{\frac{2}{3}} \cdot 27^{\frac{3}{2}}}{81^{\frac{1}{2}}} = 3^x$

$\Rightarrow x = ?$

A) $\frac{10}{3}$ B) $\frac{7}{2}$ C) $\frac{11}{3}$ D) $\frac{23}{6}$ E) 4

14. $\left(\frac{4}{9}\right)^{x-3} = \left(\frac{27}{8}\right)^{x+1}$

$\Rightarrow x = ?$

A) $\frac{3}{5}$ B) $\frac{5}{3}$ C) $\frac{7}{3}$ D) 3 E) 9

15. $\left(\frac{2}{5}\right)^{a+1} = \left(\frac{25}{4}\right)^{2a-3}$

$\Rightarrow a = ?$

A) 1 B) $\frac{5}{3}$ C) 2 D) $\frac{7}{3}$ E) 3

16. $(-2)^5 + (-2)^6 + (-2)^7 = 2^4 \cdot x$

$\Rightarrow x = ?$

A) -8 B) -6 C) -2 D) 2 E) 4

1. $3^{x+2} + 3^{x+1} = 108$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $2^{x+1} + 2^x + 2^{x-1} = 56$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

3. $7^{x+2} + 2 \cdot 7^x - 4 \cdot 7^{x+1} = 161$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $3 \cdot 3^{n-2} + 6 \cdot 3^{n-1} + 3 \cdot 3^n = 144$

$\Rightarrow n = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $4^{x+1} + 16 \cdot 4^{x-1} = m \cdot 4^x$

$\Rightarrow m = ?$

A) 6 B) 8 C) 10 D) 12 E) 16

6. $5^{3x-6} = 1$

$\Rightarrow x = ?$

A) -2 B) -1 C) 2 D) 3 E) 4

7. $2^{x+7} = 1$

$\Rightarrow x = ?$

A) -3 B) -4 C) -5 D) -6 E) -7

8. $3^x = 5$

$\Rightarrow 3^{x+1} = ?$

A) 3 B) 6 C) 9 D) 12 E) 15

9. $2^{x+2} = 24$

$\Rightarrow 2^{x-1} = ?$

A) 2 B) 3 C) 6 D) 8 E) 12

10. $2^{x+1} = 3$

$\Rightarrow 2^{x-2} = ?$

A) $\frac{3}{16}$ B) $\frac{3}{8}$ C) $\frac{3}{4}$ D) $\frac{3}{2}$ E) 3

11. $7^x = 3$

$\Rightarrow 7^{x-1} = ?$

A) $\frac{3}{7}$ B) $\frac{3}{14}$ C) 2 D) 3 E) 6

12. $5^x = m$

$\Rightarrow 5^{2x+3} = ?$

A) $125 + m^2$ B) $125m^2$ C) $25m^2$ D) $25m$ E) $25 + m$

13. $4^{x+1} = 20$

$\Rightarrow 8^{2x} = ?$

A) 2 B) 6 C) 25 D) 100 E) 125

14. $9^{1-x} = 18$

$\Rightarrow 9^{2-x} = ?$

A) 9 B) 18 C) 36 D) 81 E) 162

15. $(-2)^{2x-4} = 9$

$\Rightarrow 2^x = ?$

A) 3 B) 4 C) 9 D) 12 E) 16

16. $2^a \cdot 3^b = 12$

$\Rightarrow 2^{3-a} \cdot 3^{2-b} = ?$

A) 2 B) 3 C) 6 D) 8 E) 12

1. $\left.\begin{array}{l} 2^x = a \\ 3^x = b \end{array}\right\} \Rightarrow (108)^x = ?$

A) ab B) a^3b^2 C) a^2b^3 D) a^2b^2 E) a^3b^3

2. $\left.\begin{array}{l} 3^x = a \\ 5^x = b \\ 2^x = c \end{array}\right\} \Rightarrow 180^x = ?$

A) a^2bc^2 B) a^2b^2c C) $a^2b^2c^2$ D) a^3bc E) a^3b^2c

3. $15^x = 6$

$\Rightarrow 3^{x-1} \cdot 5^{x+1} = ?$

A) 3 B) 6 C) 10 D) 15 E) 30

4. $21^x = 14$

$\Rightarrow 3^{x+1} \cdot 7^{x-1} = ?$

A) 2 B) 3 C) 6 D) 7 E) 14

5. $15^{x-1} = \frac{6}{45}$

$\Rightarrow 3^{x+1} \cdot 5^{x-1} = ?$

A) $\frac{2}{5}$ B) $\frac{6}{5}$ C) 2 D) 3 E) 6

6. $(32)^{\frac{1}{10}} \cdot (16)^{\frac{1}{8}} \cdot (125)^{\frac{1}{3}} = 10^x$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $7^{x+1} = \frac{147}{3^x}$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $3^{x-1} = \frac{75}{5^x}$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $3^{1-a} = 4$

$\Rightarrow (3^{a-2})^{-1} = ?$

A) $\frac{4}{9}$ B) $\frac{3}{4}$ C) $\frac{4}{3}$ D) 6 E) 12

10. $x^{0,2} = 2$

$\Rightarrow x = ?$

A) 2 B) 4 C) 16 D) 32 E) 64

11. $2^{x+1} \cdot 3^{x-2} = 4$

$\Rightarrow 6^{x-1} = ?$

A) 2 B) 3 C) 4 D) 9 E) 18

12. $125^x = 5^{x-2}$

$\Rightarrow 2^x = ?$

A) -1 B) $\frac{1}{2}$ C) 1 D) 4 E) 8

13. $\frac{4 \cdot 3^x + 2 \cdot 3^{x+1}}{4 \cdot 3^{x+1} - 2 \cdot 3^x} = ?$

A) 10 B) 6 C) 4 D) 2 E) 1

14. $\frac{4^{2x} + 4^{x+1}}{8^{2x} + 4^{2x+1}} = \frac{1}{4}$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $\frac{3^{x+2} + 3^x + 2 \cdot 3^{x-1}}{3^{x+1} - 6 \cdot 3^{x-2} + 3^{x-1}} = ?$

A) $\frac{1}{3}$ B) $\frac{4}{9}$ C) 1 D) $\frac{12}{7}$ E) 4

16. $x = 5^{a-b+1}$

$\Rightarrow 25^{a-b+2} = ?$

A) x^2 B) $5x^2$ C) $25x^2$ D) $125x^2$ E) $625x^2$

1. $9^{a+1} = 36$

$\Rightarrow 3^a = ?$

A) 2 B) 3 C) 6 D) 9 E) 18

2. $8^{x-2} = 27$

$\Rightarrow 4^{x-1} = ?$

A) 12 B) 24 C) 30 D) 36 E) 48

3. $3^{x-2} + \frac{4}{3^{2-x}} = 45$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $3^{x-1} - \frac{1}{3^{2-x}} = 54$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $\frac{5}{4^{x-1}} - 4^{1-x} = \frac{1}{16}$

$\Rightarrow x = ?$

A) –2 B) –1 C) 1 D) 2 E) 4

6. $(x + 7)^3 = (2x + 8)^3$

$\Rightarrow$ S.S. = ?

A) {–1} B) {–5} C) {3} D) {2} E) {–1, –5}

7. $(x - 7)^5 + (9 - 2x)^5 = 0$

$\Rightarrow$ S.S. = ?

A) $\left\{2, \frac{16}{3}\right\}$ B) $\left\{\frac{16}{3}\right\}$ C) {2} D) {3} E) {1}

8. $(x + 3)^3 = (3x - 1)^3$

$\Rightarrow$ S.S. = ?

A) {–1} B) {0} C) {1} D) {2} E) {3}

9. $(3x-2)^2 = (2x+4)^2$

$\Rightarrow$ S.S. = ?

A) $\left\{-\frac{2}{5}\right\}$ B) $\left\{-\frac{2}{5}, 6\right\}$ C) R

D) $\emptyset$ E) $\left\{-\frac{2}{5}, 1, 6\right\}$

10. $(4x+1)^4 = (3x+13)^4$

$\Rightarrow$ S.S. = ?

A) {12} B) {2} C) {6}

D) {−2, 6} E) {12, −2}

11. $\frac{5}{1+x^{-2}} + \frac{5}{1+x^2} = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

12. $x, y \in Z$

$5^{x-3} = 7^{y+x-9}$

$\Rightarrow x \cdot y = ?$

A) 18 B) 12 C) 9 D) 6 E) 3

13. $x^{\frac{1}{5}} = y^{\frac{1}{2}}$

$\Rightarrow x^{\frac{3}{5}} \cdot y = ?$

A) x B) x^2 C) x^3 D) x^4 E) x^5

14. $(5x-6)^{x+4} = 1$

$\Rightarrow$ S.S. = ?

A) {−4} B) $\left\{-4, \frac{7}{5}\right\}$ C) $\left\{\frac{7}{5}\right\}$

D) $\left\{0, \frac{7}{5}\right\}$ E) $\left\{-4, 1, \frac{7}{5}\right\}$

15. $(2x-3)^{4x+8} = 1$

$\Rightarrow$ S.S. = ?

A) {−2} B) {2} C) {−2, 2}

D) {1} E) {−2, 2, 1}

16. $(2x-1)^{x+2} = 1$

$\Rightarrow$ S.S. = ?

A) {−2} B) {1} C) {1, −2}

D) {0, 1} E) {−2, 0, 1}

1. $\left.\begin{matrix} 2^x = 16 \\ 2^y = 32 \end{matrix}\right\} \Rightarrow \frac{x-y}{x+y} = ?$

A) $-\frac{1}{18}$ B) $-\frac{1}{9}$ C) $\frac{1}{3}$ D) $\frac{1}{9}$ E) $\frac{1}{18}$

2. $\left.\begin{matrix} 9^x = 125 \\ 27^y = 25 \end{matrix}\right\} \Rightarrow \frac{x}{y} = ?$

A) $\frac{2}{3}$ B) $\frac{3}{4}$ C) 1 D) $\frac{4}{3}$ E) $\frac{9}{4}$

3. $\left.\begin{matrix} 4^m = 125 \\ 5^n = 16 \end{matrix}\right\} \Rightarrow m \cdot n = ?$

A) 3 B) 4 C) 6 D) 8 E) 12

4. $x, y \in Z$

$x^y = 4$

$x^z = \frac{1}{16}$

$\Rightarrow \frac{x+2y}{x-z} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

5. $\left.\begin{matrix} x^a = 9 \\ x^2 = 3 \cdot x^{-b} \end{matrix}\right\} \Rightarrow a = ?$

A) 2b B) b C) b + 1 D) 2b + 2 E) 2b + 4

6. $\left.\begin{matrix} 2^x \cdot 3^y = 18 \\ 3^x \cdot 2^y = 72 \end{matrix}\right\} \Rightarrow x + y = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

7. $\left.\begin{matrix} 2^{a+3} \cdot 5^b = 400 \\ 2^b \cdot 5^{a+3} = 2500 \end{matrix}\right\} \Rightarrow a + b = ?$

A) 3 B) 5 C) 6 D) 9 E) 11

8. $\left.\begin{matrix} 3^x \cdot 5^y = 9 \\ 3^y \cdot 5^x = 25 \end{matrix}\right\} \Rightarrow x - y = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

9. $2^a \cdot 3^b \cdot 5^c = 17$

$6^a \cdot 9^b \cdot 15^c = 153$

$\Rightarrow a + b + c = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

10. $5^a = 3^b$

$\Rightarrow 9^{\frac{b}{a}} + 125^{\frac{a}{b}} = ?$

A) 8 B) 14 C) 28 D) 52 E) 134

11. $\left.\begin{array}{l} 2^x = 13 \\ 3^y = 15 \\ 5^z = 17 \end{array}\right\} \Rightarrow ? < ? < ?$

A) $x < y < z$ B) $x < z < y$ C) $z < x < y$

D) $z < y < x$ E) $y < x < z$

12. $\left.\begin{array}{l} 2^a = 15 \\ 3^b = 7 \\ 5^c = 120 \end{array}\right\} \Rightarrow ? > ? > ?$

A) $c > b > a$ B) $b > c > a$ C) $c > a > b$

D) $a > b > c$ E) $a > c > b$

13. $\left.\begin{array}{l} a = 3^{-2} \\ b = (-2)^{-2} \\ c = -2^{(-2)} \end{array}\right\} \Rightarrow ? < ? < ?$

A) $a < b < c$ B) $a < c < b$ C) $b < a < c$

D) $c < a < b$ E) $b < c < a$

14. $\left.\begin{array}{l} a = 4^{60} \\ b = 6^{40} \\ c = 3^{80} \end{array}\right\} \Rightarrow ? < ? < ?$

A) $c < b < a$ B) $a < b < c$ C) $a < c < b$

D) $c < a < b$ E) $b < a < c$

15. $25^{2x-3} = 120$

$\Rightarrow ? < x < ?$

A) $2 < x < \frac{9}{4}$ B) $\frac{5}{2} < x < 3$

C) $-\frac{3}{2} < x < \frac{1}{2}$ D) $\frac{3}{4} < x < \frac{7}{4}$

E) $\frac{3}{2} < x < \frac{7}{2}$

16. $x = \left(\frac{1}{2}\right)^{\frac{1}{2}}$ $y = \left(\frac{1}{2}\right)^{\frac{1}{3}}$ $z = \left(\frac{1}{2}\right)^{\frac{1}{7}}$

$\Rightarrow ? < ? < ?$

A) $z < y < x$ B) $z < x < y$ C) $y < x < z$

D) $x < z < y$ E) $x < y < z$

1. $(0{,}027)^{\frac{2}{3}} \cdot (400)^{\frac{1}{2}} = ?$

A) 6 B) $\frac{16}{5}$ C) 3 D) $\frac{9}{4}$ E) $\frac{9}{5}$

2. $\frac{7}{1+19^{13}} + \frac{7}{1+19^{-13}} = ?$

A) 1 B) 7 C) 10 D) 13 E) 19

3. $x, y, z \in Z$

$2^{x+y-4} = 7^{x-1} = 13^{z-2}$

$\Rightarrow x \cdot y + z = ?$

A) 4 B) 5 C) 7 D) 10 E) 12

4. $a, b \in Z^+$

$(a-b)^3 \cdot (a+b)^3 = 27$

$\Rightarrow 2a - b = ?$

A) 2 B) 3 C) 4 D) 6 E) 7

5. $\frac{2^x}{2^{x-y}+1} - \frac{2^y}{2^{y-x}+1} = ?$

A) $2^x + 2^y$ B) 2^{x+y} C) 0 D) $2^{x \cdot y}$ E) 2^{x-y}

6. $2^a = 3^b \Rightarrow 4^{\frac{a}{b}} + 9^{\frac{b}{a}} = ?$

A) 4 B) 5 C) 9 D) 13 E) 17

7. $3^{a-1} = 4^{b+1}$

$\Rightarrow 16^{\frac{b+1}{a-1}} + 3^{\frac{a-1}{b+1}} - 2$

A) 3 B) 7 C) 9 D) 13 E) 25

8. $\frac{8}{4^{1+x-y}+4} + \frac{8}{4^{1+y-x}+4} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 2 D) 4 E) 8

9. $\frac{2-3x}{x^n}+\frac{3-x^2}{x^{n-1}}+\frac{x}{x^{n-2}}=?$

A) $\frac{x}{x^n}$ B) $\frac{2+x}{x^n}$ C) $\frac{2+x^2}{x^n}$

D) $\frac{3}{x^n}$ E) $\frac{2}{x^n}$

10. $\left.\begin{array}{l}4^a=3\\9^b=5\\125^c=2\end{array}\right\} \Rightarrow a\ b\ c=?$

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{6}$ D) $\frac{1}{12}$ E) $\frac{1}{24}$

11. $\left.\begin{array}{l}a=2^{100}\\b=3^{75}\\c=5^{50}\end{array}\right\} \Rightarrow ?<?<?$

A) $c<b<a$ B) $a<b<c$ C) $a<c<b$

D) $c<a<b$ E) $b<c<a$

12. $a\in Z^+$

$\left(\frac{2}{3}\right)^{1-a}<\left(\frac{9}{4}\right)^{\frac{a+1}{3}} \Rightarrow \max(a)=?$

A) 6 B) 5 C) 4 D) 2 E) 1

13. $x=\left(\frac{1}{3}\right)^{\frac{1}{2}}$ $y=\left(\frac{1}{3}\right)^{\frac{1}{4}}$ $z=\left(\frac{1}{3}\right)^{\frac{1}{8}}$

$\Rightarrow ?<?<?$

A) $z<y<x$ B) $z<x<y$ C) $y<x<z$

D) $x<z<y$ E) $x<y<z$

14. $\left.\begin{array}{l}x=7^a+2\\y=7^{-a}-2\end{array}\right\} \Rightarrow y=?$

A) $\frac{x-2}{x+2}$ B) $x+2$ C) $x-2$

D) $\frac{5-2x}{x-2}$ E) $\frac{x-5}{x+2}$

15. $x=y^{2a-3b}=z^{2a+3b}$

$\Rightarrow (y\cdot z)^{4a^2-9b^2}=?$

A) x^{6b} B) x^{4a} C) x^{2a+3b}

D) x^{2a-3b} E) $x^{4a^2-9b^2}$

16. $\frac{x}{y}=\frac{3}{2}$

$x^y=y^x \Rightarrow x=?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{8}{9}$ D) $\frac{9}{8}$ E) $\frac{27}{8}$

ÜSLÜ İFADELER EXPONENTIAL EXPRESSIONS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	A	D	D	A	C	D	C	B	E	B	C	A	A	E

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	A	B	B	A	C	C	A	C	A	E	D	C	B	B

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	C	E	D	C	C	D	B	B	E	B	C	C	E

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	C	B	A	D	B	D	B	E	B	B	A	C	E	D

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	E	E	C	E	A	A	B	D	B	C	D	A	A	B

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	A	C	B	C	E	E	B	B	A	B	E	E	D	C

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	C	C	B	A	A	B	E	D	B	B	E	A	E	C

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	D	E	E	A	C	D	B	E	A	A	A	B	E	E

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	E	C	D	E	C	A	E	E	D	D	E	D	E	A	E

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	B	B	B	C	D	D	C	E	D	C	C	E	D	B	E

KÖKLÜ İFADELER
RADICAL EXPRESSIONS

ÖZELLİK|Property 1

Köklü İfadeler | Radicals

$a \in R^+, n \in N \ (n > 1)$

$a^n = b \Rightarrow \sqrt[n]{b} = a$

$\sqrt{a} = \sqrt[2]{a}$

Köklü ifade $\sqrt[n]{b}$ şeklinde gösterilir. n'ye kökün derecesi, a'ya b'nin n. dereceden kökü denir.

A radical is an expression of the form $\sqrt[n]{b}$ which denotes the principal n^{th} root of a where the positive integer n is the index or order of the radical and the number a is the radicand.

1. $\sqrt{16} = ?$ — 4

2. $\sqrt{25} + \sqrt{9} - \sqrt{100} = ?$ — -2

3. $\sqrt{121} - \sqrt{144} + \sqrt{64} = ?$ — 7

4. $\dfrac{\sqrt{9} + \sqrt{16}}{\sqrt{4}} = ?$ — $\dfrac{7}{2}$

5. $\dfrac{\sqrt{81} + \sqrt{4}}{\sqrt{49}} = ?$ — $\dfrac{11}{7}$

6. $\sqrt{9} \cdot \sqrt{100} - \sqrt{196} = ?$ — 16

7. $\sqrt{225} \cdot \sqrt{4} - \sqrt{16} \cdot \sqrt{36} = ?$ — 6

8. $\sqrt{400} \cdot \sqrt{16} - \sqrt{49} = ?$ — 73

9. $\sqrt{25} + \sqrt{289} + \sqrt{256} = ?$ — 38

10. $\sqrt{100} - (\sqrt{25} - \sqrt{256}) = ?$ — 21

11. $\sqrt{225} - [\sqrt{16} - (-\sqrt{169})] = ?$ — -2

12. $\dfrac{\sqrt{64} + \sqrt{9} \cdot \sqrt{100}}{\sqrt{225}} = ?$ — $\dfrac{38}{15}$

13. $\dfrac{\sqrt{9} \cdot \sqrt{16} - \sqrt{225}}{\sqrt{\dfrac{1}{9}}} = ?$ — -9

14. $\dfrac{\sqrt{81} - \sqrt{289}}{\sqrt{256}} = ?$ — $-\dfrac{1}{2}$

15. $\dfrac{\sqrt{100} - \sqrt{64}}{\sqrt{900}} = ?$ — $\dfrac{1}{15}$

ÖZELLİK|Property 2

$$\sqrt[n]{a^n} \Rightarrow \begin{cases} a & \text{n tek sayı } \textit{(n is odd number)} \\ |a| & \text{n çift sayı } \textit{(n is even number)} \end{cases}$$

1. $\sqrt[3]{8} - \sqrt[3]{27} = ?$ **−1**

2. $\sqrt[3]{125} - \sqrt{4} + \sqrt[4]{16} = ?$ **5**

3. $\sqrt[3]{64} - \sqrt[3]{-8} = ?$ **6**

4. $\sqrt[3]{125} + \sqrt[5]{-32} = ?$ **3**

5. $\sqrt[3]{27} - \left(-\sqrt[4]{81}\right) = ?$ **6**

6. $\dfrac{\sqrt[5]{243} - \sqrt[4]{81}}{\sqrt[3]{-8}} = ?$ **0**

7. $\sqrt{(-2)^2} - \sqrt[3]{(-2)^3} = ?$ **4**

8. $\sqrt[3]{-27} - \sqrt{(-3)^2} = ?$ **−6**

9. $\sqrt{6 - \sqrt[3]{8}} = ?$ **2**

10. $\sqrt[3]{24 + \sqrt[4]{81}} = ?$ **3**

11. $\sqrt[3]{8} - (\sqrt{16} \cdot \sqrt{9}) = ?$ **−10**

12. $\sqrt[3]{-216} + \sqrt[3]{64} - \sqrt{64} = ?$ **−10**

13. $\sqrt[3]{6 \cdot 2 + 15} = ?$ **3**

14. $\sqrt[4]{77 + 2 \cdot \sqrt{4}} = ?$ **3**

15. $\dfrac{\sqrt[3]{-8} \cdot \sqrt{4}}{\sqrt[3]{27}} = ?$ **$-\frac{4}{3}$**

ÖZELLİK|Property 3

$a, b \in R^+$

- $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$
- $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$
- $\sqrt[n]{a^k} = a^{\frac{k}{n}}$
- $\sqrt[n]{a^m} = \sqrt[\frac{n}{k}]{a^{\frac{m}{k}}}$
- $\sqrt[n]{a^m} = \sqrt[n \cdot k]{a^{m \cdot k}}$

1. $\sqrt{3} \cdot \sqrt{2} = ?$ $\sqrt{6}$

2. $\sqrt{3} \cdot \sqrt{2} \cdot \sqrt{6} = ?$ 6

3. $\sqrt{3} \cdot \sqrt{3} = ?$ 3

4. $\frac{\sqrt{15} \cdot \sqrt{10}}{\sqrt{6}} = ?$ 5

5. $\frac{\sqrt{21} \cdot \sqrt{6}}{\sqrt{14}} = ?$ 3

6. $\frac{\sqrt{105} \cdot \sqrt{7}}{\sqrt{15}} = ?$ 7

7. $\sqrt[3]{2} \cdot \sqrt[3]{4} = ?$ 2

8. $\frac{\sqrt[3]{10} \cdot \sqrt[3]{4}}{\sqrt[3]{5}} = ?$ 2

9. $\frac{\sqrt[4]{54} \cdot \sqrt[4]{3}}{\sqrt[4]{2}} = ?$ 3

10. $\frac{\sqrt[4]{18} \cdot \sqrt[4]{27}}{\sqrt[4]{6}} = ?$ 3

11. $\frac{\sqrt[3]{12} \cdot \sqrt[3]{6}}{\sqrt[3]{9}} = ?$ 2

12. $\sqrt{2} \cdot \sqrt[3]{2} = ?$ $\sqrt[6]{2^5}$

13. $\sqrt{3} \cdot \sqrt[3]{9} = ?$ $3 \cdot \sqrt[6]{3}$

14. $\sqrt[3]{5} \cdot \sqrt{2} = ?$ $\sqrt[6]{200}$

15. $\frac{\sqrt[3]{9} \cdot \sqrt{27}}{\sqrt[6]{81}} = ?$ $3\sqrt{3}$

ÖZELLİK|Property 4

- $\sqrt[n]{a} \mp \sqrt[n]{b} \neq \sqrt[n]{a \mp b}$
- $a\sqrt[n]{k} + b\sqrt[n]{k} - c\sqrt[n]{k} = (a+b-c)\sqrt[n]{k}$

1. $\sqrt{8} = ?$

$2\sqrt{2}$

2. $\sqrt{32} - \sqrt{8} = ?$

$2\sqrt{2}$

3. $\sqrt{24} + \sqrt{6} = ?$

$3\sqrt{6}$

4. $\sqrt{75} - \sqrt{12} + \sqrt{27} = ?$

$6\sqrt{3}$

5. $\sqrt{18} - \sqrt{2} + \sqrt{32} = ?$

$6\sqrt{2}$

6. $\sqrt[3]{16} + \sqrt[3]{54} = ?$

$5\sqrt[3]{2}$

7. $\sqrt[3]{24} - \sqrt[3]{375} = ?$

$-3\cdot\sqrt[3]{3}$

8. $\sqrt[3]{32} - \sqrt[3]{500} = ?$

$-3\cdot\sqrt[3]{4}$

9. $\dfrac{\sqrt[3]{-16} + \sqrt[3]{54}}{\sqrt[3]{2}} = ?$

1

10. $\dfrac{\sqrt{20} - \sqrt{5} + \sqrt{125}}{\sqrt{5}} = ?$

6

11. $\dfrac{\sqrt{75} + \sqrt{48} - \sqrt{147}}{\sqrt{3}} = ?$

2

12. $\dfrac{\sqrt{32} + 3\sqrt{18}}{\sqrt{2}} = ?$

13

13. $\dfrac{\sqrt[3]{3} - \sqrt[3]{24}}{\sqrt[3]{81}} = ?$

$-\dfrac{1}{3}$

14. $\dfrac{\sqrt[5]{-32} + \sqrt[3]{8} - \sqrt[3]{81}}{\sqrt[3]{3}} = ?$

-3

15. $\dfrac{\sqrt{72} - \sqrt{2}}{\sqrt{8}} = ?$

$\dfrac{5}{2}$

ÖZELLİK|Property 5

Köklü ifadede bölme işlemi yapılırken paydanın eşleniği ile ifade genişletilerek ifadenin paydası rasyonel yapılır.

In radical expressions, when making rationalizing division, the expression is expanded using the conjugate of the denominator and the denominator is made rational.

$a \in R^+$

- $\sqrt{a}$ nın eşleniği (*conjugate of*) $\sqrt{a}$ $\quad \sqrt{a} \cdot \sqrt{a} = a$
- $\sqrt[n]{a}$ nın eşleniği (*conjugate of*) $\sqrt[n]{a^{n-1}}$ $\quad \sqrt[n]{a} \cdot \sqrt[n]{a^{n-1}} = a$

1. $\frac{4}{\sqrt{2}} = ?$

$2\sqrt{2}$

2. $\frac{10}{\sqrt{5}} + 2\sqrt{5} = ?$

$4\sqrt{5}$

3. $\frac{6}{\sqrt{2}} + \frac{4}{\sqrt{2}} = ?$

$5\sqrt{2}$

4. $\frac{4}{\sqrt[3]{2}} = ?$

$2\sqrt[3]{4}$

5. $\frac{5}{\sqrt[5]{5^3}} = ?$

$\sqrt[5]{5^2}$

6. $4\left(3\sqrt{2} - \frac{1}{\sqrt{2}}\right) = ?$

$10\sqrt{2}$

7. $3 \cdot \left(\frac{12}{\sqrt{3}} - \frac{5}{\sqrt{3}}\right) = ?$

$7\sqrt{3}$

8. $1 - \frac{1}{\sqrt{2}} = ?$

$\frac{2-\sqrt{2}}{2}$

9. $1 - \frac{1}{\sqrt{3}} = ?$

$\frac{3-\sqrt{3}}{3}$

10. $\frac{30}{\sqrt{5}} - \frac{15}{\sqrt{5}} + 3\sqrt{5} = ?$

$6\sqrt{5}$

11. $\left(\frac{5}{\sqrt{2}} + \frac{7}{\sqrt{2}}\right) \cdot 2 = ?$

$12\sqrt{2}$

12. $\left(4\sqrt{3} - \frac{6}{\sqrt{3}}\right) \cdot 5 = ?$

$10\sqrt{3}$

13. $\left(\frac{4}{\sqrt{2}} - \frac{3}{\sqrt{2}}\right) \cdot \left(\frac{6}{\sqrt{3}}\right) = ?$

$\sqrt{6}$

14. $\left(\frac{12}{\sqrt{3}} - \frac{5}{\sqrt{3}}\right) \cdot \frac{1}{\sqrt{7}} = ?$

$\frac{\sqrt{21}}{3}$

15. $\left(\frac{9}{\sqrt{3}} - \sqrt{3}\right) \cdot \frac{1}{\sqrt{2}} = ?$

$\sqrt{6}$

ÖZELLİK|Property 6

- $\sqrt{a}+\sqrt{b}$ nin eşleniği $\sqrt{a}-\sqrt{b}$
  $\sqrt{a}+\sqrt{b}$ *conjugate of* $\sqrt{a}-\sqrt{b}$
- $\sqrt{a}-\sqrt{b}$ nin eşleniği $\sqrt{a}+\sqrt{b}$
  $\sqrt{a}-\sqrt{b}$ *conjugate of* $\sqrt{a}+\sqrt{b}$

$(\sqrt{a}+\sqrt{b})\cdot(\sqrt{a}-\sqrt{b})=a-b$

1. $\frac{1}{\sqrt{3}-\sqrt{2}}=?$ $\sqrt{3}+\sqrt{2}$

2. $\frac{4}{\sqrt{5}+1}=?$ $\sqrt{5}-1$

3. $\frac{2}{(\sqrt{5}-\sqrt{3})}=?$ $\sqrt{5}+\sqrt{3}$

4. $\frac{1}{\sqrt{6}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{4}}=?$ $\sqrt{6}-2$

5. $\frac{4}{\sqrt{7}+\sqrt{3}}=?$ $\sqrt{7}-\sqrt{3}$

6. $\frac{7}{3-\sqrt{2}}=?$ $3+\sqrt{2}$

7. $\frac{1}{\sqrt{3}+\sqrt{2}}+\frac{2}{\sqrt{2}}=?$ $\sqrt{3}$

8. $\frac{1}{\sqrt{5}-2}=?$ $\sqrt{5}+2$

9. $\sqrt{\sqrt{7}-\sqrt{2}}\cdot\sqrt{\sqrt{7}+\sqrt{2}}=?$ $\sqrt{5}$

10. $\sqrt{\sqrt{5}-1}\cdot\sqrt{\sqrt{5}+1}=?$ 2

11. $\frac{3}{\sqrt{5}+\sqrt{2}}+\frac{1}{\sqrt{2}+1}=?$ $\sqrt{5}-1$

12. $\frac{4}{\sqrt{6}-\sqrt{2}}+\frac{4}{\sqrt{6}+\sqrt{2}}=?$ $2\sqrt{6}$

13. $\frac{1}{1+\frac{1}{\sqrt{2}}}=?$ $2-\sqrt{2}$

14. $\frac{2\sqrt{3}}{1-\frac{1}{\sqrt{3}}}=?$ $3\sqrt{3}+3$

15. $\left(\frac{1+\frac{1}{\sqrt{3}}}{\sqrt{3}+1}+\frac{1}{\sqrt{4}+\sqrt{3}}\right)\cdot\sqrt{3}=?$ $2\sqrt{3}-2$

ÖZELLİK|Property 7

$r \in Z^+$

- $\sqrt[n]{a^k} = a^{\frac{k}{n}} = a^{\frac{k \cdot r}{n \cdot r}} = \sqrt[n \cdot r]{a^{k \cdot r}}$
- $\sqrt[n]{a^k} = a^{\frac{k}{n}} = a^{\frac{k/r}{n/r}} = \sqrt[n/r]{a^{k/r}}$
- $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$
- $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$

1. $\sqrt{3} \cdot \sqrt[3]{9} = 3^x$
$\Rightarrow x = ?$

$\frac{7}{6}$

2. $\sqrt{2} \cdot \sqrt[3]{2} = 2^x$
$\Rightarrow x = ?$

$\frac{5}{6}$

3. $\sqrt{3} \cdot \sqrt[3]{3} \cdot \sqrt[4]{3} = \sqrt[12]{x}$
$\Rightarrow x = ?$

3^{13}

4. $\sqrt{2} \cdot \sqrt[3]{2} = \sqrt[3]{\sqrt{2^x}}$
$\Rightarrow x = ?$

5

5. $\sqrt{5} \cdot \sqrt[3]{25} = \sqrt[6]{5^x}$
$\Rightarrow x = ?$

7

6. $\sqrt[3]{9} \cdot \sqrt{27} = \sqrt{3^x}$
$\Rightarrow x = ?$

$\frac{13}{3}$

7. $\sqrt{2} \cdot \sqrt[3]{2} \cdot \sqrt[6]{2} = \sqrt[3]{\sqrt{x}}$
$\Rightarrow x = ?$

64

ÖZELLİK|Property 8

- $\sqrt[m]{\sqrt[k]{\sqrt[r]{a}}} = \sqrt[m \cdot k \cdot r]{a}$
- $\sqrt[m]{a \sqrt[k]{b \sqrt[r]{c}}} = \sqrt[m]{a} \cdot \sqrt[m \cdot k]{b} \cdot \sqrt[m \cdot k \cdot r]{c}$
- $\sqrt[m]{a \sqrt[k]{b \sqrt[r]{c}}} = \sqrt[m \cdot k \cdot r]{a^{kr} \cdot b^r \cdot c}$

1. $\sqrt[4]{2 \cdot \sqrt{2^{14}}} = x$
$\Rightarrow x = ?$

2^2

2. $\sqrt[3]{2 \cdot \sqrt{2 \cdot \sqrt{8}}} = ?$

$2^{\frac{3}{4}}$

3. $\sqrt{5 \cdot \sqrt[3]{5 \cdot \sqrt{25}}} = 5^x$
$\Rightarrow x = ?$

$\frac{5}{6}$

4. $\sqrt[4]{3 \cdot \sqrt{3 \cdot \sqrt[3]{9}}} = 3^x$
$\Rightarrow x = ?$

$\frac{11}{24}$

5. $\sqrt{\sqrt{2}} = 4^x$
$\Rightarrow x = ?$

$\frac{1}{16}$

6. $\sqrt{\sqrt[3]{3}} = \sqrt[4]{x}$
$\Rightarrow x = ?$

$\sqrt[3]{9}$

7. $\sqrt{4 \sqrt[3]{8 \sqrt{2}}} = 2^x$
$\Rightarrow x = ?$

$\frac{19}{12}$

8. $\sqrt[4]{2 \cdot \sqrt[3]{2}} = 2^x$
$\Rightarrow x = ?$

$\frac{1}{3}$

ÖZELLİK|Property 9

$$\sqrt{a \mp 2\sqrt{b}}$$

m n

$m \cdot n = b$ ve *(and)* $a = m + n$

$\Rightarrow \sqrt{a+2\sqrt{b}} = \sqrt{m} + \sqrt{n}$

$\sqrt{a-2\sqrt{b}} = \sqrt{m} - \sqrt{n}$ $(m > n)$

1. $\sqrt{3+2\sqrt{2}} = ?$

$\sqrt{2}+1$

2. $\sqrt{5-2\sqrt{6}} = ?$

$\sqrt{3}-\sqrt{2}$

3. $\sqrt{6-2\sqrt{5}}+1 = ?$

$\sqrt{5}$

4. $\sqrt{7+2\sqrt{6}}+\sqrt{7-2\sqrt{6}} = ?$

$2\sqrt{6}$

5. $\sqrt{4+\sqrt{12}} = ?$

$\sqrt{3}+1$

6. $\sqrt{5-\sqrt{24}} = ?$

$\sqrt{3}-\sqrt{2}$

7. $\sqrt{8-4\sqrt{3}} = ?$

$\sqrt{6}-\sqrt{2}$

8. $\sqrt{11+6\sqrt{2}} = ?$

$3+\sqrt{2}$

9. $\sqrt{7+4\sqrt{3}}+\sqrt{7-4\sqrt{3}} = ?$

4

10. $\sqrt{9+4\sqrt{5}}-2 = ?$

$\sqrt{5}$

11. $\sqrt{9-6\sqrt{2}} = ?$

$\sqrt{6}-\sqrt{3}$

12. $\sqrt{x+1+2\sqrt{x}} = \sqrt{15}+1$

$\Rightarrow x = ?$

15

13. $a > 3$

$\sqrt{a+3-2\sqrt{3\cdot a}}+\sqrt{3} = 7$

$\Rightarrow a = ?$

49

14. $\sqrt{2+\sqrt{3}}-\sqrt{2-\sqrt{3}} = ?$

$\sqrt{2}$

15. $\sqrt{4-\sqrt{7}}-\sqrt{4+\sqrt{7}} = ?$

$-\sqrt{2}$

ÖZELLİK|Property 10

Sonsuz İfadeler | Infinite Expressions

- $\sqrt{a\cdot\sqrt{a\cdot\sqrt{a\cdot\ldots}}} = a$
- $\sqrt[n]{a\cdot\sqrt[n]{a\cdot\sqrt[n]{a\cdot\ldots}}} = \sqrt[n-1]{a}$
- $\sqrt[n]{a:\sqrt[n]{a:\sqrt[n]{a:\ldots}}} = \sqrt[n+1]{a}$
- a = n(n + 1) olmak üzere
  Let a = n(n + 1)
  $\sqrt{a+\sqrt{a+\sqrt{a+\ldots}}} = n+1$
- $\sqrt{a+\sqrt{a+\sqrt{a+\ldots}}} = \dfrac{\sqrt{4a+1}+1}{2}$
- a = n(n + 1) olmak üzere
  Let a = n(n + 1)
  $\sqrt{a-\sqrt{a-\sqrt{a-\ldots}}} = n$
- $\sqrt{a-\sqrt{a-\sqrt{a-\ldots}}} = \dfrac{\sqrt{4a+1}-1}{2}$

1. $\sqrt{3\cdot\sqrt{3\cdot\sqrt{3\cdot\ldots}}} = ?$ **3**

2. $\sqrt[3]{64\cdot\sqrt[3]{64\cdot\sqrt[3]{64\cdot\ldots..}}} = ?$ **8**

3. $\sqrt{125:\sqrt{125:\sqrt{125:\sqrt{125:\ldots..}}}} = ?$ **5**

4. $\sqrt{72+\sqrt{72+\sqrt{72+\ldots}}} = ?$ **9**

5. $\sqrt{42-\sqrt{42-\sqrt{42-\ldots}}} = ?$ **6**

6. $\dfrac{\sqrt[4]{8\cdot\sqrt[4]{8\cdot\sqrt[4]{8\cdot\ldots..}}}}{\sqrt{8:\sqrt{8:\sqrt{8:\ldots..}}}} = ?$ **1**

7. $\dfrac{\sqrt{6+\sqrt{6+\sqrt{6+\sqrt{6+\ldots..}}}}}{\sqrt{2-\sqrt{2-\sqrt{2-\sqrt{2-\ldots..}}}}} = ?$ **3**

8. $\dfrac{\sqrt{12+\sqrt{12+\sqrt{12+\ldots}}}}{\sqrt{6-\sqrt{6-\sqrt{6-\ldots}}}} = ?$ **2**

9. $\sqrt{x+\sqrt{x+\sqrt{x+\ldots}}} = 6$
$\Rightarrow x = ?$ **30**

10. $\sqrt{2\cdot\sqrt{5\cdot\sqrt{2\cdot\sqrt{5\cdot\ldots}}}} = ?$ $\sqrt[3]{20}$

11. $\sqrt[3]{3\sqrt{2}\sqrt[3]{3\sqrt{2}\ldots}} = ?$ $\sqrt[5]{18}$

12. $\sqrt{a+\sqrt{1+\sqrt{a+\sqrt{1+\ldots..}}}} = 2$
$\Rightarrow a = ?$ $4-\sqrt{3}$

13. $\sqrt{x+\sqrt{2+\sqrt{x+\sqrt{2+\ldots..}}}} = 2$
$\Rightarrow x = ?$ **2**

14. $\sqrt{5+\sqrt{12+\sqrt{12+\sqrt{12+\ldots}}}} = ?$ **3**

15. $\sqrt{5-\sqrt{11+\sqrt{20+\sqrt{20+\sqrt{20+\ldots}}}}} = ?$ **1**

ÖZELLİK|Property 11

Köklü İfadelerde Sıralama
Ordering in Radical Expressions

Kök dereceleri eşit olan köklü ifadelerde, kök içi büyük olan en büyüktür. Kök dereceleri eşit değil ise eşit duruma getirilip sonra sıralama yapılır.

If the power of the radicals are equal, the order is made with respect to increasing order. If the power of the radicals are not equal the order is made with respect to the same equality.

- $a > b > c > 0$

  $\sqrt[m]{a} > \sqrt[m]{b} > \sqrt[m]{c}$

Aşağıdaki ifadeleri büyükten küçüğe sıralayınız.
Write the following radicals in increasing order.

1. $a = \sqrt{5}$
$b = \sqrt{8}$
$c = \sqrt{6}$

b > c > a

2. $a = \sqrt[3]{12}$
$b = \sqrt[3]{17}$
$c = \sqrt[3]{7}$

b > a > c

3. $x = \sqrt{2}$
$y = \sqrt[3]{3}$
$z = \sqrt[4]{5}$

z > y > x

4. $a = 3\sqrt{5}$
$b = 4\sqrt{2}$
$c = 2\sqrt{11}$

a > c > b

5. $x = \sqrt{3}$
$y = \sqrt[3]{5}$
$z = \sqrt[6]{13}$

x > y > z

6. $0 < a < 1$
$x = \sqrt{a}$
$y = \sqrt[3]{a}$
$z = \sqrt[6]{a}$

z > y > x

7. $x = -3\sqrt{5}$
$y = -2\sqrt{6}$
$z = -4\sqrt{2}$

y > z > x

8. $a = \dfrac{1}{\sqrt[3]{10}}$
$b = \dfrac{1}{\sqrt{6}}$
$c = \dfrac{1}{\sqrt[6]{75}}$

c > a > b

9. $x = -\dfrac{1}{\sqrt{10}}$
$y = -\dfrac{1}{\sqrt{15}}$
$z = -\dfrac{1}{\sqrt{6}}$

y > x > z

ÖRNEK SORU TÜRLERİ Exemplary Question Types

1. $\sqrt{(-5)^2} + \sqrt[3]{(-2)^3} + \sqrt[3]{64} = ?$

7

2. $\sqrt{(1-\sqrt{7})^2} + \sqrt{(\sqrt{7}-3)^2} = ?$

2

3. $x < 0 < y$

$$\Rightarrow \frac{\sqrt{x^2} + \sqrt[4]{y^4}}{\sqrt[5]{x^5} - \sqrt[3]{y^3}} = ?$$

−1

4. $\sqrt{2+\sqrt[3]{5+\sqrt{11-\sqrt{x+1}}}} = 2$

$\Rightarrow x = ?$

3

5. $\dfrac{3\sqrt{2}-2\sqrt{3}}{\sqrt{3}-\sqrt{2}} = ?$

$\sqrt{6}$

6. $A \in R$

$$A = \frac{\sqrt{x-2}+x+3}{\sqrt{4-2x}+x-1}$$

$\Rightarrow A = ?$

5

7. $x = \dfrac{\sqrt{5}-2}{\sqrt{7}+\sqrt{3}}$

$$\Rightarrow \frac{\sqrt{7}-\sqrt{3}}{\sqrt{5}+2}$$

ifadesinin x türünden ifadesi nedir?

What is the value of $\dfrac{\sqrt{7}-\sqrt{3}}{\sqrt{5}+2}$ *in terms of x?*

4x

8. $x + \sqrt{x} = 13$

$$\Rightarrow x + \frac{13}{\sqrt{x}} = ?$$

14

ÖRNEK SORU TÜRLERİ Exemplary Question Types

9. $0 < x < 1$

$a = x\sqrt{x}$

$b = \sqrt{x \cdot \sqrt{x}}$

$c = \sqrt[3]{x^2}$

$a < b < c$

10. $x = \sqrt{5} - 2$

$\Rightarrow x \cdot (x+1) \cdot (x+3) \cdot (x+4) = ?$

4

11. $x, y \in Z$

$\frac{1}{\sqrt{8-2\sqrt{7}}} = x + y\sqrt{7}$

$\Rightarrow x^2 + y^2 = ?$

$\frac{1}{18}$

12. $\sqrt[3]{2^{6-9x} + \frac{19}{8^{3x-1}}} = 48$

$\Rightarrow x = ?$

-1

13. $y < 0$

$\Rightarrow \sqrt{-3y \cdot \sqrt{-9y \cdot \sqrt[5]{-y^5}}} = ?$

$-3y$

14. $\frac{1}{\sqrt{1}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{7}} + \ldots + \frac{1}{\sqrt{47}+\sqrt{49}} = ?$

3

15. $\sqrt[4]{3} + 1 = x$

$\Rightarrow \frac{(\sqrt[8]{3}-1)\cdot(\sqrt[8]{3}+1)}{\sqrt{3}-1} = ?$

$\frac{1}{x}$

16. $\sqrt{3+\sqrt{5}} + \sqrt{3-\sqrt{5}} = ?$

$\sqrt{10}$

1. $\sqrt{16} + \sqrt{81} - \sqrt{25} = ?$

A) 10 B) 8 C) 5 D) 4 E) 1

2. $\frac{\sqrt{25}}{10} - \frac{\sqrt{16}}{5} + \frac{\sqrt{9}}{10} = ?$

A) -1 B) 0 C) 1 D) 2 E) 3

3. $\sqrt{144} + \sqrt{225} + 5\sqrt[3]{-64} = ?$

A) -9 B) -7 C) 0 D) 4 E) 7

4. $\sqrt[4]{16} + \sqrt[3]{27} - \sqrt{64} = ?$

A) -4 B) -3 C) 1 D) $\sqrt[4]{2} + 3$ E) $-6 + \sqrt[3]{27}$

5. $\sqrt{64} - \sqrt[3]{-125} + \sqrt[4]{16^3} = ?$

A) 20 B) 21 C) 25 D) 29 E) 32

6. $\sqrt{(-5)^2} + \sqrt[3]{(-7)^3} = ?$

A) 12 B) 6 C) 2 D) -2 E) -12

7. $\sqrt{25} + \sqrt[3]{-8} + \sqrt[3]{27} = ?$

A) 10 B) 8 C) 6 D) 4 E) 0

8. $\sqrt[4]{(-4)^2} + \sqrt[5]{-7^5} + \sqrt{9} = ?$

A) -4 B) -2 C) 1 D) 2 E) 3

9. $\sqrt{0,36} - \sqrt{0,16} = ?$

A) 0,02 B) 0,2 C) 0,4 D) 0,8 E) 1

10. $\sqrt{(-3)^2} + \sqrt{(-1)^2} - \sqrt{16} = ?$

A) -3 B) 0 C) 1 D) 2 E) 4

11. $\sqrt{12^{-1} \cdot (2^3 - 5)} = ?$

A) $\frac{1}{12}$ B) $\frac{1}{8}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

12. $\sqrt{15 \cdot 42 \cdot 70} = ?$

A) 30 B) 42 C) 70 D) 140 E) 210

13. $\sqrt[3]{2^2 \cdot 16^2 \cdot 4^4} = ?$

A) 2^{16} B) 2^{15} C) 2^{12} D) 2^9 E) 2^6

14. $\sqrt{1 + \frac{9}{16}} + \sqrt{1 - \frac{5}{9}} = ?$

A) $\frac{5}{3}$ B) $\frac{11}{6}$ C) $\frac{23}{12}$ D) 2 E) $\frac{25}{12}$

15. $\sqrt{1 - \frac{9}{25}} + \sqrt{1 - \frac{7}{16}} = ?$

A) $\frac{3}{5}$ B) $\frac{5}{4}$ C) $\frac{29}{30}$ D) $\frac{31}{20}$ E) $\frac{8}{5}$

16. $\sqrt{8 - \frac{7}{4}} - \sqrt{3 - \frac{3}{4}} = ?$

A) -2 B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) 1 E) $\frac{5}{4}$

1. $\sqrt{\frac{1}{9}\cdot\frac{1}{16}} = ?$

A) $\frac{1}{18}$ B) $\frac{1}{12}$ C) $\frac{1}{6}$ D) $\frac{1}{3}$ E) $\frac{1}{2}$

2. $\sqrt{\frac{1}{9}+\frac{1}{16}} = ?$

A) $\frac{1}{12}$ B) $\frac{1}{6}$ C) $\frac{1}{4}$ D) $\frac{1}{3}$ E) $\frac{5}{12}$

3. $\sqrt{6}\cdot\sqrt{15}\cdot\sqrt{10} = ?$

A) 30 B) 24 C) 18 D) 12 E) 10

4. $\sqrt{6}\cdot\sqrt{21}\cdot\sqrt{14} = ?$

A) 36 B) 42 C) 49 D) 126 E) 144

5. $\sqrt{5-\frac{1}{2}}\cdot\sqrt{2} = ?$

A) 1 B) $-\sqrt{2}$ C) $\sqrt{3}$ D) $\sqrt{6}$ E) 3

6. $\sqrt{3^2+4^2+12^2} = ?$

A) 8 B) 10 C) 13 D) 15 E) 19

7. $\frac{35}{\sqrt{3^2+4^2}} = ?$

A) 9 B) 7 C) 6 D) 5 E) 4

8. $\frac{20}{\sqrt{6^2+8^2}} = ?$

A) 1 B) 2 C) 4 D) 5 E) 10

9. $\sqrt{1\frac{5}{4}-\frac{8}{9}}=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{7}{6}$ D) $\frac{3}{2}$ E) 2

10. $\sqrt{\frac{1}{25}+\frac{1}{144}}=?$

A) $\frac{1}{60}$ B) $\frac{1}{30}$ C) $\frac{13}{60}$ D) $\frac{1}{12}$ E) $\frac{1}{10}$

11. $\sqrt{\frac{1}{4}+\frac{1}{16}+1\frac{1}{4}}=?$

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{5}{4}$ D) 2 E) $\frac{5}{2}$

12. $\frac{\sqrt{15}\cdot\sqrt{77}\cdot\sqrt{35}}{\sqrt{33}}=?$

A) 15 B) 21 C) 25 D) 35 E) 77

13. $\sqrt{(1-\sqrt{2})^2}\cdot(1+\sqrt{2})=?$

A) $-\sqrt{2}$ B) -1 C) 1 D) $\sqrt{2}-1$ E) $2\sqrt{2}$

14. $\sqrt{(2-\sqrt{5})^2}+\sqrt{5}=?$

A) 2 B) $2\sqrt{5}-2$ C) $2\sqrt{5}$ D) 4 E) $5\sqrt{2}$

15. $\sqrt{(2-\sqrt{7})^2}-\sqrt{7}=?$

A) $-2\sqrt{7}$ B) -2 C) 2 D) $2\sqrt{7}$ E) $4\sqrt{7}$

16. $x<y<0<z$

$\Rightarrow \sqrt{z^2}-\sqrt[3]{y^3}+\sqrt[4]{x^4}=?$

A) $z+y-x$ B) $z+y+x$ C) $z-y+x$ D) $z-y-x$ E) $x-y-z$

1. $\sqrt{4!} \cdot \sqrt{3!} = ?$

A) $3! \cdot 4$ B) 6 C) 12 D) 26 E) 30

2. $\sqrt{47 + \sqrt[3]{3 + \sqrt{25}}} = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

3. $\sqrt[3]{66 - \sqrt[3]{3 + \sqrt{25}}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\sqrt[3]{5 + \sqrt{12 - \sqrt[3]{27}}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $\sqrt[3]{-23 + \sqrt[3]{-72 + \sqrt{64}}} = ?$

A) -3 B) -2 C) -1 D) 1 E) 2

6. $\sqrt{1 + \sqrt{3 + 3\sqrt{2 + \sqrt[3]{8}}}} = ?$

A) 1 B) $\sqrt{3}$ C) 2 D) $2\sqrt{3}$ E) $3\sqrt{2}$

7. $\sqrt{37 + \sqrt[3]{5 - \sqrt{29 + \sqrt{3x - 2}}}} = 6$

$\Rightarrow x = ?$

A) 21 B) 19 C) 18 D) 17 E) 16

8. $\sqrt{12} - \sqrt{75} + \sqrt{48} = ?$

A) $\sqrt{3}$ B) $\sqrt{5}$ C) $2\sqrt{3}$ D) $4\sqrt{3}$ E) $3\sqrt{5}$

9. $\sqrt{75}+\sqrt{48}-\sqrt{27}=?$

A) $12\sqrt{3}$ B) $9\sqrt{3}$ C) $6\sqrt{3}$ D) 9 E) $3\sqrt{3}$

10. $\sqrt{2}\cdot(\sqrt{8}+\sqrt{2})+\sqrt{3}\cdot(\sqrt{27}-\sqrt{12})=?$

A) 3 B) $2\sqrt{3}$ C) $3\sqrt{2}$ D) $3\sqrt{3}$ E) 9

11. $\sqrt{3}\cdot(\sqrt{27}-\sqrt{3})+\sqrt{5}\cdot(\sqrt{45}+\sqrt{5})=?$

A) 15 B) 18 C) 23 D) 26 E) 29

12. $\sqrt{20}\cdot\sqrt{2+\sqrt{(-3)^2}}=?$

A) $2\sqrt{2}$ B) $2\sqrt{5}$ C) 5 D) $5\sqrt{2}$ E) 10

13. $\dfrac{\sqrt{27}+\sqrt{12}}{\sqrt{3}}=?$

A) 2 B) 3 C) 4 D) 5 E) 6

14. $\dfrac{\sqrt{63}+\sqrt{28}}{\sqrt{7}}=?$

A) 7 B) 5 C) 3 D) $\sqrt{7}$ E) 1

15. $\dfrac{4\sqrt{18}+\sqrt{8}-\sqrt{50}}{\sqrt{72}}=?$

A) $3\sqrt{2}$ B) $\sqrt{2}$ C) $\dfrac{3}{2}$ D) $\dfrac{\sqrt{2}}{2}$ E) $\dfrac{1}{6}$

16. $\dfrac{2\sqrt{72}-3\sqrt{50}}{\sqrt{18}}=?$

A) -1 B) $\sqrt{2}$ C) 2 D) $2\sqrt{2}$ E) 4

1. $\frac{\sqrt{40}\cdot\sqrt{18}}{\sqrt{80}} = ?$

A) $4\sqrt{5}$ B) $2\sqrt{5}$ C) 3 D) 2 E) 1

2. $\frac{2}{\sqrt{5}}(\sqrt{20}+\sqrt{45}) = ?$

A) 2 B) 5 C) 7 D) 10 E) 20

3. $\frac{\sqrt{8}+\sqrt{18}+\sqrt{50}}{\sqrt{32}+\sqrt{2}} = ?$

A) $\sqrt{2}$ B) 2 C) $2\sqrt{2}$ D) 4 E) $4\sqrt{2}$

4. $\frac{\sqrt{63}-\sqrt{28}}{\sqrt{112}} = ?$

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{\sqrt{7}}{4}$ D) $\frac{\sqrt{7}}{2}$ E) $\sqrt{7}$

5. $\frac{\sqrt{18}+\sqrt{27}}{\sqrt{2}+\sqrt{3}} = ?$

A) 2 B) 3 C) $\sqrt{3}$ D) $2\sqrt{3}$ E) $3\sqrt{3}$

6. $\frac{7\sqrt{2}}{\sqrt{200}}+\frac{\sqrt{27}}{\sqrt{300}} = ?$

A) 1 B) $\sqrt{2}$ C) $3\sqrt{2}$ D) $3\sqrt{3}$ E) $\sqrt{6}$

7. $\frac{300}{\sqrt{900}}+\frac{\sqrt{100}}{10} = ?$

A) 32 B) 20 C) 12 D) 11 E) 2

8. $\frac{\sqrt{45}+\sqrt{20}-\sqrt{5}}{\sqrt{125}-\sqrt{80}} = ?$

A) $\sqrt{5}$ B) 3 C) 4 D) 5 E) $5\sqrt{5}$

9. $(\sqrt{7}-\sqrt{5})\cdot(\sqrt{7}+\sqrt{5}) = ?$

A) 2 B) 5 C) 7 D) 11 E) 12

10. $\frac{6}{\sqrt{3}} = ?$

A) $\sqrt{2}$ B) 2 C) 3 D) $2\sqrt{3}$ E) $3\sqrt{2}$

11. $\frac{24}{\sqrt{6}} = ?$

A) $\sqrt{6}$ B) $2\sqrt{6}$ C) $4\sqrt{6}$ D) 6 E) 24

12. $\frac{\sqrt{3}\cdot\sqrt{3}}{\sqrt{3}+\sqrt{3}} = ?$

A) $\frac{\sqrt{3}}{2}$ B) 1 C) $\sqrt{3}$ D) 3 E) $3\sqrt{3}$

13. $\frac{\sqrt{32}+\sqrt{8}-\sqrt{2}}{\sqrt{5}} = ?$

A) $\sqrt{10}$ B) $\sqrt{5}$ C) $\sqrt{2}$ D) 1 E) 0

14. $\frac{16}{\sqrt{2}}+3\sqrt{2} = ?$

A) $3\sqrt{3}$ B) $4\sqrt{2}$ C) $\frac{5\sqrt{2}}{2}$ D) $11\sqrt{2}$ E) $15\sqrt{2}$

15. $\left(\frac{6}{\sqrt{2}}+\frac{10}{\sqrt{2}}\right)\cdot\sqrt{18} = ?$

A) 18 B) 24 C) 36 D) 48 E) 54

16. $\frac{\sqrt{48}-\sqrt{12}}{\sqrt{24}} = ?$

A) 1 B) $\frac{\sqrt{2}}{2}$ C) $\sqrt{2}$ D) $\sqrt{3}$ E) 4

1. $\frac{4}{\sqrt{5}-3} = ?$

A) $3+\sqrt{5}$ B) $3-\sqrt{5}$ C) $-3-\sqrt{5}$ D) $\sqrt{5}-3$ E) $\frac{1}{\sqrt{5}+3}$

2. $\frac{\sqrt{45}+\sqrt{35}}{\sqrt{5}} - \frac{7}{\sqrt{7}} = ?$

A) $\sqrt{3}$ B) $\sqrt{5}$ C) 3 D) 5 E) $2\sqrt{7}$

3. $\frac{2}{\sqrt{7}-\sqrt{5}} - \frac{5}{\sqrt{5}} = ?$

A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) $\sqrt{5}$ E) $\sqrt{7}$

4. $\frac{1}{\sqrt{3}-1} - \frac{\sqrt{3}}{2} = ?$

A) 0 B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 3

5. $\frac{6}{\sqrt{2}} - \frac{3}{\sqrt{3}} + \frac{3}{\sqrt{3}+\sqrt{2}} = ?$

A) $-\sqrt{3}$ B) $-\sqrt{2}$ C) $\sqrt{3}$ D) $2\sqrt{3}$ E) $3\sqrt{3}$

6. $\frac{2}{\sqrt{7}+\sqrt{5}} + \frac{2}{\sqrt{5}-\sqrt{3}} = ?$

A) $2\sqrt{7}$ B) $2\sqrt{5}$ C) $\sqrt{5}+\sqrt{7}$ D) $\sqrt{7}+\sqrt{3}$ E) $\sqrt{7}-\sqrt{5}$

7. $\frac{15}{\sqrt{7}-2} - \frac{21}{\sqrt{7}} = ?$

A) -6 B) $-6-6\sqrt{7}$ C) $2\sqrt{7}+10$ D) 6 E) $6+6\sqrt{7}$

8. $\frac{1}{\sqrt{3}-1} + \frac{1}{\sqrt{3}+1} = ?$

A) -2 B) -1 C) 0 D) $\sqrt{3}$ E) $2\sqrt{3}$

9. $\frac{14}{5-3\sqrt{2}} - \frac{6}{\sqrt{2}} = ?$

A) $10+3\sqrt{2}$ B) $7+\sqrt{2}$ C) $10-6\sqrt{2}$ D) $6\sqrt{2}$ E) $5+3\sqrt{2}$

10. $\frac{1}{3+2\sqrt{2}} - \frac{1}{3-2\sqrt{2}} = ?$

A) $4\sqrt{2}$ B) $3\sqrt{2}$ C) 6 D) -6 E) $-4\sqrt{2}$

11. $\frac{1}{3-\sqrt{8}} + \frac{1}{3+2\sqrt{2}} = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

12. $\frac{6}{\sqrt{5}-\sqrt{2}} - \frac{9}{\sqrt{5}+\sqrt{2}} - \frac{10}{\sqrt{2}} = ?$

A) $-\sqrt{5}$ B) -2 C) $-\sqrt{2}$ D) 2 E) 3

13. $\frac{2}{\sqrt{6}-\sqrt{2}} - \frac{\sqrt{3}-1}{\sqrt{2}} = ?$

A) 1 B) $\sqrt{2}$ C) 2 D) $\sqrt{6}$ E) $2\sqrt{6}$

14. $2\sqrt{3}\cdot 3\sqrt{2} + 3\sqrt{2} : \sqrt{3} = ?$

A) $7\sqrt{6}$ B) $6\sqrt{6}$ C) 6 D) $\sqrt{6}$ E) $\sqrt{3}$

15. $\frac{4}{\sqrt[3]{2}} = ?$

A) $2\sqrt[3]{2}$ B) $2\sqrt{2}$ C) $2\sqrt[3]{4}$ D) 4 E) $4\sqrt[3]{2}$

16. $2\sqrt{\frac{3}{2}} + 3\sqrt{\frac{2}{3}} = ?$

A) 2 B) $2\sqrt{2}$ C) $2\sqrt{3}$ D) $2\sqrt{6}$ E) $3\sqrt{2}$

1. $\dfrac{6}{\sqrt{3}+\dfrac{3}{\sqrt{3}}} = ?$

A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) $2\sqrt{3}$ E) $\sqrt{6}$

2. $\left(\sqrt{3}+\dfrac{1}{\sqrt{3}}\right)\cdot\left(\sqrt{2}+\dfrac{1}{\sqrt{2}}\right) = ?$

A) $\sqrt{3}$ B) $2\sqrt{2}$ C) $2\sqrt{3}$ D) $2\sqrt{6}$ E) $4\sqrt{3}$

3. $\dfrac{4}{3}+\dfrac{\sqrt{2}}{\sqrt{2}+\dfrac{1}{\sqrt{2}}} = ?$

A) $\sqrt{2}$ B) $\sqrt{3}$ C) 2 D) $2\sqrt{2}$ E) 4

4. $\dfrac{\sqrt{3}-\dfrac{1}{\sqrt{3}}}{\sqrt{3}+\dfrac{1}{\sqrt{3}}} = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{2}{3}$ C) $\dfrac{3}{4}$ D) 1 E) $\dfrac{5}{4}$

5. $\dfrac{1}{2-\dfrac{4}{\sqrt{2}}}+\dfrac{1}{2+\dfrac{4}{\sqrt{2}}} = ?$

A) -1 B) 1 C) $\sqrt{2}$ D) 2 E) $2\sqrt{2}$

6. $\dfrac{\sqrt{3}}{\sqrt{3}-1}-\dfrac{1}{\sqrt{3}+1} = ?$

A) $2+\sqrt{3}$ B) $2-\sqrt{3}$ C) $\sqrt{3}$ D) 2 E) 4

7. $\dfrac{1}{\sqrt{5}+\sqrt{6}}+\dfrac{1}{\sqrt{6}+\sqrt{7}}+\dfrac{1}{\sqrt{7}+\sqrt{8}} = ?$

A) $2\sqrt{2}-\sqrt{5}$ B) $\sqrt{5}-1$ C) $4-\sqrt{5}$ D) $\sqrt{5}$ E) $2\sqrt{5}$

8. $\dfrac{1+\sqrt{2}+\sqrt{3}+\sqrt{6}}{1+\sqrt{3}} = ?$

A) $\sqrt{2}+1$ B) $\sqrt{3}+1$ C) $\sqrt{2}+\sqrt{3}$ D) $1+\sqrt{6}$ E) $\sqrt{2}+\sqrt{6}$

9. $\frac{\sqrt{3}-1}{\sqrt{15}-\sqrt{5}+\sqrt{3}-1}-\frac{1}{\sqrt{5}-1}=?$

A) $-\frac{1}{4}$ B) $-\frac{1}{2}$ C) 0 D) $\frac{\sqrt{5}}{4}$ E) $\frac{\sqrt{5}}{2}$

10. $\frac{3-\sqrt{6}}{\sqrt{3}-\sqrt{2}}=?$

A) $\sqrt{2}$ B) $\sqrt{3}$ C) $2\sqrt{3}$ D) $\sqrt{3}-\sqrt{2}$ E) $\sqrt{3}+\sqrt{2}$

11. $\frac{5\sqrt{3}-\sqrt{50}}{\sqrt{15}-\sqrt{10}}=?$

A) $\frac{\sqrt{5}}{5}$ B) $\frac{2\sqrt{5}}{5}$ C) $\sqrt{5}-1$ D) $\sqrt{5}$ E) $\sqrt{5}+1$

12. $2\sqrt{45}+3\sqrt{20}=x\sqrt{5}$
$\Rightarrow x=?$

A) 2 B) 4 C) 6 D) 12 E) 36

13. $\frac{1}{\sqrt{0,09}}+\frac{1}{\sqrt{0,04}}-\frac{1}{\sqrt{0,01}}=?$

A) $-\frac{3}{4}$ B) $-\frac{5}{4}$ C) $-\frac{5}{3}$ D) $\frac{2}{5}$ E) $\frac{3}{7}$

14. $\frac{\sqrt{3}\cdot\sqrt{12}}{\sqrt{0,04}+\sqrt{0,25}}=?$

A) 2 B) $\frac{50}{7}$ C) $\frac{60}{7}$ D) 9 E) $\frac{47}{5}$

15. $\frac{\sqrt{1,44}+\sqrt{0,09}}{\sqrt{0,25}}=?$

A) 1 B) $\frac{3}{5}$ C) $\frac{3}{25}$ D) 3 E) 5

16. $\frac{\sqrt{1,44}+\sqrt{0,09}}{\sqrt{0,64}+\sqrt{0,01}}=?$

A) $\frac{3}{\sqrt{10}}$ B) $\frac{3}{10}$ C) $5\sqrt{10}$ D) $\frac{5\sqrt{10}}{3}$ E) $\frac{5}{3}$

1. $\sqrt[3]{16} + \sqrt[3]{54} = ?$

A) $5\sqrt[3]{2}$ B) $5\sqrt{2}$ C) 5 D) $3\sqrt{5}$ E) $3\sqrt[3]{5}$

2. $\sqrt[3]{-54} + \sqrt[3]{16} = ?$

A) -2 B) $-\sqrt[3]{2}$ C) 1 D) 2 E) $\sqrt[3]{2}$

3. $\sqrt[3]{128} + 3 \cdot \sqrt[3]{54} - \sqrt[3]{2} = ?$

A) $\sqrt[3]{2}$ B) 2 C) $6\sqrt[3]{2}$ D) 12 E) $12\sqrt[3]{2}$

4. $\dfrac{\sqrt[3]{54} + \sqrt[3]{128}}{\sqrt[3]{16}} = ?$

A) $\frac{3}{2}$ B) 2 C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$

5. $\sqrt[3]{0,027} + \sqrt[4]{0,0016} = ?$

A) 0,1 B) 0,2 C) 0,3 D) 0,4 E) 0,5

6. $\sqrt{0,25} + \sqrt{0,04} + \sqrt[3]{0,008} = ?$

A) 1 B) 0,9 C) 0,8 D) 0,6 E) 0,5

7. $\sqrt{\sqrt{13} - 3} \cdot \sqrt{\sqrt{13} + 3} = ?$

A) 1 B) 2 C) 3 D) 4 E) 9

8. $\sqrt{\sqrt{19} + \sqrt{15}} \cdot \sqrt{\sqrt{19} - \sqrt{15}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $\sqrt{(5\sqrt{2}-1)(5\sqrt{2}+1)} = ?$

A) 4 B) 5 C) 7 D) 9 E) 11

10. $\sqrt{6+\sqrt{11}} \cdot \sqrt{6-\sqrt{11}} = ?$

A) 2 B) 5 C) 6 D) 10 E) 11

11. $\sqrt{(\sqrt{8}-2)} \cdot \sqrt{(2+2\sqrt{2})} = ?$

A) 1 B) $\sqrt{2}$ C) 2 D) $2\sqrt{2}$ E) $\sqrt{6}$

12. $\sqrt{\sqrt{8}-\sqrt{3}} \cdot \sqrt{\sqrt{8}+\sqrt{3}} \cdot \sqrt{5} = ?$

A) $\sqrt{3}$ B) $\sqrt{5}$ C) $\sqrt{15}$ D) 5 E) 15

13. $\sqrt[6]{81 \cdot 9 \cdot \left(\frac{1}{9}\right)^{-3}} = ?$

A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) 1 D) 3 E) 9

14. $3^x \cdot 9^x = \sqrt[3]{81} \Rightarrow x = ?$

A) $\frac{1}{3}$ B) $\frac{4}{9}$ C) $\frac{5}{9}$ D) 1 E) 2

15. $\sqrt[3]{\frac{81}{\sqrt[3]{27}}} = 3^x \Rightarrow x = ?$

A) $\frac{1}{7}$ B) $\frac{2}{7}$ C) $\frac{1}{3}$ D) 1 E) 3

16. $\frac{\sqrt{4^{x+3}}}{\sqrt[3]{2^{3x+y}}} = 16 \Rightarrow y = ?$

A) -3 B) -1 C) 2 D) 4 E) 6

1. $\sqrt{5+2\sqrt{6}} - \sqrt{2} = ?$

A) $\sqrt{2}$ B) $\sqrt{2}+\sqrt{3}$ C) $\sqrt{2}+2\sqrt{3}$ D) $\sqrt{3}$ E) $\sqrt{3}-2\sqrt{2}$

2. $\sqrt{8-2\sqrt{7}} + \sqrt{8+2\sqrt{7}} = ?$

A) $2\sqrt{7}$ B) 2 C) 1 D) -2 E) $-2\sqrt{7}$

3. $\sqrt{8+2\sqrt{7}} - \sqrt{11-2\sqrt{28}} = ?$

A) $\sqrt{7}+1$ B) $2\sqrt{7}$ C) $\sqrt{11}$ D) 3 E) 1

4. $\sqrt{12+2\sqrt{11}} - \sqrt{12-2\sqrt{11}} = ?$

A) -2 B) 2 C) $2\sqrt{2}$ D) 4 E) $2\sqrt{22}$

5. $\sqrt{5-2\sqrt{6}} \cdot \sqrt{5+2\sqrt{6}} = ?$

A) 1 B) 2 C) $\sqrt{3}$ D) $2\sqrt{3}$ E) 5

6. $\sqrt{(\sqrt{7}-\sqrt{2})\cdot\sqrt{9+2\sqrt{14}}} = ?$

A) 2 B) $\sqrt{5}$ C) $2\sqrt{2}$ D) $2\sqrt{7}$ E) 7

7. $\sqrt{4-\sqrt{12}} + 1 = ?$

A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2 E) 4

8. $\sqrt{4-\sqrt{12}} : (\sqrt{3}+1) = ?$

A) 1 B) $2+\sqrt{3}$ C) $2-\sqrt{3}$ D) $\sqrt{3}+1$ E) $2\sqrt{3}$

9. $\sqrt{11+\sqrt{40}}-\sqrt{10}=?$

A) 2 B) 1 C) $-2\sqrt{10}+1$ D) $-2\sqrt{10}$ E) $-\sqrt{10}$

10. $\sqrt{7-\sqrt{40}}\cdot\sqrt{7+\sqrt{40}}=?$

A) $\sqrt{7}$ B) 3 C) 4 D) $3\sqrt{3}$ E) 7

11. $\sqrt{9+4\sqrt{5}}-\frac{5}{\sqrt{5}}=?$

A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2 E) $\sqrt{5}$

12. $\sqrt{7-4\sqrt{3}}+\sqrt{7+4\sqrt{3}}=?$

A) 2 B) $2\sqrt{3}$ C) 4 D) $4+2\sqrt{3}$ E) $4\sqrt{3}$

13. $\sqrt{14+6\sqrt{5}}-\frac{10}{\sqrt{5}}=?$

A) 5 B) $2\sqrt{5}$ C) 3 D) $3-\sqrt{5}$ E) $3-2\sqrt{5}$

14. $\sqrt{1+\sqrt{3-\sqrt{8}}}-\sqrt{-1+\sqrt{3+\sqrt{8}}}=?$

A) 0 B) 1 C) $\sqrt[4]{2}$ D) $\sqrt{2}$ E) 2

15. $(\sqrt{7}-\sqrt{3})\cdot\sqrt{5+\sqrt{21}}=?$

A) 2 B) $2\sqrt{2}$ C) 4 D) 5 E) 7

16. $\sqrt{4+\sqrt{15}}-\sqrt{4-\sqrt{15}}=?$

A) $\sqrt{2}$ B) $\sqrt{3}$ C) 2 D) $\sqrt{6}$ E) $2\sqrt{3}$

1. $\sqrt[3]{4} \cdot \sqrt{2} = ?$

A) $2\sqrt[6]{2}$ B) $\sqrt[6]{2}$ C) $2\sqrt[3]{2}$ D) $\sqrt[3]{2}$ E) $\sqrt[3]{4}$

2. $\sqrt{2} \cdot \sqrt[3]{2} \cdot \sqrt[6]{2} = ?$

A) $\sqrt[3]{4}$ B) $\sqrt[6]{2^5}$ C) 2 D) $2\sqrt{2}$ E) $2\sqrt[3]{2}$

3. $\sqrt{3} \cdot \sqrt[3]{9} \cdot \sqrt[4]{\frac{1}{81}} = ?$

A) $\sqrt[3]{3}$ B) $3\sqrt[3]{3}$ C) $\sqrt[6]{3}$ D) $\sqrt[3]{9}$ E) $\sqrt[12]{3}$

4. $\sqrt[5]{\sqrt[3]{\sqrt{3}}} = ?$

A) $3^{\frac{1}{5}}$ B) $3^{\frac{1}{10}}$ C) $3^{\frac{1}{15}}$ D) $3^{\frac{1}{20}}$ E) $3^{\frac{1}{30}}$

5. $\sqrt{2\sqrt[3]{2\sqrt[4]{2}}} = ?$

A) $2^{\frac{5}{24}}$ B) $2^{\frac{1}{2}}$ C) $2^{\frac{17}{24}}$ D) $2^{\frac{5}{6}}$ E) $2^{\frac{23}{24}}$

6. $\sqrt{2\sqrt[3]{2\sqrt{2}}} = ?$

A) $2^{\frac{1}{12}}$ B) $2^{\frac{1}{6}}$ C) $2^{\frac{1}{4}}$ D) $2^{\frac{3}{4}}$ E) 2

7. $\sqrt[3]{\sqrt{3}} \cdot \sqrt[3]{\sqrt{2}} = ?$

A) $\sqrt{2}$ B) $\sqrt{3}$ C) $\sqrt[6]{2}$ D) $\sqrt[6]{3}$ E) $\sqrt[6]{6}$

8. $\sqrt[3]{9\sqrt{3^4\sqrt{3^{-4}}}} = 3^x \Rightarrow x = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) 1 E) $\frac{5}{2}$

9. $\frac{\sqrt{\sqrt[3]{\sqrt{8}}}}{\sqrt{2\sqrt{4\sqrt{2}}}} = 2^x$

$\Rightarrow x = ?$

A) $-\frac{3}{8}$ B) $-\frac{1}{2}$ C) $-\frac{5}{8}$ D) $-\frac{3}{4}$ E) $-\frac{7}{8}$

10. $\sqrt[4]{2\sqrt{3}} = \sqrt[8]{3x}$

$\Rightarrow x = ?$

A) $\sqrt[4]{2}$ B) $\sqrt[3]{2}$ C) $\sqrt{2}$ D) $2\sqrt{2}$ E) 4

11. $\sqrt{2\sqrt[3]{x}} = \sqrt[3]{9\sqrt{8}}$

$\Rightarrow x = ?$

A) 36 B) 54 C) 64 D) 72 E) 81

12. $\sqrt[4]{8\sqrt{a}} = 2\sqrt{2}$

$\Rightarrow a = ?$

A) 8 B) 16 C) 32 D) 64 E) 128

13. $\sqrt{x \cdot \sqrt[4]{x \cdot \sqrt[3]{x}}} = \sqrt{3^2 \cdot \sqrt[3]{3 \cdot \sqrt{3^2}}}$

$\Rightarrow x = ?$

A) 1 B) $\sqrt[3]{3}$ C) $\sqrt{3}$ D) 3 E) 9

14. $\sqrt{\frac{1}{2}\sqrt{4^{-1} \cdot \sqrt[3]{16}}} = 2^x$

$\Rightarrow x = ?$

A) $-\frac{1}{3}$ B) $-\frac{2}{3}$ C) $-\frac{3}{2}$ D) -2 E) $-\frac{5}{2}$

15. $\sqrt{x \cdot \sqrt[5]{x^3}} = \sqrt[5]{\sqrt{16}}$

$\Rightarrow x = ?$

A) 1 B) $\sqrt[4]{2}$ C) $\sqrt{2}$ D) 2 E) 4

16. $\sqrt{2} \cdot \sqrt[3]{2} \cdot \sqrt[4]{2} = \sqrt{2 \cdot \sqrt[3]{2\sqrt{x}}}$

$\Rightarrow x = ?$

A) 4 B) 8 C) 16 D) 32 E) 64

1. $\sqrt{5\sqrt{5\sqrt{5\cdots}}} = ?$

A) $\sqrt{5}$ B) 5 C) $5\sqrt{5}$ D) 25 E) 125

2. $\dfrac{\sqrt[3]{64\cdot\sqrt[3]{64\cdot\sqrt[3]{64\cdot\ .....}}}}{\sqrt{64:\sqrt{64:\sqrt{64:\ .....}}}} = ?$

A) $\sqrt[3]{2}$ B) $\sqrt{2}$ C) 2 D) $2\sqrt{2}$ E) 4

3. $\dfrac{\sqrt{72+\sqrt{72+\sqrt{72+.....}}}}{\sqrt{12-\sqrt{12-\sqrt{12-.....}}}} = ?$

A) 8 B) 6 C) 4 D) 3 E) 2

4. $\sqrt{30+\sqrt{30+\sqrt{30+...}}} + \sqrt{20-\sqrt{20-\sqrt{20-...}}} = ?$

A) 50 B) 20 C) 11 D) 10 E) 5

5. $\sqrt{x+\sqrt{x+\sqrt{x+\cdots}}} = 5$

$\Rightarrow x = ?$

A) 5 B) 10 C) 15 D) 20 E) 30

6. $\left.\begin{array}{l} a = \sqrt{12+\sqrt{12+\sqrt{12+.....}}} \\ b = \sqrt{64:\sqrt{64:\sqrt{64:\ .....}}} \end{array}\right\} \Rightarrow a + b = ?$

A) 5 B) 8 C) 12 D) 20 E) 78

7. $\dfrac{\sqrt[4]{3\cdot\sqrt[4]{3\cdot\sqrt[4]{3\cdot\ .....}}}}{\sqrt{3:\sqrt{3:\sqrt{3:\ .....}}}} = ?$

A) 1 B) 3 C) 9 D) 81 E) 243

8. $\sqrt{x+\sqrt{x+\sqrt{x+.....}}} = 5$

$\Rightarrow \sqrt{x\cdot\sqrt{x\cdot\sqrt{x\cdot.....}}} = ?$

A) 4 B) 5 C) 10 D) 20 E) 25

9. $\sqrt{2\cdot\sqrt{3\cdot\sqrt{2\cdot\sqrt{3\cdot\ .....}}}} = ?$

A) $\sqrt[4]{12}$ B) $\sqrt[3]{12}$ C) $\sqrt[4]{18}$ D) $\sqrt[3]{18}$ E) $\sqrt{15}$

10. $\sqrt[3]{x+1+\sqrt[3]{x+1+\sqrt[3]{x+1+\sqrt[3]{...}}}} = 2$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $\sqrt[3]{x+\sqrt[3]{x+\sqrt[3]{x+\cdots}}} = 2$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

12. $\sqrt[3]{x+\sqrt{3}\cdot\sqrt[3]{x+\sqrt{3}\cdot\sqrt[3]{x+\sqrt{3}\cdot...}}} = 3$

$\Rightarrow x = ?$

A) 15 B) 18 C) 21 D) 24 E) 27

13. $\sqrt{2+\sqrt{x-\sqrt{x-\sqrt{x-\cdots}}}} = 3$

$\Rightarrow x = ?$

A) 56 B) 48 C) 42 D) 28 E) 7

14. $\sqrt{14+\sqrt{6-\sqrt{6-\sqrt{6-...}}}} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

15. $\sqrt{7+2\sqrt{3-2\sqrt{3-2\sqrt{3.....}}}} = ?$

A) 2 B) 3 C) $2\sqrt{2}$ D) $2\sqrt{3}$ E) $3\sqrt{2}$

16. $\sqrt{44+\sqrt{20+\sqrt{30-\sqrt{30-\sqrt{30-.....}}}}} = ?$

A) 1 B) 2 C) 4 D) 5 E) 7

1. $A \in R$

$A = \sqrt{5-x} + \sqrt{x-5} + \sqrt{x+4}$

$\Rightarrow A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $A \in R$

$A = \dfrac{\sqrt{3-x} + 4x}{6 - \sqrt{x-3}} \Rightarrow A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\sqrt{x-y+4} + \sqrt{y-3} = 0$

$\Rightarrow x \cdot y = ?$

A) -4 B) -3 C) 1 D) 3 E) 4

4. $x \in R$

$\sqrt[3]{x-5} + \sqrt[3]{7-2x} = 0$

$\Rightarrow x = ?$

A) -3 B) -1 C) 2 D) 3 E) 4

5. $\sqrt{(\sqrt{3}-\sqrt{2})^2} + \sqrt{(\sqrt{3}-5)^2} = ?$

A) $2\sqrt{3} - \sqrt{2} - 5$ B) $\sqrt{3} - 5$

C) $\sqrt{3} + \sqrt{2}$ D) $5 + \sqrt{2}$

E) $5 - \sqrt{2}$

6. $\left.\begin{array}{l} a = 1 + \sqrt{3} \\ b = 1 - \sqrt{3} \end{array}\right\} \Rightarrow \sqrt{(b-a)^2} = ?$

A) $-2\sqrt{3}$ B) $\sqrt{3}$ C) 2

D) 3 E) $2\sqrt{3}$

7. $\left.\begin{array}{l} x = \sqrt{3} + \sqrt{2} \\ y = \sqrt{3} - \sqrt{2} \end{array}\right\} \Rightarrow \dfrac{x}{y} + \dfrac{y}{x} = ?$

A) 6 B) 8 C) 9 D) 10 E) 12

8. $\dfrac{\sqrt[3]{20} \cdot \sqrt{15}}{\sqrt[6]{375}} = ?$

A) $\sqrt[3]{80}$ B) $\sqrt[3]{60}$ C) $\sqrt[4]{60}$

D) $\sqrt[6]{80}$ E) $\sqrt[3]{40}$

9. $x = \dfrac{\sqrt{7}-2}{3-\sqrt{6}}$ $\quad y = \dfrac{3+\sqrt{6}}{\sqrt{7}+2}$

$\Rightarrow \dfrac{x}{y} = ?$

A) $\dfrac{5}{3}$ B) $\dfrac{4}{3}$ C) 1 D) $\dfrac{3}{5}$ E) $\dfrac{1}{3}$

10. $\dfrac{\sqrt{7}-\sqrt{3}}{\sqrt{3}+1} = x \Rightarrow \dfrac{\sqrt{3}-1}{\sqrt{7}+\sqrt{3}} = ?$

A) 1 B) $\dfrac{x}{2}$ C) x D) 2x E) 3x

11. $\dfrac{\sqrt{7}+1}{\sqrt{3}-1} = x \Rightarrow \dfrac{\sqrt{7}-1}{\sqrt{3}+1} = ?$

A) 3x B) 2x C) $\sqrt{x}$ D) $\dfrac{2}{x}$ E) $\dfrac{3}{x}$

12. $x = \dfrac{\sqrt{11}-2}{4-\sqrt{2}}$

$\Rightarrow \dfrac{4+\sqrt{2}}{\sqrt{11}+2} = ?$

A) 2x B) $\dfrac{2}{x}$ C) $\dfrac{x}{2}$ D) 4x E) $\dfrac{4}{x}$

13. $\left.\begin{array}{l} x = -4\sqrt{5} \\ y = -3\sqrt{3} \\ z = -6\sqrt{2} \end{array}\right\} \Rightarrow ? > ? > ?$

A) z > y > x B) z > x > y C) x > y > z
D) x > z > y E) y > z > x

14. $a = \dfrac{1}{\sqrt[3]{4}}$ $\quad b = \dfrac{1}{\sqrt{5}}$ $\quad c = \dfrac{1}{\sqrt[6]{83}}$

$\Rightarrow ? > ? > ?$

A) a > b > c B) a > c > b C) b > a > c
D) c > b > a E) c > a > b

15. $0 < a < 1$

$x = \sqrt{a}$ $\quad y = \sqrt[3]{a}$ $\quad z = \sqrt[6]{a}$

$\Rightarrow ? < ? < ?$

A) x < z < y B) z < x < y C) y < x < z
D) x < y < z E) z < y < x

16. $\sqrt[3]{2} \cdot \sqrt{3x} = \sqrt[3]{4\sqrt{3}}$

$\Rightarrow x = ?$

A) $\sqrt[3]{\dfrac{3}{2}}$ B) $\sqrt[3]{\dfrac{4}{9}}$ C) $\sqrt[3]{\dfrac{9}{4}}$

D) $\dfrac{3}{2}$ E) $\dfrac{2}{3}$

1. $\sqrt{1+\frac{1}{2}} \cdot \sqrt{1+\frac{1}{3}} \cdot \sqrt{1+\frac{1}{4}} \cdot \ldots\ldots \cdot \sqrt{1+\frac{1}{7}} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\sqrt[n]{5^{n+3}} - 2\sqrt[n]{5^3} = ?$

A) $5\sqrt[n]{5^3}$ B) $3\sqrt[n]{5^3}$ C) $\sqrt[n]{5^3}$

D) $\sqrt[3]{5^n}$ E) $5\sqrt[3]{5^n}$

3. $\frac{5\sqrt{2}-2\sqrt{5}}{\sqrt{5}-\sqrt{2}} = ?$

A) $\sqrt{2}$ B) $\sqrt{5}$ C) $\sqrt{10}$

D) $2\sqrt{5}$ E) $5\sqrt{2}$

4. $x < 0 < y$

$\Rightarrow \frac{\sqrt{x^2}+\sqrt{y^2}}{\sqrt[3]{x^3}-\sqrt[3]{y^3}} = ?$

A) 1 B) y C) $-x$ D) $-y$ E) -1

5. $3 < x < 7$

$\Rightarrow \sqrt{x^2-5x+2+\sqrt{x^2-14x+49}} = ?$

A) $x-7$ B) $7-x$ C) $x-3$

D) $3-x$ E) $x-5$

6. $\sqrt[3]{\frac{16}{\sqrt{2}}} = 2^x \Rightarrow x = ?$

A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) $\frac{7}{6}$ E) $\frac{21}{2}$

7. $a \cdot \sqrt{\frac{2}{3}} = \sqrt{\frac{2}{3}} + \sqrt{\frac{3}{2}}$

$\Rightarrow a = ?$

A) $\frac{2}{5}$ B) $\frac{2}{3}$ C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

8. $\frac{a\sqrt{b}-b\sqrt{a}}{a-b} : \frac{\sqrt{ab}}{\sqrt{a}+\sqrt{b}} = ?$

A) $\sqrt{a}$ B) $\sqrt{a}-\sqrt{b}$ C) 1

D) $\sqrt{a}+\sqrt{b}$ E) $\frac{1}{\sqrt{a}+\sqrt{b}}$

9. $\sqrt[3]{2+\sqrt{3}} \cdot \sqrt[6]{7-4\sqrt{3}} = ?$

A) $\sqrt{7}$ B) 1 C) -1 D) $-\sqrt{2}$ E) $-\sqrt{3}$

10. $\sqrt{5^{2x-2} + \frac{24}{25^{1-x}}} = 125$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $a + \sqrt{a} = 16$

$\Rightarrow a + \frac{16}{\sqrt{a}} = ?$

A) 4 B) 12 C) 16 D) 17 E) 21

12. $m < 0$

$\sqrt{2m \cdot \sqrt[3]{-8m^2} \cdot \sqrt[6]{m^6}} = ?$

A) $4m^2$ B) $4m$ C) $2m$ D) $-2m$ E) $-m$

13. $x > 0$

$\frac{\sqrt[6]{x^{28} + x^{30}}}{\sqrt[6]{1 + \frac{1}{x^2}}} = ?$

A) x^3 B) x^4 C) x^5 D) x^6 E) x^7

14. $\sqrt{3} \cdot \sqrt[3]{3} \cdot \sqrt[6]{3} = \sqrt{\frac{1}{9}\sqrt[3]{27^x}}$

$\Rightarrow x = ?$

A) 1 B) $\frac{3}{2}$ C) 2 D) 3 E) 4

15. $\sqrt{2-\sqrt{3}} - \sqrt{2+\sqrt{3}} = ?$

A) -2 B) $-\sqrt{2}$ C) 0 D) $\sqrt{2}$ E) 2

16. $\sqrt[3]{x\sqrt{x}} = \sqrt{2\sqrt{2\sqrt{2\cdots}}}$

$\Rightarrow x = ?$

A) 2 B) $2\sqrt{2}$ C) 4 D) $4\sqrt{2}$ E) 8

1. $\sqrt{x+3} = a - \sqrt{x} = b + \sqrt{x}$

$\Rightarrow a \cdot b = ?$

A) 1 B) $\sqrt{3}$ C) $\sqrt{5}$ D) 3 E) 5

2. $\sqrt[4]{17+12\sqrt{2}} = ?$

A) $1+\sqrt{2}$ B) $2+\sqrt{2}$ C) $1+2\sqrt{2}$

D) $3+\sqrt{2}$ E) $1+3\sqrt{2}$

3. $0 < m < 5$

$x = \sqrt{m+5-2\sqrt{5m}} + \dfrac{m}{\sqrt{m}}$

$\Rightarrow x^2 - 1 = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

4. $a^2 = 5 - 2\sqrt{6}$

$\Rightarrow (a+\sqrt{2}) \cdot (a-\sqrt{3}) = ?$

A) $-\sqrt{6}$ B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2 E) 3

5. $x \neq 0$

$\sqrt{-x+2\sqrt{x}} + \sqrt{-y+\sqrt{2y-1}} = 0$

$\Rightarrow x + y = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

6. $(\sqrt{5} - x + x\sqrt{5}) \cdot (x + \sqrt{5} + x\sqrt{5}) = 50x - 95$

$\Rightarrow x = ?$

A) -10 B) -5 C) 5 D) 10 E) 15

7. $\sqrt{\sqrt{49+20\sqrt{6}}} = ?$

A) $5-\sqrt{6}$ B) $5-\sqrt{3}$ C) $2-\sqrt{3}$

D) $\sqrt{3}+\sqrt{2}$ E) $\sqrt{3}-\sqrt{2}$

8. $\dfrac{1}{\sqrt{2^x}} + \dfrac{1}{\sqrt{2^{x-2}}} - \dfrac{1}{\sqrt{2^{x-4}}} = -4$

$\Rightarrow x = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

9. $27^{\frac{a+1}{2}} = b$

$\Rightarrow 9^{a+1} = ?$

A) $\sqrt[3]{b^2}$ B) b C) $b\sqrt[3]{b}$

D) $b\sqrt[3]{b^2}$ E) b^2

10. $\dfrac{\sqrt{5+\sqrt{8}}-\sqrt{5-\sqrt{8}}}{\sqrt{5-\sqrt{17}}} = ?$

A) $\dfrac{\sqrt{2}}{2}$ B) $\sqrt{2}$ C) $2\sqrt{2}$

D) $\sqrt{10}$ E) $2\sqrt{5}$

11. $\sqrt[4]{4020 \cdot 4180 - 4182 \cdot 4018} = ?$

A) 18 B) 15 C) $2\sqrt{6}$

D) $2\sqrt{5}$ E) $3\sqrt{2}$

12. $\sqrt[4]{28 - 16\sqrt{3}} = ?$

A) $\sqrt{3}+1$ B) $\sqrt{3}-1$ C) $4-2\sqrt{3}$

D) $4+2\sqrt{3}$ E) $\sqrt{3}+2$

13. $\dfrac{\sqrt[3]{81:\sqrt[3]{81:\sqrt[3]{81:\ldots}}} + \sqrt[5]{16\cdot\sqrt[5]{16\cdot\sqrt[5]{16\cdot\ldots}}}}{\sqrt{4-\sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}}} = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

14. $\dfrac{1}{\sqrt{2}+\sqrt{3}} + \dfrac{1}{\sqrt{3}+\sqrt{4}} + \dfrac{1}{\sqrt{4}+\sqrt{5}} = x$

$\dfrac{1}{\sqrt{5}+\sqrt{6}} + \dfrac{1}{\sqrt{6}+\sqrt{7}} + \dfrac{1}{\sqrt{7}+\sqrt{8}} = y$

$\Rightarrow x + y = ?$

A) $3\sqrt{2}$ B) $\sqrt{3}-\sqrt{7}$ C) $-\sqrt{2}-\sqrt{7}$

D) $\sqrt{2}$ E) $-\sqrt{2}$

15. $\sqrt{a+\sqrt{a}} - \sqrt{a-\sqrt{a}} = 3$

$\Rightarrow a = ?$

A) $\dfrac{20}{63}$ B) $\dfrac{54}{35}$ C) $\dfrac{60}{29}$ D) $\dfrac{72}{25}$ E) $\dfrac{81}{32}$

16. $\dfrac{\sqrt{3}+1+\sqrt{2}}{\sqrt{3}+1-\sqrt{2}} = ?$

A) $\sqrt{3}+\sqrt{2}$ B) $\sqrt{3}-\sqrt{2}$ C) $\sqrt{3}-1$

D) $\sqrt{2}-1$ E) $-1-\sqrt{2}$

KÖKLÜ İFADELER RADICAL EXPRESSIONS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	E	B	B	D	C	B	B	B	D	E	E	C	D	D

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	E	A	B	E	C	B	B	C	C	C	D	C	B	B	D

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	D	B	A	C	D	A	C	E	D	E	D	B	C	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	B	B	B	A	D	C	A	D	C	A	A	D	D	B

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	E	B	D	D	C	D	A	E	D	A	B	A	C	D

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	C	A	A	D	A	A	B	B	D	D	C	C	D	E

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	E	E	E	B	B	B	C	B	C	D	E	B	D	A

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	D	B	A	B	C	C	B	B	D	C	D	A	B	D

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	C	C	E	C	D	E	D	E	E	E	D	E	B	C	D

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	D	D	D	B	A	D	B	E	D	D	A	C	B	E

TEST 11

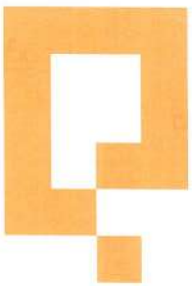
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	B	C	E	E	D	B	C	B	E	A	E	B	D	B

TEST 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	C	E	C	D	E	C	B	C	D	D	C	E	B	C

TEST 13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	C	A	C	C	D	B	C	B	E	B	A	D	E	A



ÇARPANLARA AYIRMA
FACTORISING

ÖZELLİK | Property 1

Ortak Paranteze Alma | Common Monomial Factor

- $ax + bx = x \cdot (a + b)$
- $ax + bx + x = x \cdot (a + b + 1)$

Çarpım durumundaki ifadelere terim denir. Terimlerde ortak ifade var ise bu ifade, terimlerden ayrılarak çarpım durumuna getirilir.

The factors of given algebraic expression consist of two or more algebraic expressions which when multiplied together produce the given expression.

Aşağıdaki ifadeleri çarpanlarına ayırarak en sade hale getiriniz.

Factorize the following expressions to make it simple form.

1. $2x + 2y = ?$ — $2(x + y)$

2. $3x + 6 = ?$ — $3(x + 2)$

3. $x^2 - 2x = ?$ — $x(x - 2)$

4. $2x - 3x + 4x = ?$ — $3x$

5. $9a^2 - 6a = ?$ — $3a(3a - 2)$

6. $25a - 10ab = ?$ — $5a(5 - 2b)$

7. $36xy + 6x^2y = ?$ — $6xy(6 + x)$

8. $12x^3y^2 - 4x^2y^2 = ?$ — $4x^2y^2(3x - 1)$

9. $\frac{2a^2b - 4ab}{a - 2} = ?$ — $2ab$

10. $\frac{3x + 6}{x + 2} = ?$ — 3

11. $\frac{x^3y^2 - x^2y^3}{x - y} = ?$ — x^2y^2

12. $\frac{3a - 3b}{b - a} = ?$ — -3

13. $\frac{8x^3 - 4x^2}{2x^2 - 4x^3} = ?$ — -2

14. $\frac{ax^3 - bx^2}{2ax - 2b} = ?$ — $\frac{x^2}{2}$

15. $\frac{(2a - 1)^3 - (2a - 1)^2}{2a - 2} = ?$ — $(2a - 1)^2$

ÖZELLİK | Property 2

Gruplandırarak Ortak Çarpan Parantezine Alma | Grouping

Bütün terimlerde ortak olan bir ifade yoksa gruplandırılarak ortak çarpan parantezine alınır.

If there isn't any common factors among all terms · they are grouped and then the common factor is performed within parenthesis.

$$ax + ay + bx + by = a(x + y) + b(x + y)$$
$$= (x + y) \cdot (a + b)$$

Aşağıdaki ifadeleri çarpanlarına ayırarak en sade hale getiriniz.

Factorize the following expressions to make it simple form.

1. $\frac{x^3 + x^2 - x - 1}{x^2 - 1} = ?$ — $x + 1$

2. $\frac{ax + bx + ay + by}{a + b} = ?$ — $x + y$

3. $\frac{x^2 - xy + 2x - 2y}{x + 2} = ?$ — $x - y$

4. $\frac{x^2 - 3x - x + 3}{x - 1} = ?$ — $x - 3$

5. $\frac{a^3 + 2a^2 - a - 2}{2a^2 - 2} = ?$ — $\frac{a+2}{2}$

6. $\frac{ax + ay - bx - by}{2x + 2y} = ?$ — $\frac{a-b}{2}$

7. $\frac{ax - ay + bx - by - cx + cy}{x - y}$ — $a + b - c$

8. $\frac{(x-y)^2 - 2(y-x)^2}{(y-x)^2} = ?$ — -1

9. $\frac{(x-y)^2 - 2(y-x)}{x-y+2} = ?$ — $x - y$

10. $\frac{a(x-y) + b(y-x)}{x-y} = ?$ — $a - b$

11. $\frac{a(y-x) + a(x-y) + b(y-x)}{y-x} = ?$ — b

12. $\frac{(x-y)^2 + (y-x)^3}{(y-x)^2} = ?$ — $y - x + 1$

13. $\frac{3x-3y}{x-y} + \frac{2y+2x}{x+y} + \frac{(x-y)^4}{(y-x)^4} = ?$ — 6

14. $\frac{a^2x + ay - b^2x + by}{ax - bx + y} = ?$ — $a + b$

15. $\frac{x^3 - x^2y + 3x^2y - 3xy^2}{x^3 - x^2y - 3x^2y + 3xy^2} = ?$ — $\frac{x+3y}{x-3y}$

ÖZELLİK|Property 3

$x^2 + ax + b$ gibi İfadeleri Çarpanlarına Ayırma

Factorising trinomials $x^2 + ax + b$

$x^2 + ax + b$ $\quad b = m \cdot n$

$\quad\quad a = m + n$

$m \quad n$

$\Rightarrow x^2 + ax + b = (x + m)(x + n)$

Aşağıdaki ifadeleri çarpanlarına ayırarak en sade hale getiriniz.

Factorize the following expressions to make it simple form.

1. $x^2 + 4x + 3 = ?$ $\quad (x + 3)(x + 1)$

2. $x^2 + 2x - 3 = ?$ $\quad (x + 3)(x - 1)$

3. $x^2 - 3x - 4 = ?$ $\quad (x - 4)(x + 1)$

4. $\dfrac{x^2 + 7x + 6}{x^2 + 5x + 4} = ?$ $\quad \dfrac{x + 6}{x + 4}$

5. $\dfrac{x^2 + 6x + 8}{x^2 + x - 12} = ?$ $\quad \dfrac{x + 2}{x - 3}$

6. $\dfrac{x^2 + 5x + 6}{2x + 4} = ?$ $\quad \dfrac{x + 3}{2}$

7. $\dfrac{x^2 - 4x - 5}{x^2 + 3x + 2} = ?$ $\quad \dfrac{x - 5}{x + 2}$

8. $\dfrac{x^2 - x - 6}{x^2 + 3x + 2} = ?$ $\quad \dfrac{x - 3}{x + 1}$

9. $\dfrac{x^2 + 5x + 6}{x^2 + 4x + 3} = ?$ $\quad \dfrac{x + 2}{x + 1}$

10. $\dfrac{x^2 - x - 6}{x^2 + x - 2} : \dfrac{x - 3}{x - 1} = ?$ $\quad 1$

11. $\dfrac{x^2 + 2x - 3}{x^2 + x - 6} : \dfrac{x^2 - 1}{x^2 - x - 2} = ?$ $\quad 1$

12. $\dfrac{x^2 - x - 12}{x^2 - 2x - 8} : \dfrac{x + 3}{2x + 4} = ?$ $\quad 2$

13. $\dfrac{x^2 + ax - 2}{x^2 + 3x - 10} = \dfrac{x + 1}{x + 5}$ $\quad -1$

$\Rightarrow a = ?$

14. $\dfrac{x^2 + 3xy - 4y^2}{x - y} = ?$ $\quad x + 4y$

15. $\dfrac{x^2 - 8xy - 9y^2}{x^2 - 11xy + 18y^2} = ?$ $\quad \dfrac{x + y}{x - 2y}$

ÖZELLİK|Property 4

$ax^2 + bx + c$ gibi İfadeleri Çarpanlarına Ayırma ($a \neq 1$ ise)

Factorising trinomials $ax^2 + bx + c$ (if $a \neq 1$)

$ax^2 + bx + c$

$mx \quad p$

$nx \quad q$

$a = m \cdot n$

$c = p \cdot q$

$b = m \cdot q + n \cdot p$

$ax^2 + bx + c = (mx + p)(nx + q)$

mx —— p

nx —— q

Aşağıdaki ifadeleri çarpanlarına ayırarak en sade hale getiriniz.

Factorize the following expressions to make it simple form.

1. $2x^2 + x - 6 = ?$ $(2x - 3)(x + 2)$

2. $2x^2 + 5x + 3 = ?$ $(2x + 3)(x + 1)$

3. $6x^2 - x - 2 = ?$ $(3x - 2)(2x + 1)$

4. $5x^2 - 13x - 6 = ?$ $(5x + 2)(x - 3)$

5. $\dfrac{6x^2 - x - 1}{2x^2 + x - 1} = ?$ $\dfrac{3x+1}{x+1}$

6. $\dfrac{2x^2 + 5x + 2}{x^2 + 2x} = ?$ $\dfrac{2x+1}{x}$

7. $\dfrac{4x^2 - 5x - 6}{x^2 - x - 2} = ?$ $\dfrac{4x+3}{x+1}$

8. $\dfrac{12x^2 + 16x - 3}{4x + 6} = ?$ $\dfrac{6x-1}{2}$

9. $\dfrac{3x^2 + 7x + 4}{x^2 - x - 2} : \dfrac{3x + 4}{x^2 + x - 6} = ?$ $x + 3$

10. $\dfrac{9a^2 - 3a - 2}{6a - 4} = ?$ $\dfrac{3a+1}{2}$

11. $\dfrac{18a^2 - 6a - 4}{12a^2 + 10a + 2} = ?$ $\dfrac{3a-2}{2a+1}$

12. $\dfrac{6x^2 - 7x - 3}{2x^2 - 5x + 3} = ?$ $\dfrac{3x+1}{x-1}$

13. $\dfrac{a - 1}{2a^2 - 4a + 2} \cdot \dfrac{4a - 4}{a^2 + 3a + 2} = ?$ $\dfrac{2}{(a+2)(a+1)}$

14. $\dfrac{2a^2 - 2a - 4}{a^2 - 2a - 3} : \dfrac{2a - 4}{a - 3} = ?$ 1

15. $\dfrac{2a^2 + 4a - 6}{a^2 + a - 2} \cdot \dfrac{a^2 + 2a}{a^2 + 3a} = ?$ 2

ÖZELLİK | Property 5

İki Kare Farkı | Difference of Two Squares

$$a^2 - b^2 = (a - b)(a + b)$$

Aşağıdaki ifadeleri çarpanlarına ayırarak en sade hale getiriniz.

Factorize the following expressions to determine their simplest form.

1. $x^2 - y^2 = ?$

$(x - y)(x + y)$

2. $x^2 - 9 = ?$

$(x - 3)(x + 3)$

3. $a^2 - 4b^2 = ?$

$(a - 2b)(a + 2b)$

4. $\dfrac{16a^2 - 9b^2}{4a + 3b} = ?$

$4a - 3b$

5. $\dfrac{102^2 - 100^2}{51^2 - 50^2} = ?$

4

6. $\dfrac{x^2 + 5x + 6}{x^2 - 4} = ?$

$\dfrac{x + 3}{x - 2}$

7. $\dfrac{a^2 - 9}{a^2 - 2a - 3} : \dfrac{a + 3}{2a + 2} = ?$

2

8. $\dfrac{x^2 - 25}{x^2 + 7x + 10} : \dfrac{x^2 - 7x + 10}{x^2 - 4} = ?$

1

9. $(2^x - 1)(2^x + 1)(2^{2x} + 1)(2^{4x} + 1) = 2^{32} - 1$

$\Rightarrow x = ?$

4

10. $\dfrac{a - \dfrac{4}{a}}{a - 2} \cdot \dfrac{a^2}{a^2 + 2a} = ?$

1

11. $\dfrac{a^2 + a - b^2 - b}{a + b + 1} = ?$

$a - b$

12. $(2a + 1)^2 - (a - 1)^2 = ?$

$3a(a + 2)$

13. $x \cdot y \in Z^+$

$x^2 - y^2 = 19$

$\Rightarrow x = ?$

10

14. $x \cdot y \in Z^+$

$x^2 - y^2 = -7$

$\Rightarrow x = ?$

3

15. $\sqrt{2005 \cdot 1995 + 25} = ?$

2000

ÖZELLİK|Property 6

- $(a+b)^2 = a^2 + 2ab + b^2$
- $(a-b)^2 = a^2 - 2ab + b^2$
- $a^2 + b^2 = (a+b)^2 - 2ab$
- $a^2 + b^2 = (a-b)^2 + 2ab$
- $(a+b)^2 - (a-b)^2 = 4ab$

1. $(x-2y)^2 = ?$

$x^2 - 4xy + 4y^2$

2. $(3x+y)^2 = ?$

$9x^2 + 6xy + y^2$

3. $(3x-2)^2 = ?$

$9x^2 - 12x + 4$

4. $x^2 - 8x + 16 = ?$

$(x-4)^2$

5. $\left(a + \frac{3}{a}\right)^2 = ?$

$a^2 + 6 + \frac{9}{a^2}$

6. $x^2 + 10x + 25 = ?$

$(x+5)^2$

7. $x + y = 6$

$x \cdot y = 4$

$\Rightarrow x^2 + y^2 = ?$

28

8. $x \in R^+$

$x^2 + \frac{1}{x^2} = 23$

$\Rightarrow x + \frac{1}{x} = ?$

5

9. $x - y = 5$

$x^2 + y^2 = 13$

$\Rightarrow x \cdot y = ?$

-6

10. $x + \frac{1}{x} = 4$

$\Rightarrow x^2 + \frac{1}{x^2} = ?$

14

11. $x - \frac{1}{x} = 4$

$\Rightarrow x + \frac{1}{x} = ?$

$2\sqrt{5}$

12. $x - y = 4$

$x \cdot y = 8$

$\Rightarrow x + y = ?$

$4\sqrt{3}$

13. $a \cdot b \in R$

$a^2 + b^2 + 4a + 6b + 13 = 0$

$\Rightarrow a \cdot b = ?$

6

14. $a \cdot b \in R$

$a^2 + b^2 - 8a + 10b + 41 = 0$

$\Rightarrow a \cdot b = ?$

-20

15. $\frac{a^2 - b^2 - 4b - 4}{a - b - 2} = ?$

$a + b + 2$

ÖZELLİK|Property 7

- $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + ac + bc)$
- $(a + b - c)^2 = a^2 + b^2 + c^2 + 2(ab - ac - bc)$
- $(a - b - c)^2 = a^2 + b^2 + c^2 + 2(-ab - ac + bc)$

1. $a + b - c = 9$

$a^2 + b^2 + c^2 = 23$

$\Rightarrow ac + bc - ab = ?$

– 29

2. $a - b + c = 11$

$a^2 + b^2 + c^2 = 15$

$\Rightarrow ac - bc - ab = ?$

53

3. $a - b - c = 8$

$ab + ac - bc = -10$

$\Rightarrow a^2 + b^2 + c^2 = ?$

44

4. $a^2 + b^2 + c^2 = 44$

$ab - ac - bc = 8$

$\Rightarrow (a + b - c)^2 = ?$

60

5. $x - y + z = -5$

$y \cdot (x + z) - 7 = xz$

$\Rightarrow x^2 + y^2 + z^2 = ?$

39

6. $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{12}{xyz}$

$x + y + z = 7$

$\Rightarrow x^2 + y^2 + z^2 = ?$

25

7. $x, y, z \in R^+$

$x^2 + 2xy = 6$

$y^2 + 2yz = 10$

$z^2 + 2xz = 9$

$\Rightarrow x + y + z = ?$

5

8. $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{8}{xyz}$

$x + y + z = 6$

$\Rightarrow x^2 + y^2 + z^2 = ?$

20

9. $a + b + c = 5$

$ab + bc + ac = 3$

$\Rightarrow a^2 + b^2 + c^2 = ?$

19

10. $x, y, z \in R^-$

$x^2 + 2xy = 9$

$y^2 + 2yz = 11$

$z^2 + 2zx = 16$

$\Rightarrow x + y + z = ?$

– 6

11. $x + y + z = 4$

$xy + yz + xz = 2$

$\Rightarrow x^2 + y^2 + z^2 = ?$

12

12. $x - y + z = 3$

$xy - xz + yz = 4$

$\Rightarrow x^2 + y^2 + z^2 = ?$

17

ÖZELLİK|Property 8

- $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
- $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

1. $a^3 - (2b)^3 = ?$

$(a - 2b)(a^2 + 2ab + 4b^2)$

2. $27x^3 + y^3 = ?$

$(3x + y)(9x^2 - 3xy + y^2)$

3. $\dfrac{a^3 - b^3}{a^2 + ab + b^2} = ?$

$a - b$

4. $\dfrac{x^3 + 1}{x^2 - 1} \cdot \dfrac{x^2 + x - 2}{x + 2} = ?$

$x^2 - x + 1$

5. $\dfrac{x^3 + 1}{x^3 - 1} : \dfrac{x^2 - x + 1}{x^2 + x + 1} = ?$

$\dfrac{x + 1}{x - 1}$

6. $(x - 2y)(x^2 + 2xy + 4y^2) = 152$

$x = 6$

$\Rightarrow y = ?$

2

7. $\dfrac{(a^3 + b^3)(a^2 - b^2)}{(a + b)^2 \cdot (a^2 + b^2 - ab)} = ?$

$a - b$

8. $\dfrac{a + \dfrac{1}{a^2}}{a - \dfrac{1}{a}} \cdot \dfrac{a - 1}{a^2 - a + 1} = ?$

$\dfrac{1}{a}$

9. $\dfrac{x^2 + 2x + 1}{x^3 + 1} : \dfrac{1}{x^2 - x + 1} = ?$

$x + 1$

10. $a^3 - b^3 = a^2 + ab + b^2$

$a + b = 3$

$\Rightarrow a \cdot b = ?$

2

11. $a > b$

$a^2 + b^2 = 8$

$a \cdot b = 2$

$\Rightarrow a^3 - b^3 = ?$

20

12. $a^3 - b^3 = 124$

$a - b = 4$

$\Rightarrow a \cdot b = ?$

5

13. $\dfrac{x^3 + y^3}{(x - y)^2 + xy} = ?$

$x + y$

14. $x + \dfrac{2}{x} = 3$

$\Rightarrow x^3 + \dfrac{8}{x^3} = ?$

9

ÖZELLİK | Property 9

$x^n - y^n$ ve $x^n + y^n$

şeklindeki ifadeleri çarpanlarına ayırma

factoring expressions in the form of

■ n pozitif bir tamsayı
(n is a positive integer)

$x^n - y^n = (x - y)(x^{n-1} + x^{n-2} \cdot y + x^{n-3} \cdot y^2 + \ldots + x \cdot y^{n-2} + y^{n-1})$

Her terimdeki x ve y'lerin üsleri toplamı n – 1 dir.

Her terimde x'in kuvveti 1 azalırken y'nin kuvveti 1 artırılır.

In each term the sum of the exponents of x and y is n – 1.

In each term · the exponent of x is decreased by 1 while the exponent of y is increased by 1.

■ n pozitif bir tek tamsayı
(n is a positive odd integer)

$x^n + y^n = (x + y)(x^{n-1} - x^{n-2} \cdot y + x^{n-3}y^2 - \ldots - xy^{n-2} + y^{n-1})$

1. $(2a + 3b) \cdot (16a^4 - 24a^3b + 36a^2b^2 - 54ab^3 + 81b^4) = 211$

$b = 1$

$\Rightarrow a = ?$

– 1

2. $x = \sqrt[7]{2}$

$\Rightarrow (x - 2) \cdot (x^6 + 2x^5 + 4x^4 + 8x^3 + 16x^2 + 32x + 64) = ?$

– 126

3. $\dfrac{a^3 + 27}{a^2 - 2a - 3} \cdot \dfrac{(a - 3) \cdot (a^2 - 1)}{a^2 - 3a + 9} = ?$

$(a + 3) \cdot (a - 1)$

4. $\dfrac{x^5 - 1}{x^4 + x^3 + x^2 + x + 1} \cdot \dfrac{2x + 2}{x^2 - 1} = ?$

2

5. $x^4 + x^3 + x^2 + x = 9$

$\Rightarrow x^5 - 10x = ?$

– 9

6. $x^4 - 2x^3 + 4x^2 - 8x + 16 = 8$

$\Rightarrow x^5 - 8x = ?$

– 16

7. $x^4 + x^3 + x^2 + x + 1 = 0$

$\Rightarrow x^{10} + x^5 = ?$

2

8. $x^4 - 3x^3 + 9x^2 - 27x + 81 = 0$

$\Rightarrow x = ?$

– 3

9. $x = \dfrac{4}{5}$

$\Rightarrow \dfrac{x^{62} + x^{61} + x^{60} + \ldots + 1}{1 - x^{63}} = ?$

5

10. $\dfrac{5a^4 + 5a^3 + 5a^2 + 6a + 5}{a^5 - 1} : \dfrac{10a + 10}{a^2 - 1} = ?$

$\frac{1}{2}$

11. $(x + y)(x^4 - x^3y + x^2y^2 - xy^3 + y^4) = 244$

$y = 1$

$\Rightarrow x = ?$

3

12. $(a - b)(a^4 + a^3b + a^2b^2 + ab^3 + b^4) = 31$

$b = 1$

$\Rightarrow a = ?$

2

13. $x = \sqrt[5]{7}$

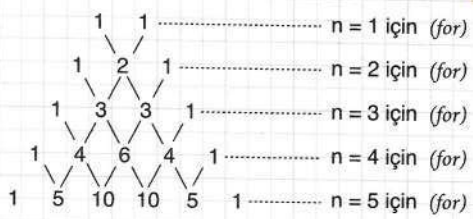
$\Rightarrow (x - 1)(x^4 + x^3 + x^2 + x + 1) = ?$

6

ÖZELLİK|Property 10

BİNOM AÇILIMI | BINOMIAL EXPONSION

Paskal Üçgeni | Pascal's Triangle



$(a+b)^1 = a+b$

$(a+b)^2 = a^2+2ab+b^2$

$(a+b)^3 = a^3+3a^2b+3ab^2+b^3$

$(a-b)^2 = a^2-2ab+b^2$

$(a-b)^3 = a^3-3a^2b+3ab^2-b^3$

$(a-b)^4 = a^4-4a^3b+6a^2b^2-4ab^3+b^4$

1. $(a+b)^3 = ?$ — $a^3+3a^2b+3ab^2+b^3$

2. $a^3-3a^2b+3ab^2-b^3 = 8$
$\Rightarrow a-b = ?$ — 2

3. $x^3-6x^2+12x-8 = 27$
$\Rightarrow x = ?$ — 5

4. $8x^3+12x^2+6x+1 = 125$
$\Rightarrow x = ?$ — 2

5. $\dfrac{x^3+3x^2+3x+1}{x^2+2x+1} = ?$ — $x+1$

6. $\dfrac{x^3-9x^2y+27xy^2-27y^3}{(x-3y)^2} = ?$ — $x-3y$

7. $\dfrac{x^3+9x^2+27x+27}{x^2+6x+9} = ?$ — $x+3$

8. $x^3-9x^2y+27xy^2-27y^3 = 8$
$\Rightarrow x-3y = ?$ — 2

9. $8a^3+12a^2b+6ab^2+b^3 = 64$
$b = 1$
$\Rightarrow a = ?$ — $\frac{3}{2}$

10. $a^3+3ab^2 = 8$
$b^3+3a^2b = 7$
$\Rightarrow a-b = ?$ — 1

11. $a^3+3a^2b = 20$
$b^3+3ab^2 = 7$
$\Rightarrow a+b = ?$ — 3

12. $x > y$
$x^4-4x^3y+6x^2y^2-4xy^3+y^4 = 16$
$\Rightarrow x-y = ?$ — 2

13. $x^5-5x^4+10x^3-10x^2+5x-1 = 32$
$\Rightarrow x = ?$ — 3

14. $x+y = 4$
$x \cdot y = 2$
$\Rightarrow x^3+y^3 = ?$ — 40

15. $x-y = 3$
$x \cdot y = 1$
$\Rightarrow x^3-y^3 = ?$ — 36

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $\dfrac{x^6-1}{x^5+x^4+x^3+x^2+x+1}=?$

$x-1$

2. $\dfrac{x^2-(a-b)x-ab}{x-a}=?$

$x+b$

3. $\dfrac{6x^2-x-35}{4x^2-25}=?$

$\dfrac{3x+7}{2x+5}$

4. $\sqrt{1985\cdot 1973+36}=?$

1979

5. $\dfrac{1}{x}-\dfrac{1}{y}-\dfrac{1}{z}=\dfrac{5}{xyz}$

$x-y-z=7$

$\Rightarrow x^2+y^2+z^2=?$

39

6. $x-z=3$

$z-y=3$

$\Rightarrow x^2+y^2-2z^2=?$

18

7. $\dfrac{a^2-b^2-4a+4}{a-2-b}=?$

$a-2+b$

8. $x\cdot y\in R$

$x\cdot y>0$

$6x^2+5xy-4y^2=0$

$\Rightarrow \dfrac{y}{x}=?$

2

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

9. $a+\frac{3}{a-2}=9$

$\Rightarrow (a-2)^2+\frac{9}{(a-2)^2}=?$

43

10. $x^2-7x+1=0$

$\Rightarrow x^2+\frac{1}{x^2}=?$

47

11. $x^2-5x+2=0$

$\Rightarrow x^2+\frac{10}{x}=?$

23

12. $x^2+x+1=0$

$\Rightarrow x^{92}$ ifadesinin x cinsinden değeri nedir?

What is the value of x^{92} in terms of x?

$-x-1$

13. $x\in R$

$A=x^2-3x+1$

$\Rightarrow \min(A)=?$

$-\frac{5}{4}$

14. $a\cdot b\cdot c\in R$

$a^2+b^2+c^2-2a+4b+6c+14=0$

$\Rightarrow a\cdot b\cdot c=?$

6

15. $\frac{a^4-19a^2+9}{a^2-5a+3}=?$

a^2+5a+3

16. $A=(2+1)(2^2+1)(2^4+1)(2^8+1)(2^{16}+1)$

$\Rightarrow \frac{A+1}{2^8}=?$

2^{24}

1. $\frac{4ab+8a}{b+2} = ?$

A) 2a B) 4a C) 2b D) 4ab E) 8a

2. $\frac{200 \cdot 187 - 400 \cdot 93}{100 \cdot 758 - 100 \cdot 756} = ?$

A) 1 B) 2 C) 4 D) 100 E) 1000

3. $\frac{a^2b^3}{a^3b^2} : \frac{a^4b^5}{a^5b^4} = ?$

A) $\frac{b}{a}$ B) $\frac{a}{b}$ C) $\frac{a^2}{b}$ D) $\frac{b^2}{a}$ E) 1

4. $\frac{12x^2y^3 - 18x^3y^2}{6y - 9x} = ?$

A) $2xy^3$ B) x^2y^2 C) $2x^2y^2$ D) $3x^2y^2$ E) $6xy$

5. $\frac{18a^4b - 4a^2b^2}{9a^3 - 2ab} = ?$

A) $2a^2b$ B) $2ab^2$ C) $3ab$ D) $2ab$ E) $2a^2b^2$

6. $\frac{9a^2b + 3ab^2}{3a + b} = ?$

A) 3a B) 3b C) 3ab D) 3 E) ab

7. $\frac{25ab + 5a^2b}{5a^2 + 25a} = ?$

A) a B) 5a C) 5 D) 5b E) b

8. $\frac{24x^3y - 18x^2y^2}{12x^2y - 9xy^2} = ?$

A) 2 B) 2x C) 2xy D) x^2y E) xy

9. $\dfrac{30y^2x^2 - 15y^3x}{3y^2x - 6yx^2} = ?$

A) $5x$ B) x C) $-5y$ D) -5 E) $-y^2$

10. $\dfrac{6a^2b - 9ab^2}{9ab^2 - 6ba^2} = ?$

A) -1 B) $-a$ C) $-\dfrac{2}{3}$ D) $-\dfrac{2}{3}a$ E) b

11. $\dfrac{7x^3y^2 - 49x^2y^2}{x^3y^2 - 7x^2y^2} = ?$

A) 7 B) $7x$ C) $7xy$ D) $7x^2y$ E) x^2y^2

12. $\dfrac{4y - 4x}{x - y} + \dfrac{3y + 3x}{x + y} + \dfrac{(x - y)^2}{(y - x)^2} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

13. $\dfrac{a - b}{b - a} + \dfrac{a + b}{b + a} + \dfrac{(a - b)^3}{(b - a)^3} + \dfrac{(a - b)^{10}}{(b - a)^{10}} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

14. $\dfrac{m(x - y) + n(y - x) - k(x - y)}{(x - y)} = ?$

A) $m + n - k$ B) $m - n - k$ C) $m - n + k$
D) $m + n + k$ E) $k + n - m$

15. $\dfrac{m(y - x) - m(x - y) + n(y - x)}{2m(y - x) - n(x - y)} = ?$

A) 1 B) $2m - n$ C) $m - n$
D) $x - y$ E) $y - x$

16. $\dfrac{(a - b)^2 + 2(b - a)}{b - a} = ?$

A) $b - a$ B) $a + b$ C) $b - a + 1$
D) $b + 1$ E) $b - a + 2$

1. $\dfrac{(x-y)^2-(x-y)}{x-y-1}=?$

A) $y-x$ B) $x+y$ C) $x\cdot y$ D) $\dfrac{x}{y}$ E) $x-y$

2. $\dfrac{(2a+5)^3+(2a+5)^2}{(2a+5)^2\cdot(a+3)}=?$

A) 5 B) 4 C) 3 D) 2 E) 1

3. $\dfrac{(3a-1)^4+(3a-1)^3}{9a^2-3a}=?$

A) $3a-1$ B) $(3a-1)^2$ C) $3a$ D) $\dfrac{1}{3a}$ E) a

4. $\dfrac{(x-3)^2\cdot(x-4)+(3-x)^2}{(3-x)^3}=?$

A) -1 B) 1 C) $x-3$ D) $3-x$ E) $(x-3)^2$

5. $\dfrac{a(b-a)^4-b(a-b)^4}{(b-a)^5}=?$

A) -1 B) 1 C) $b-a$ D) $a-b$ E) a^2-b

6. $\left(\dfrac{a}{a^2+ab}-\dfrac{b}{ab+b^2}\right):\dfrac{a-b}{ab}=?$

A) $-a$ B) b C) $b-a$ D) 1 E) 0

7. $\left(\dfrac{1}{x^2+xy}-\dfrac{1}{xy+y^2}\right)\cdot\dfrac{x}{y-x}=?$

A) -1 B) 1 C) $\dfrac{1}{x+y}$ D) $\dfrac{1}{y(x+y)}$ E) $\dfrac{1}{x(x+y)}$

8. $\dfrac{ax+bx+ay+by}{a+b}=?$

A) $x+y$ B) $x-y$ C) $a+b$ D) $a-b$ E) $a+x$

9. $\frac{ax - bx + ay - by}{x + y} = ?$

A) $x - y$ B) $x + y$ C) $a + b$

D) $a - b$ E) $2a$

10. $\frac{x^3 + x^2 + x + 1}{x^2 + x} = ?$

A) x^3+1 B) $x+1$ C) $\frac{x^2+1}{x}$

D) $\frac{x+1}{x}$ E) x

11. $\frac{3x^2 + 9y - 9x - 3xy}{(3 - x)(x - y)} = ?$

A) 9 B) 6 C) 3 D) -3 E) -9

12. $\frac{(a+b)^2 - 4a - 4b}{a + b - 4} = ?$

A) $a - b$ B) $a + b$ C) ab

D) $a^2 - b^2$ E) $4a - 4b$

13. $\frac{x^3 - x^2y + 4x - 4y}{x^3 + 4x} = ?$

A) $\frac{x-y}{x}$ B) $\frac{x-y}{4}$ C) $\frac{x+y}{y}$

D) $\frac{x-y}{y}$ E) $\frac{x+y}{4}$

14. $\frac{x^2y - x - xy + 1}{x^2y - x} = ?$

A) $\frac{x-1}{x}$ B) $x + 1$ C) $x - 1$

D) $xy - 1$ E) xy

15. $\frac{bx - yx + 2ay - 2ab}{y - b} = ?$

A) -1 B) 1 C) $y - 2a$

D) $x - 2a$ E) $2a - x$

16. $\frac{x^4 - x^3y + 2x - 2y}{x^4 + 2x} = ?$

A) $x - y$ B) $x + y$ C) $2x$

D) $x^3 + 2$ E) $\frac{x-y}{x}$

1. $\frac{x^3-2x^2-x+2}{x-2}=?$

A) $x-1$ B) $x+1$ C) x^2-1 D) $x-2$ E) $x+2$

2. $\frac{3x^3+6x^2-x-2}{3x^2-1}=?$

A) $x-2$ B) $x+1$ C) $x-1$ D) $x+2$ E) $x+3$

3. $\frac{5x-x^2+5x^3-x^4}{5x^2-x^3}=?$

A) $x-1$ B) $x+1$ C) $\frac{x^2+1}{x}$ D) x^2+1 E) $5x^2-1$

4. $\frac{x^3+x^2-x-1}{(x+1)^2}=?$

A) $x-1$ B) $x+1$ C) x^2-1 D) x E) x^3+1

5. $\frac{ax-ay+y-x+bx-by}{y-x}=?$

A) $a+b$ B) $a-b$ C) $1-a-b$ D) $-a-b$ E) $a+b-1$

6. $\frac{a^2+ab+ac+bc+c^2+ac}{a+b+c}=?$

A) $a+b$ B) $b+c$ C) $2a+2b$ D) $2b+2c$ E) $a+c$

7. $\frac{a^2x+ay-b^2x-by}{(ax+bx+y)}=?$

A) a B) b C) $a+b$ D) $a-b$ E) $x-y$

8. $\frac{x^3+2x^2-x-2}{x^2+2x-x-2}=?$

A) x B) $x-1$ C) $x+1$ D) x^2-1 E) x^2

9. $\frac{a^2-ab+ax+ay-by+xy}{a-b+x}=?$

A) $a-y$ B) $a+y$ C) $a-b-x$

D) $a+b+x$ E) $a-b$

10. $\frac{ax-ay+bx-by+cy-cx}{ax+bx-cx}=?$

A) $x+y$ B) $\frac{x-y}{x}$ C) $x-y$

D) x E) $a+b-c$

11. $\frac{x^5-x^4+x^3-x^2+x-1}{x^4+x^2+1}=?$

A) x B) $x-1$ C) $x+1$

D) x^2 E) x^3

12. $\frac{a^3-a^2b+3a^2b-3ab^2}{a^3-a^2b-3a^2b+3ab^2}=?$

A) $\frac{3a-b}{a-3b}$ B) $\frac{a-3b}{a+3b}$ C) $\frac{a+3b}{a-3b}$

D) $\frac{b}{a-b}$ E) $\frac{a}{a+b}$

13. $\frac{m^3+2m-3m^2-6}{m^2+2-3m^2-6}=?$

A) $\frac{3-m}{2}$ B) $m-3$ C) $m+3$

D) $\frac{m}{2}$ E) $\frac{m+3}{2}$

14. $\frac{5x^2+15xy-2yx-6y^2}{-4xy-12y^2+10x^2+30xy}=?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1

D) $x-y$ E) x^2-y

15. $\frac{a(b^2+1)-b(a^2+1)}{ab-1}=?$

A) $a-b$ B) $b-a$ C) $ab+1$

D) $ab-1$ E) $ab-a$

16. $\frac{x^{8n}-x^{7n}-x^{6n}+x^{5n}}{x^{7n}-x^{6n}}=?$

A) x^2 B) x^n+x^{-n} C) x^n-x^{-n}

D) x^n+1 E) x^{7n}

1. $\frac{x^2-8x-9}{x^2-11x+18} = ?$

A) $\frac{x-1}{x+2}$ B) $\frac{x-1}{x-2}$ C) $\frac{x+1}{x-2}$

D) $\frac{x-9}{x-2}$ E) $\frac{x-9}{x+2}$

2. $\frac{x^2+2x-3}{x^2+x-2} = ?$

A) $\frac{x+3}{x+2}$ B) $\frac{x-3}{x-2}$ C) $\frac{x-1}{x+2}$

D) $\frac{x+3}{x-1}$ E) $\frac{x-3}{x+2}$

3. $\frac{x^2-6x-55}{x^2-12x+11} \cdot (x-1) = ?$

A) $x+11$ B) $x-11$ C) $x-1$

D) $x+5$ E) $x-6$

4. $\frac{x^2+x-6}{x^2+2x-3} = ?$

A) $\frac{x+3}{x-1}$ B) $\frac{x-2}{x-1}$ C) $\frac{x-2}{x+3}$

D) $x+3$ E) 1

5. $\frac{x^2+6x+8}{x^2+2x-8} = ?$

A) $x+4$ B) $\frac{x+2}{x+4}$ C) $\frac{x+2}{x-2}$

D) $\frac{x-2}{x+2}$ E) $\frac{x+4}{x-2}$

6. $\frac{x^2-2x-15}{x^2-x-12} = ?$

A) $\frac{x-5}{x-4}$ B) $\frac{x+3}{x-4}$ C) $x+3$

D) $\frac{x-5}{x+3}$ E) $x-5$

7. $\frac{x^2-11x+30}{x^2-6x+5} \cdot \frac{2x-2}{3x-18} = ?$

A) $\frac{2(x-1)}{3}$ B) $\frac{2}{3}$ C) 1

D) $\frac{1}{3x-6}$ E) $\frac{x-6}{x-3}$

8. $\frac{x^2-x-6}{x^2+x-2} : \frac{x^2+x-12}{x^2+3x-4} = ?$

A) $\frac{x+2}{x-1}$ B) $\frac{x-3}{x+4}$ C) $\frac{x-3}{x-1}$

D) 1 E) 2

9. $\frac{x^2-4x-12}{x^2-x-6}:\frac{4x-12}{2x-12}=?$

A) $\frac{x-6}{x-3}$ B) $\frac{x+2}{x-6}$ C) $\frac{x-3}{x+2}$

D) 1 E) 2

10. $\frac{x^2-10x-11}{x^2-4x-5}:\frac{2x-22}{6x-30}=?$

A) $\frac{x-11}{x-2}$ B) $\frac{x-11}{x-5}$ C) $\frac{x+1}{x-5}$

D) 2 E) 3

11. $\frac{x^2-3x-18}{x^2-4x-12}:\frac{x^2+2x-3}{x^2+x-2}=?$

A) $\frac{x+3}{x-6}$ B) $\frac{x-1}{x+2}$ C) $\frac{x+3}{x+2}$

D) 1 E) 2

12. $\frac{x^2-ax-12}{x^2+5x-6}=\frac{x-2}{x-1}$

$\Rightarrow a=?$

A) 6 B) 3 C) -2 D) -4 E) -6

13. $\frac{x^2+ax+6}{x^2+7x+12}=\frac{x+2}{x+4}$

$\Rightarrow a=?$

A) -3 B) -1 C) 1 D) 3 E) 5

14. $\frac{x^2-ax-6}{x^2+2x-15}=\frac{x+2}{x+5}$

$\Rightarrow a=?$

A) -2 B) -1 C) 1 D) 2 E) 3

15. $\frac{x^2+2xy-8y^2}{x^2+xy-6y^2}=?$

A) $\frac{x-2y}{x+3y}$ B) $\frac{x+4y}{x-2y}$ C) $\frac{x+2y}{x+4y}$

D) $\frac{x-3y}{x+2y}$ E) $\frac{x+4y}{x+3y}$

16. $\frac{x^2-\left(m-\frac{1}{n}\right)x-\frac{m}{n}}{x+\frac{1}{n}}+m=?$

A) $x+m$ B) $x+n$ C) x

D) $x-m$ E) $x-n$

1. $\dfrac{x^2+xy-2y^2}{x^2+2xy-3y^2}=?$

A) $\dfrac{x-y}{x+y}$ B) $\dfrac{x+2y}{x+y}$ C) $\dfrac{x+2y}{x+3y}$

D) $x-y$ E) $x+y$

2. $\dfrac{x^2-xy-6y^2}{x^2-3xy-10y^2}=?$

A) $\dfrac{x-3y}{x-5y}$ B) $\dfrac{x+2y}{x-5y}$ C) $\dfrac{x-3y}{x+2y}$

D) $x+2y$ E) 1

3. $\dfrac{x^2-ax-6a^2}{x^2-8ax+15a^2}=?$

A) $\dfrac{x+2a}{x+5a}$ B) $\dfrac{x-3a}{x+5a}$ C) $\dfrac{x+2a}{x-3a}$

D) $\dfrac{x-3a}{x-5a}$ E) $\dfrac{x+2a}{x-5a}$

4. $\dfrac{x^2-2xy-15y^2}{x^2-xy-12y^2}\cdot\dfrac{3x-12y}{2x-10y}=?$

A) $\dfrac{x-5y}{x-4y}$ B) $\dfrac{x-4y}{x+3y}$ C) 1

D) $x+3y$ E) $\dfrac{3}{2}$

5. $\dfrac{x^2-xy-6y^2}{x^2+xy-2y^2}:\dfrac{x^2+xy-12y^2}{x^2+3xy-4y^2}=?$

A) $\dfrac{x+2y}{x-3}$ B) $\dfrac{x-3y}{x+y}$ C) $\dfrac{x+4y}{x+2y}$

D) $\dfrac{x+2y}{x+4y}$ E) 1

6. $\dfrac{a^3-a^2-2a}{a^3+a^2-6a}=?$

A) $\dfrac{a}{a+3}$ B) $\dfrac{a+1}{a+3}$ C) $\dfrac{a^2+a}{a+3}$

D) $\dfrac{a+1}{a}$ E) 1

7. $\dfrac{a^3-14a^2+45a}{a^2-8a-9}=?$

A) $\dfrac{a(a-5)}{a+1}$ B) $\dfrac{a-5}{a+1}$ C) $\dfrac{a-5}{a(a+1)}$

D) a E) $a-5$

8. $\dfrac{a^3+2a^2-24a}{a^2-2a-8}=?$

A) a B) $\dfrac{a^2-4a}{a+2}$ C) $\dfrac{a^2+6a}{a+2}$

D) $\dfrac{a}{a+2}$ E) 1

9. $\frac{(a+b)^2+8(a+b)+7}{a+b+7} = ?$

A) $a+b+7$ B) $a+b-1$ C) $a+b$

D) $a+b+1$ E) $a+b+8$

10. $\frac{(a+b)^2+7(a+b)+12}{a+b+3} = ?$

A) $a+b+4$ B) $a+b+1$ C) $a+b+3$

D) $a+b-4$ E) $a+b$

11. $\frac{x^2y^2-xy-2}{x^2y^2-1} = ?$

A) $\frac{xy+2}{xy+1}$ B) $\frac{xy-2}{xy-1}$ C) 1

D) $\frac{xy+2}{xy-1}$ E) $\frac{xy-2}{xy+1}$

12. $\frac{x^2y^2+xy-6}{x^2y^2+4xy+3} = ?$

A) $\frac{xy+2}{xy+1}$ B) $\frac{xy+1}{xy}$ C) $\frac{xy-2}{xy+1}$

D) $xy-1$ E) 1

13. $\frac{(a-b)^2-7(a-b)+10}{(a-b)^2-5(a-b)+6} = ?$

A) $\frac{a-b-5}{a-b+2}$ B) $\frac{a-b-2}{a-b+3}$ C) $\frac{a-b-5}{a-b-3}$

D) $\frac{a-b-5}{a-b-2}$ E) 1

14. $\frac{(x^2+6x)^2+7(x^2+6x)+10}{x^2+6x+2} = ?$

A) $x+6$ B) $x+5$ C) $(x+5)(x+1)$

D) $\frac{x+5}{x+2}$ E) $\frac{x+5}{x+1}$

15. $\frac{x^2(x+3)+(x+3)(2x+5)}{m(x+3)+(x^2+2x)(x+3)} = 1$

$\Rightarrow m = ?$

A) -5 B) -3 C) 3 D) 5 E) 6

16. $\frac{x^2y^2-4}{x^2y^2+xy-2} : \frac{x^2y^2+xy-6}{x^2y^2+4xy-5} = ?$

A) $\frac{xy-2}{xy+3}$ B) $\frac{xy+5}{xy+3}$ C) $\frac{xy+5}{xy-2}$

D) 1 E) 2

1. $\frac{2a^2+13a+21}{a+3}=?$

A) $2a+3$ B) $2a+7$ C) $2a+5$

D) $a+7$ E) $a+14$

2. $\frac{6a^2+2a-4}{a+1}=?$

A) $3a-2$ B) $6a-2$ C) $6a+2$

D) $6a-4$ E) $3a+2$

3. $\frac{2a^2+11a-6}{a+6}=?$

A) $a+3$ B) $2a+1$ C) $2a-1$

D) a^2+6 E) 1

4. $\frac{6x^2+5x-4}{3x^2+7x+4}=?$

A) $\frac{3x+4}{x+1}$ B) $\frac{2x-1}{3x+4}$ C) $\frac{3x-1}{2x+4}$

D) $\frac{2x+1}{x-1}$ E) $\frac{2x-1}{x+1}$

5. $\frac{6x^2+13x+6}{6x^2+5x-6}=?$

A) $\frac{2x+3}{2x-3}$ B) $\frac{2x-3}{2x+3}$ C) $\frac{x+3}{x+2}$

D) $\frac{3x-2}{3x+2}$ E) $\frac{3x+2}{3x-2}$

6. $\frac{9a^2-3a-2}{6a^2+5a+1}=?$

A) $\frac{3a-2}{3a+1}$ B) $\frac{3a+1}{2a+1}$ C) $\frac{3a-2}{3a-1}$

D) $\frac{3a-2}{2a+1}$ E) 1

7. $\frac{15a^2+a-6}{15a^2+6a-9}=?$

A) $\frac{3a+2}{3a+3}$ B) $\frac{3a+2}{5a-3}$ C) $\frac{5a-3}{3a+3}$

D) $5a-3$ E) 1

8. $\frac{14x^2-41xy+15y^2}{7x-3y}=?$

A) $7x+3y$ B) $2x+5y$ C) $2x-5y$

D) 1 E) 2

9. $\frac{6a^2-7a-3}{6a^2-5a-6} : \frac{6a+2}{12a+8} = ?$

A) $\frac{2a-3}{3a+2}$ B) $\frac{3a+1}{2a-3}$ C) $\frac{3a+1}{3a+2}$

D) 1 E) 2

10. $\frac{35m^2-4m-15}{25m^2-9} = ?$

A) $\frac{7m+5}{5m+3}$ B) $\frac{7m-5}{5m-3}$ C) $\frac{7m-5}{5m+3}$

D) $\frac{7m-3}{m-5}$ E) $\frac{5m-3}{5m+3}$

11. $\frac{36a^2+30a-50}{18a^2-50} = ?$

A) $\frac{2a+5}{a-5}$ B) $\frac{6a+5}{3a+5}$ C) $\frac{6a-5}{3a-5}$

D) 2 E) $\frac{2a-5}{a-5}$

12. $\frac{4m^2+11m-3}{16m^2-1} : \frac{m^2-9}{8m+2} = ?$

A) $\frac{1}{2(m-3)}$ B) $\frac{2}{m+3}$ C) $\frac{1}{m+3}$

D) $\frac{2}{m-3}$ E) $\frac{1}{m-3}$

13. $\frac{12a^2+2a-2}{9a^2-1} = ?$

A) $\frac{a+2}{3a+1}$ B) $\frac{4a+2}{3a+1}$ C) $\frac{4a}{3a+1}$

D) $\frac{1}{3a-1}$ E) 4

14. $\frac{15x^2-2x-8}{25x^2-16} = ?$

A) $3x+2$ B) $5x-4$ C) $\frac{3x+2}{5x+4}$

D) $\frac{3x+2}{5x-4}$ E) 1

15. $\frac{60x^2-5x-30}{9x^2-4} = ?$

A) $20x-15$ B) $\frac{5(4x-3)}{3x-2}$ C) $\frac{4x-3}{3x+2}$

D) $\frac{3x+2}{3x-2}$ E) $5(3x+2)$

16. $\frac{10a^2+16a-8}{4a^2-16} = ?$

A) 1 B) 2 C) $\frac{5a-2}{2a+4}$

D) $\frac{5a-2}{2a-4}$ E) $\frac{2a+4}{2a-4}$

1. $\frac{x^2-4x-5}{x^2-1} : \frac{x^2-x-20}{x^2+3x-4} = ?$

A) 1 B) $x-4$ C) $x-1$

D) $x+1$ E) $x+2$

2. $\frac{6x^2+5x-6}{9x^2-4} : \frac{4x^2-9}{8x-12} = ?$

A) 4 B) 1 C) $4(2x-3)$

D) $\frac{4(2x-3)}{3x+2}$ E) $\frac{4}{3x+2}$

3. $\frac{x^2-4}{x^2+4x+4} \cdot \frac{x^2+5x+6}{x^2+x-6} = ?$

A) $\frac{x+2}{x+3}$ B) $\frac{x+3}{x+2}$ C) $\frac{x-2}{x+3}$

D) $\frac{x+3}{x-2}$ E) 1

4. $\frac{x^2-1}{2x^2-4x+2} : \frac{x^2+3x+2}{4x-4} = ?$

A) $\frac{x-1}{x+2}$ B) $\frac{x+1}{x-1}$ C) $\frac{4x+4}{x-1}$

D) $\frac{2}{x+2}$ E) 1

5. $\frac{x^2-1}{x^2-2x+1} \cdot \frac{x^2-4}{x^2+3x+2} = ?$

A) $\frac{x-2}{x+1}$ B) $\frac{x+1}{x+2}$ C) $\frac{x+2}{x+1}$

D) $\frac{x-2}{x-1}$ E) $\frac{x-1}{x-2}$

6. $\frac{a^2+3a}{a^2-3a+2} \cdot \frac{a^2-a}{a^2+a-6} : \frac{a^3}{a^2-4a+4} = ?$

A) $\frac{a-3}{a^2}$ B) $\frac{1}{a}$ C) $\frac{a-3}{a}$

D) $\frac{a^2+4a+4}{a}$ E) a^2+4a+4

7. $\frac{x^3y-4xy^3}{x^3y+4x^2y^2+4xy^3} = ?$

A) $\frac{x-2y}{x+2y}$ B) $\frac{x-y}{x+y}$ C) $\frac{x-4y}{x+4y}$

D) $\frac{1}{x+2y}$ E) $x-2y$

8. $\frac{273^2-27^2}{173^2-73^2} = ?$

A) 1 B) 2 C) 3 D) $\frac{148}{133}$ E) $\frac{123}{50}$

9. $\frac{399^2 - 101^2}{299^2 - 201^2} = ?$

A) $\frac{198}{101}$ B) 2 C) $\frac{151}{74}$ D) $\frac{298}{99}$ E) $\frac{149}{49}$

10. $\left.\begin{matrix} A = 2011 \\ B = 2009 \end{matrix}\right\} \Rightarrow A^2 + B^2 - 2AB = ?$

A) 1 B) 2 C) 4 D) 6 E) 9

11. $x = 971$

$y = 968$

$\Rightarrow (x + y)^2 - 4xy = ?$

A) 1 B) 4 C) 9 D) 16 E) 25

12. $a = 303$

$b = 101$

$\Rightarrow \frac{(a+b)^2 - 4ab}{(a-b)^2 + 4ab} = ?$

A) $\frac{1}{16}$ B) $\frac{1}{4}$ C) 1 D) 4 E) 6

13. $(2a - 1)^2 - (3a + 1)^2 = ?$

A) $(2 - a)(5a)$ B) $(2 - a)(3a)$

C) $(a + 2)(-5a)$ D) $(a + 3)(-5a)$

E) $(2 + a)(-3a)$

14. $(a + b + c)^2 - (a - b - c)^2 = ?$

A) $2b(a + c)$ B) $2a(b - c)$ C) $2a(b + c)$

D) $4a(b + c)$ E) $4b(a + c)$

15. $\frac{(2a - b + c)^2 - (a + b - c)^2}{a - 2b + 2c} = ?$

A) $3a$ B) $a - b + c$

C) $3a - 2b + 2c$ D) $a - 2b - 2c$

E) 3

16. $\sqrt{2007 \cdot 1993 + 49} = ?$

A) 2007 B) 2003 C) 2000

D) 1997 E) 1993

1. $\dfrac{m^4 - 3m^3 - 4m^2 + 12m}{(m-3)\cdot(m-2)} = ?$

A) m B) $m+2$ C) $m(m-4)$ D) $m(m+4)$ E) $m(m+2)$

2. $\dfrac{3^{20} - 3^{10}}{(3^5+1)\cdot(3^5-1)} = ?$

A) 1 B) 3 C) 3^5 D) 3^8 E) 3^{10}

3. $a + b = 7$

$b + c = 3$

$\Rightarrow a^2 + ab - bc - ac = ?$

A) 12 B) 18 C) 21 D) 28 E) 36

4. $\dfrac{x^{2m} - x^m}{(x^2-1)\cdot(x^m-1)} = ?$

A) x^m B) $\dfrac{x^m}{x^m-1}$ C) $\dfrac{x^m}{x^2-1}$ D) 1 E) x

5. $\dfrac{x^{6m} - 2x^{3m}}{x^{3m}} = ?$

A) $x^2 - 2$ B) $x^3 - 2$ C) $x^{3m} - 1$ D) $x^{3m} - 2$ E) $x^{2m} - 2$

6. $\dfrac{(2x)^{4m} - 16^m \cdot x^{2m}}{(4x)^{2m}} = ?$

A) x^{2m} B) $x^{2m} - 1$ C) x^{2m-1} D) $x^m + 1$ E) $x^{2m} + 1$

7. $\dfrac{xa^2 + xa - x - 3a^2 - 3a + 3}{xa^2 + 4a^2 + ax + 4a - x - 4} = ?$

A) $x - 3$ B) $x + 4$ C) $a^2 + a - 1$ D) $\dfrac{x-3}{x+4}$ E) 1

8. $\dfrac{a^4 - 4a^2 + 3}{a^3 - a} = ?$

A) $\dfrac{a^2-3}{a}$ B) $\dfrac{a-3}{a}$ C) $\dfrac{a+3}{a}$ D) $a^2 - 1$ E) $\dfrac{a-1}{a}$

9. $\dfrac{x^4-13x^2+36}{x^2+x-6}=?$

A) x^2+x-2 B) x^2-x-6 C) x^2+x+6

D) x^2+x-6 E) 1

10. $\dfrac{a^2-b^2-2a+1}{a-b-1}=?$

A) $b-a-1$ B) $a+b-1$ C) $a-b-1$

D) $b-a+1$ E) $a+b+1$

11. $\dfrac{a^2-b^2-2b-1}{a-b-1}=?$

A) $a+b-1$ B) $a+b$ C) $a+b+1$

D) $a-b$ E) $a-b-1$

12. $\dfrac{(x+y)^2+2(x+y)-35}{x^2+2xy+y^2-49}=?$

A) $\dfrac{x+y+7}{x+y-5}$ B) $\dfrac{x+y+7}{x+y}$ C) $\dfrac{x+y-5}{x+y+7}$

D) $\dfrac{x+y-5}{x+y-7}$ E) 1

13. $\dfrac{(x-y)^2+5(x-y)-50}{x^2-2xy+y^2-25}=?$

A) $\dfrac{x-y+10}{x-y+5}$ B) $\dfrac{x-y+5}{x-y-5}$ C) $\dfrac{x-y-5}{x-y+5}$

D) $\dfrac{x-y-10}{x-y-5}$ E) $\dfrac{x-y-2}{x-y}$

14. $a+b+c=0$

$\Rightarrow \dfrac{(a+b)^{11}+(b+c)^{11}+(a+c)^{11}}{a+a^{11}+b+b^{11}+c+c^{11}}=?$

A) 3 B) 2 C) 1 D) -1 E) -2

15. $x, y \in Z^+$

$x^2-y^2=17$

$\Rightarrow x\cdot y=?$

A) 48 B) 56 C) 64 D) 72 E) 84

16. $a=3^{\frac{1}{4}}+1$

$\Rightarrow \dfrac{\left(3^{\frac{1}{2}}-1\right)}{\left(3^{\frac{1}{8}}+1\right)\cdot\left(3^{\frac{1}{8}}-1\right)}=?$

A) 1 B) a C) 2a

D) a + 1 E) a – 1

1. $\frac{x^3+1}{x^2-1} : \frac{x^2-x+1}{x^2+9x-10} = ?$

A) $x+8$ B) $x+9$ C) $x+10$ D) $x+11$ E) $x+12$

2. $\frac{a^3-1}{a^5-a^4+a^3-a^2+a-1} = ?$

A) $\frac{1}{a^2+a+1}$ B) $\frac{1}{a^2-a+1}$ C) a^2-1 D) $a+1$ E) 1

3. $a = 2$

$\Rightarrow \frac{a+1}{a^6} \cdot \frac{a^5-a^4+a^3}{a^3+1} = ?$

A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) 1 D) 4 E) 8

4. $\frac{x-\frac{1}{x}}{x-1} : \frac{x+\frac{1}{x^2}}{x^2-x+1} = ?$

A) $x+1$ B) x^2+1 C) $x-1$ D) x E) $\frac{x+1}{x-1}$

5. $\frac{3a^2-12a+12}{a^3-8} \cdot \frac{a^2+2a+4}{(a^2-4)} = ?$

A) $a+2$ B) $\frac{a+2}{3}$ C) $a+3$ D) $\frac{3}{a+2}$ E) $\frac{2}{a+3}$

6. $\frac{x+2}{x(x-2)+3x+1} \cdot \frac{x^3-1}{x^2+x-2} = ?$

A) 1 B) $x+2$ C) $x+1$ D) $x-1$ E) $x-2$

7. $\frac{(x+y)^2 \cdot (x^2+y^2-xy)}{(x^3+y^3) \cdot (x^2-y^2)} = ?$

A) $\frac{1}{y}$ B) $\frac{1}{x+y}$ C) $\frac{1}{x-y}$ D) $\frac{1}{x^2+y^2+xy}$ E) $\frac{1}{(x-y)^2}$

8. $\frac{x^3+3x^2+3x+1}{x^2+2x+1} \cdot \frac{x^2-x+1}{x^3+1} = ?$

A) 1 B) $x+1$ C) $x-1$ D) $\frac{1}{x+1}$ E) $\frac{1}{x-1}$

9. $\left.\begin{matrix} x = 999 \\ y = 997 \end{matrix}\right\} \Rightarrow x^3 - 3x^2y + 3xy^2 - y^3 = ?$

A) 2 B) 4 C) 5 D) 8 E) 16

10. $\left.\begin{matrix} a^3 + 3a^2b = 24 \\ b^3 + 3ab^2 = 40 \end{matrix}\right\} \Rightarrow a + b = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

11. $a = 8$

$b = \frac{7}{2}$

$\Rightarrow a^3 - 6a^2b + 12ab^2 - 8b^3 = ?$

A) -8 B) $-\frac{1}{8}$ C) 1 D) 8 E) $\frac{27}{8}$

12. $\frac{a^6 + 1}{(a + a^{-1}) \cdot (a^2 + a^{-2} - 1)} = ?$

A) a^{12} B) $a^6 - 1$ C) a^6

D) a^3 E) $a^3 + 1$

13. $\frac{a^6 - 1}{(a - a^{-1}) \cdot (a^2 + a^{-2} + 1)} = ?$

A) a^{12} B) a^6+1 C) a^6

D) a^3 E) a^3-1

14. $\frac{2a^6 + 17a^3 + 8}{(2a^3 + 1) \cdot (a^2 - 2a + 4)} = ?$

A) $a - 2$ B) $a + 2$ C) $a + 4$

D) $a - 3$ E) $a - 4$

15. $\left(\frac{a^2 + 2ab + 4b^2}{a + 2b} - \frac{a^2 - 2ab + 4b^2}{a - 2b}\right) : \frac{b^2}{a^2 - 4b^2} = ?$

A) $-16b$ B) $-8b$ C) 1

D) $4b$ E) $8b$

16. $\left(\frac{a^2 + 6ab + 9b^2}{a + 3b} + \frac{a^2 - 4ab + 4b^2}{a - 2b}\right) : (4a + 2b) = ?$

A) $\frac{1}{2}$ B) 1 C) $a - 2b$

D) $a + 3b$ E) $a - b$

1. $\frac{x(x^2+ax-2)}{(x+2)(x^2-x)}=1$

$\Rightarrow a=?$

A) -2 B) -1 C) 1 D) 2 E) 3

2. $x \in Z^+$

$32^2-17^2=15x^2$

$\Rightarrow x=?$

A) 1 B) 3 C) 4 D) 7 E) 9

3. $a<b$

$\left.\begin{array}{l} a^2+2ab=21 \\ b^2-4ab=-17 \end{array}\right\} \Rightarrow a-b=?$

A) 4 B) 2 C) 1 D) -1 E) -2

4. $x, y \in R^+$

$\left.\begin{array}{l} x^2+5xy=8 \\ 9y^2+xy=17 \end{array}\right\} \Rightarrow x+3y=?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $\left.\begin{array}{l} a-b=7 \\ a^2+b^2=23 \end{array}\right\} \Rightarrow a\cdot b=?$

A) -9 B) -10 C) -11 D) -12 E) -13

6. $\left.\begin{array}{l} a+b=5 \\ a\cdot b=4 \end{array}\right\} \Rightarrow a^2+b^2=?$

A) 11 B) 13 C) 15 D) 17 E) 19

7. $x<y$

$\left.\begin{array}{l} x^2+xy=21 \\ 3y^2-9xy=-60 \end{array}\right\} \Rightarrow y-x=?$

A) 4 B) 2 C) 1 D) -1 E) -2

8. $\left.\begin{array}{l} a^3-3a^2b=7 \\ 3ab^2-b^3=20 \end{array}\right\} \Rightarrow a-b=?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $\left.\begin{matrix} x^3+6x^2y=12 \\ 12xy^2+8y^3=52 \end{matrix}\right\} \Rightarrow x+2y=?$

A) 3 B) 4 C) 5 D) 6 E) 8

10. $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{6}{abc}$

$a+b+c=5$

$\Rightarrow a^2+b^2+c^2=?$

A) 13 B) 12 C) 11 D) 10 E) 9

11. $x, y, z \in R^+$

$x^2+y^2+z^2=16$

$xy+yz+xz=10$

$\Rightarrow x+y+z=?$

A) 7 B) 6 C) 5 D) 4 E) 3

12. $x, y, z \in R^+$

$\left.\begin{matrix} x^2+2xy=3 \\ y^2+2yz=8 \\ z^2+2xz=5 \end{matrix}\right\} \Rightarrow x+y+z=?$

A) 2 B) 3 C) 4 D) 5 E) $\sqrt{15}$

13. $x, y, z \in R$

$\left.\begin{matrix} x^2+y^2+z^2=10 \\ xy-yz+xz=3 \end{matrix}\right\} \Rightarrow |x-y-z|=?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $a-c=7$

$c-b=7$

$\Rightarrow a^2+b^2-2c^2=?$

A) 49 B) 63 C) 91 D) 98 E) 105

15. $x-y=1$

$\Rightarrow \frac{x^2-y^2+6y-9}{x^2-y^2-3x+3y}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $a, b \in R$

$a \cdot b < 0$

$6a^2-ab-2b^2=0$

$\Rightarrow \frac{a}{b}=?$

A) -1 B) $-\frac{1}{2}$ C) $-\frac{2}{3}$ D) $\frac{1}{2}$ E) $\frac{1}{3}$

1. $x - \frac{1}{x} = 3\sqrt{2}$

$\Rightarrow x^2 + \frac{1}{x^2} = ?$

A) 20 B) 18 C) 16 D) 14 E) 12

2. $\left.\begin{array}{l} \frac{1}{x} < x \\ x + \frac{1}{x} = 3 \end{array}\right\} \Rightarrow x - \frac{1}{x} = ?$

A) $-\sqrt{5}$ B) $-\sqrt{3}$ C) $\sqrt{3}$ D) 2 E) $\sqrt{5}$

3. $x^2 - 3x + 1 = 0$

$\Rightarrow x^2 + \frac{1}{x^2} = ?$

A) 11 B) 9 C) 7 D) 5 E) 3

4. $x + \frac{1}{x} = 4$

$\Rightarrow x^3 + \frac{1}{x^3} = ?$

A) 54 B) 52 C) 48 D) 45 E) 42

5. $x^2 + 4x - 3 = 0$

$\Rightarrow x^2 + \frac{12}{x} = ?$

A) 5 B) 6 C) 13 D) 16 E) 19

6. $a + \frac{1}{a-1} = 8$

$\Rightarrow (a-1)^2 + \frac{1}{(a-1)^2} = ?$

A) 45 B) 47 C) 49 D) 51 E) 53

7. $x^2 + x - 1 = 0$

$\Rightarrow x^3 = ?$

A) $-x - 1$ B) $2x - 1$ C) $2x$ D) $x - 1$ E) $x + 1$

8. $x^2 - 2x - 1 = 0$

$\Rightarrow x^4 = ?$

A) $12x - 3$ B) $8x$ C) $12x + 5$ D) $12x + 3$ E) $4x - 3$

9. $x^2 + x - 1 = 0$

$\Rightarrow \dfrac{1-x}{2x^2} + \dfrac{x^2}{2x-2} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

10. $x, y \in R$

$x^2 - 4x + y^2 + 6y + 13 = 0$

$\Rightarrow x \cdot y = ?$

A) -6 B) -5 C) -4 D) -3 E) -2

11. $a, b, c \in R$

$a^2 + b^2 + c^2 - 2a + 6b + 10 = 0$

$\Rightarrow a + b + c = ?$

A) 3 B) 2 C) 1 D) -1 E) -2

12. $x \in R$

$A = x^2 + x + 7$

$\Rightarrow \min(A) = ?$

A) $\dfrac{11}{7}$ B) $\dfrac{11}{2}$ C) $\dfrac{13}{2}$ D) $\dfrac{27}{4}$ E) 7

13. $(2x-2)^3 - 3(2x-2)^2 + 3(2x-2) - 28 = 0$

$\Rightarrow x = ?$

A) -5 B) 3 C) 4 D) 8 E) 15

14. $\dfrac{x^4 + x^2 + 25}{x^2 - 3x + 5} = ?$

A) $x^2 + 3x - 5$ B) $x^2 - 3x - 5$ C) $x^2 + 3x + 5$
D) $x^2 - 3x + 5$ E) $x^2 + x + 5$

15. $(x^2 + 3x)^2 - (x^2 + 3x) - 12 = -4x^2 - 12x - 12$

$\Rightarrow$ S.S. = ?

A) {1} B) {-4} C) {3}
D) {$-3, 0$} E) {$-4, 3$}

16. $(2^x - 1)(2^{2x} + 1)(2^{4x} + 1) = \dfrac{2^{8x} - 1}{9}$

$\Rightarrow x = ?$

A) -3 B) -2 C) 1 D) 2 E) 3

ÇARPANLARA AYIRMA FACTORISING
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	A	E	C	D	C	E	B	C	A	A	C	C	B	A	E

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	A	A	E	D	A	D	C	D	B	A	A	E	E

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	C	A	C	E	D	C	B	B	B	C	A	B	B	C

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	D	B	C	A	B	D	E	E	D	D	E	C	E	C

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	E	E	E	B	A	C	D	A	B	C	C	C	D	B

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	C	E	E	D	A	C	E	B	C	D	B	C	B	D

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	E	E	D	D	B	A	C	E	C	C	B	C	D	A	C

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	E	D	C	D	B	D	A	B	B	C	D	A	D	D	B

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	A	D	D	A	C	A	D	A	C	D	D	B	A	A

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	D	E	E	E	D	C	B	B	A	B	C	B	D	D	B

TEST 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	E	C	B	E	B	B	C	C	A	E	D	B	C	D	E

BASİT EŞİTSİZLİK VE MUTLAK DEĞER

SIMPLE INEQUALITY AND ABSOLUTE VALUE

ÖZELLİK|Property 1

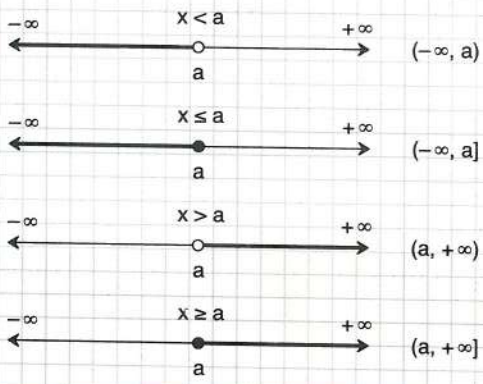
Basit Eşitsizlik | Basic Inequality

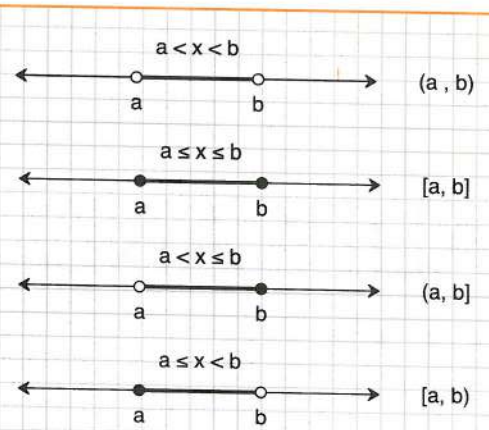
$$A(x) < B(x)$$

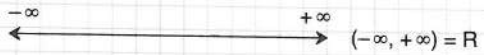
- $A(x) + C < B(x) + C$
  $A(x) - C < B(x) - C$
- $A(x) \cdot C < B(x) \cdot C \qquad C \in R^+$
  $\frac{A(x)}{C} < \frac{B(x)}{C}$
- $A(x) \cdot C > B(x) \cdot C \qquad C \in R^-$
  $\frac{A(x)}{C} > \frac{A(x)}{C}$

Bir eşitsizliğin her iki tarafına aynı sayı eklenip çıkartılabilir. Aynı pozitif sayı ile çarpılıp bölünürse yön değiştirmez. Negatif bir sayı ile çarpılıp bölünürse eşitsizlik yön değiştirir.

The same number can be added to or subtracted from both sides of an inequality. Both sides can be multiplied or divided by the same positive number direction of inequality stays the same. If it is multiplied or divided by a negative number the direction of the inequality is reversed.

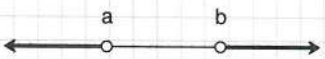






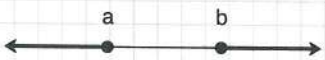
$a < b$ olmak üzere *(Let $a < b$)*

- $x < a$ veya *(or)* $b < x$



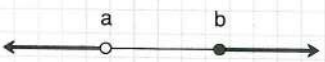
$(-\infty, a) \cup (b, \infty) = R \setminus [a, b]$

- $x \le a$ veya *(or)* $b \le x$



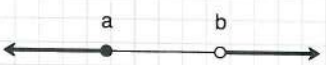
$(-\infty, a] \cup [b, \infty) = R \setminus (a, b)$

- $x < a$ veya *(or)* $b \le x$



$(-\infty, a) \cup [b, \infty) = R \setminus [a, b)$

- $x \le a$ veya *(or)* $b < x$



$(-\infty, a] \cup (b, \infty) = R \setminus (a, b]$

1. $x \in Z$
$2x - 1 < 5$
$\Rightarrow \max(x) = ?$

2

2. $x \in Z$
$3x - 3 > 7$
$\Rightarrow \min(x) = ?$

4

3. $x \in Z$
$2(x - 1) + x - 3 \ge x + 1$
$\Rightarrow \min(x) = ?$

3

4. $x \in Z$

$2x + 3(x - 2) < 4(x - 1)$

$\Rightarrow \max(x) = ?$

1

5. $2x - 5(x - 1) < 7 - x$

$\Rightarrow$ S.S. = ?

$(-1, \infty)$

6. $3(x - 1) + 2(x - 2) \geq 4(x - 3)$

$\Rightarrow$ S.S. = ?

$[-5, \infty)$

7. $2(x - 1) + 7(x - 1) < 9(x + 3)$

$\Rightarrow$ S.S. = ?

R

8. $6(x - 1) - 2(x + 3) \leq 4(x - 6)$

$\Rightarrow$ S.S. = ?

Ø

9. $(3x - 2) + 4(x + 1) > 7x - 5$

$\Rightarrow$ S.S. = ?

R

10. $\frac{x}{6} - \frac{x}{2} > \frac{2}{3}$

$\Rightarrow$ S.S. = ?

$(-\infty, -2)$

11. $\frac{x+1}{3} - \frac{1}{2} > \frac{x}{3}$

$\Rightarrow$ S.S. = ?

Ø

12. $x \in Z$

$\frac{x-1}{2} + \frac{x+1}{4} < 2$

$\Rightarrow \max(x) = ?$

2

13. $x \in Z$

$\frac{1}{5} - \frac{x}{3} < \frac{x-1}{15}$

$\Rightarrow \min(x) = ?$

1

ÖZELLİK|Property 2

$\frac{a}{b} < \frac{c}{d}$ olmak üzere

- b ve d aynı işaretli ise $ad < bc$
- b ve d farklı işaretli ise $ad > bc$

Let $\frac{a}{b} < \frac{c}{d}$

If b and d have the same sign then $ad < bc$

If b and d have opposite signs then $ad > bc$

a < b olmak üzere

- a ile b aynı işaretli ise $\frac{1}{a} > \frac{1}{b}$
- a ile b farklı işaretli ise $\frac{1}{a} < \frac{1}{b}$

Let $a < b$

If b and d have the same sign then $\frac{1}{a} > \frac{1}{b}$

If b and d have the opposite sign then $\frac{1}{a} < \frac{1}{b}$

1. $\frac{x-1}{3} \leq \frac{x+2}{2}$

⇒ S.S. = ?

$[-8, \infty)$

2. $\frac{2x-1}{2} > \frac{x-1}{4}$

⇒ S.S. = ?

$\left(\frac{1}{3}, \infty\right)$

3. $\frac{x-3}{5} \leq \frac{x-2}{2}$

⇒ S.S. = ?

$\left[\frac{4}{3}, \infty\right)$

4. $x \in Z$

$\frac{x+4}{3} > \frac{x-1}{4}$

⇒ min(x) = ?

-18

5. $\frac{2x+1}{2} > 4$

⇒ S.S. = ?

$\left(\frac{7}{2}, \infty\right)$

6. $\frac{x}{-3} < x+4$

⇒ S.S. = ?

$(-3, \infty)$

7. $\frac{2-x}{3} < \frac{1-x}{-2}$

⇒ S.S. = ?

$\left(\frac{7}{5}, \infty\right)$

8. $\frac{1+x}{-3} < \frac{x-1}{4}$

⇒ S.S. = ?

$\left(-\frac{1}{7}, \infty\right)$

9. $x > 3$

$\frac{4}{x-1} < \frac{2}{x-3}$

⇒ S.S. = ?

$(3, 5)$

10. $\frac{2}{x-3} > \frac{1}{2}$

⇒ S.S. = ?

$(3, 7)$

11. $\frac{-1}{2} > \frac{3}{x-5}$

⇒ S.S. = ?

$(-1, 5)$

12. $x \in Z$

$\frac{2}{x-6} < \frac{-5}{3}$

⇒ x = ?

5

13. $\frac{-1}{2} < \frac{2}{x-5}$

⇒ S.S. = ?

$(-\infty, 1) \cup (5, \infty)$

ÖZELLİK|Property 3

Rasyonel ifadelerde paydası aynı olan ifadeler eşitliğin bir tarafında toplanır.

Paydayı sıfır yapan ifadeler çözüm kümelerinden çıkarılır.

In rational expressions the expressions with equal denominators are gathered on one side of the equation.

The values that make the denominator zero are removed from the solution set.

1. $\frac{x}{x-1} + x + 2 < \frac{1}{x-1}$

$\Rightarrow$ S.S. = ?

$(-\infty, -3)$

2. $\frac{x}{x+2} + 3 < x - \frac{2}{x+2}$

$\Rightarrow$ S.S. = ?

$(4, \infty)$

3. $\frac{x}{x-2} + 2(x-1) < \frac{2}{x-2}$

$\Rightarrow$ S.S. = ?

$\left(-\infty, \frac{1}{2}\right)$

4. $\frac{3}{x-3} + x > \frac{x}{x-3} - 8$

$\Rightarrow$ S.S. = ?

$(-7, \infty) \setminus \{3\}$

5. $\frac{2x}{2x+3} + \frac{1}{x-1} - 2 < \frac{x}{x-1} - \frac{3}{2x+3}$

$\Rightarrow$ S.S. = ?

$R - \left\{1, \frac{-3}{2}\right\}$

ÖZELLİK|Property 4

Eşitsizlik sistemlerinde farklı eşitsizlikler ayrı ayrı çözülür. Bulunan çözüm kümelerinin kesişimi alınır.

The intersection of the solution sets is taken into consideration.

1. $-1 \le \frac{x-3}{2} < 3$

$\Rightarrow$ S.S. = ?

$[1, 9)$

2. $x - 3 < 2x + 1 < x + 8$

$\Rightarrow$ S.S. = ?

$(-4, 7)$

3. $x - 4 < 3x + 2 \le x + 6$

$\Rightarrow$ S.S. = ?

$(-3, 2]$

4. $2x - 4 < 6$

$x + 3 > 1$

$\Rightarrow$ S.S. = ?

$(-2, 5)$

5. $10 > 3x + 1$

$x - 8 < 2x + 1$

$\Rightarrow$ S.S. = ?

$(-9, 3)$

6. $3x - 2 > 4$

$x - 1 < 1$

$\Rightarrow$ S.S. = ?

$\emptyset$

7. $3(x-2) \le 2(x+1)$

$x - 3 > 1$

$\Rightarrow$ S.S. = ?

$(4, 8]$

ÖZELLİK|Property 5

- Eşitsizliklerde değişkenin en büyük veya en küçük değeri bulunurken değişken türü önemlidir.
  The type of the variable is important particularly when determining the minimum or maximum value of the variable.

- Değişkenler tamsayı (Z) ise eşitsizliğin durumuna göre değişkene değer verilerek çözüm yapılır.
  If the variable is an integer (Z); the equation is solved by giving a value to the variable according to the inequality.

- Değişkenler reel sayı (R) ise aralık çözümleri yapılarak en son değer bulunur.
  If the variable is an real number (R); the equation is solved by performing the interval solutions.

1. $x \in R$
$3 < x \leq 8$
$\Rightarrow ? < x^2 < ?$
$9 < x^2 \leq 64$

2. $x \in R$
$-4 < x \leq -1$
$\Rightarrow ? < x^2 < ?$
$1 \leq x^2 < 16$

3. $x \in R$
$-2 < x < 4$
$\Rightarrow ? < x^2 < ?$
$0 \leq x^2 < 16$

4. $x, y \in R$
$-3 < x < 4$
$-4 < y \leq 2$
$\Rightarrow ? < x \cdot y < ?$
$-16 < x \cdot y < 12$

5. $x, y \in R$
$-5 \leq x < 3$
$-6 \leq y < 2$
$\Rightarrow ? < x \cdot y < ?$
$-18 < x \cdot y \leq 30$

6. $x, y \in R$ $(x + y) \in Z$
$-3 < x < 4$
$-2 < y < 6$
$\Rightarrow \max(x + y) = ?$
9

PUZA YAYINLARI

7. $x, y \in Z$
$-3 < x < 4$
$-2 \leq y < 6$
$\Rightarrow \max(x + y) = ?$
8

8. $x, y \in Z$
$-6 < x < 3$
$-8 < y \leq 8$
$\Rightarrow \max(x - y) = ?$
9

9. $x, y \in R$
$(x + y) \in Z$
$-5 < x \leq 4$
$-3 < y < 5$
$\Rightarrow \min(x + y) = ?$
-7

PUZA YAYINLARI

10. $x, y \in R$
$(x - y) \in Z$
$-6 < x < 4$
$-3 < y < 5$
$\Rightarrow \max(x - y) = ?$
6

11. $x, y \in Z$
$-3 < x < 5$
$-2 < y < 4$
$\Rightarrow \max(2x + y) = ?$
11

12. $x, y \in Z$
$-2 \leq x < 4$
$-4 \leq y < 3$
$\Rightarrow \max(3x - y) = ?$
13

PUZA YAYINLARI

13. $x, y \in R$
$(x - 2y) \in Z$
$-4 < x \leq 5$
$-9 \leq y \leq 4$
$\Rightarrow \min(x - 2y) = ?$
-11

ÖRNEK SORU TÜRLERİ ÖRNEK SORU TÜRLERİ

1. $3(x-1)+2x<x-11$

$\Rightarrow$ S.S. = ?

$(-\infty, -2)$

2. $x \in Z$

$\frac{x+2}{3}-\frac{1}{6}>\frac{x-1}{2}$

$\Rightarrow$ max(x) = ?

5

3. $(x-3)\frac{1}{6}<(x-2)\frac{1}{2}$

$\Rightarrow$ S.S. = ?

$\left(\frac{3}{2}, \infty\right)$

4. $-2<\frac{4}{x-3}$

$\Rightarrow$ S.S. = ?

$(-\infty, 1) \cup (3, \infty)$

5. $-2<\frac{2x-1}{3}\leq 2$

$\Rightarrow$ S.S. = ?

$\left(\frac{-5}{2}, \frac{7}{2}\right]$

6. $2x-5<x+8<2x+2$

$\Rightarrow$ S.S. = ?

(6, 13)

7. $a^2 \cdot b>0$

$a^3 \cdot c^2<0$

$a \cdot c<0$

$\Rightarrow$ a, b, c sayılarının işaretleri sırasıyla nedir?

What are the signs of a, b, c respectively?

(−, +, +)

8. $x, y \in R$

$-3<x<5$

$-4<y<2$

$(2x-3y) \in Z$

$\Rightarrow \max(2x-3y) \cdot \min(2x-3y) = ?$

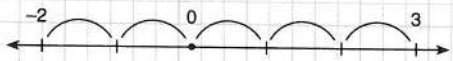
− 231

ÖZELLİK|Property 1

Mutlak Değer | Absolute Value

Bir sayının mutlak değeri, o sayının "0" (sıfıra) olan uzaklığıdır. Mutlak değer, daima pozitif bir sayıdır veya sıfırdır.

The absolute volue of a number is the distance from the number to the zero on the number line. The absolute volue is always positive or zero.



$|-2| = 2$ $|3| = 3$

1. $|-4| + |6 - |-2|| = ?$ 8

2. $|-4| - |-3| + |5| = ?$ 6

3. $|6 - |4 - |-2|| = ?$ 4

4. $\left|\frac{|7|-|-1|}{8-|-10|}\right| = ?$ 3

5. $\frac{|1-|-3|+2|}{|6-2|} = ?$ 0

6. $|8 - |-3| - 6| = ?$ 1

7. $|2 - |-6|| + |-2-3| = ?$ 9

8. $|1 - 2 \cdot |-3|| - |-2| = ?$ 3

9. $\frac{|1-|-4||}{|8-2\cdot|3||} = ?$ $\frac{3}{2}$

10. $|6 - 4 \cdot |-3| + 1| = ?$ 5

11. $3 - |1 - 2 \cdot |-2|| = ?$ 0

12. $|3^{-1} - 4^{-1}| = ?$ $\frac{1}{12}$

13. $|6 - 3 - |-2| \cdot 3| = ?$ 3

ÖZELLİK|Property 2

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$

Pozitif ifadeler mutlak değerden değişiklik olmadan çıkar. Negatif ifadeler, işaret değiştirerek pozitif çıkar.

Positive expressions are taken out of the absolute value without any modification. Negative expressions change signs and become positive.

$x < 0 < y$

- $|y| = y$
- $|x| = -x$
- $|-y| = y$
- $|-x| = -x$
- $|x - y| = y - x$
- $|y - x| = y - x$

1. $x < 0$

$\Rightarrow |x| - 3x = ?$

$-4x$

2. $x > 1$

$\Rightarrow |x - 1| = ?$

$x - 1$

3. $x < -2$

$\Rightarrow |2 + x| = ?$

$-x - 2$

4. $x < 0$

$\Rightarrow |x| + |-x| = ?$

$-2x$

5. $x > 1$

$\Rightarrow |1 - x| + |x + 2| = ?$

$2x + 1$

6. $0 < x < 3$

$\Rightarrow |x - 3| + |4 - x| = ?$

$7 - 2x$

7. $x < y < z$

$\Rightarrow |x - y| + |z - x| = ?$

$y + z - 2x$

8. $x < 0 < y$

$\Rightarrow |y - x| + |-y| = ?$

$2y - x$

9. $x < 0 < y$

$\Rightarrow |x - 3y| + |-x| - |-y| = ?$

$2y - 2x$

10. $||2 - x| + 4 - |x - 2|| = ?$

4

11. $a < 0 < b$

$\Rightarrow |a - b| + |2a - b| - |-b| = ?$

$b - 3a$

12. $-2 < x < 5$

$\Rightarrow |x + 2| - |5 - x| = ?$

$2x - 3$

13. $x < y < 0 < z$

$\Rightarrow |x - y| + |z| - |-x| - |y - z| = ?$

$2y$

ÖZELLİK|Property 3

- $|x| \geq 0$
  $|x| = 0 \Leftrightarrow x = 0$
- $a \in R^+$
  $|x| = a \Rightarrow x = a$
  $x = -a$
- $a \in R^-$
  $|x| = a \Rightarrow S.S. = \emptyset$

1. $|x| = 6$
$\Rightarrow S.S. = ?$

$\{-6, 6\}$

2. $|x| = -2$
$\Rightarrow S.S. = ?$

$\emptyset$

3. $|x - 1| = 0$
$\Rightarrow S.S. = ?$

1

4. $|x - 2| = 3$
$\Rightarrow S.S. = ?$

$\{-1, 5\}$

5. $|x + 1| = 2$
$\Rightarrow S.S. = ?$

$\{1, -3\}$

6. $|2x - 3| = -6$
$\Rightarrow S.S. = ?$

$\emptyset$

7. $\left|\frac{x-1}{3}\right| = 2$
$\Rightarrow S.S. = ?$

$\{7, -5\}$

8. $||x - 2| - 3| = 4$
$\Rightarrow S.S. = ?$

$\{-5, 9\}$

9. $||2x + 1| + 2| = 6$
$\Rightarrow S.S. = ?$

$\left\{\frac{-5}{2}, \frac{3}{2}\right\}$

10. $||x - 5| + 8| = 2$
$\Rightarrow S.S. = ?$

$\emptyset$

11. $||x - 1| - 3| = -4$
$\Rightarrow S.S. = ?$

$\emptyset$

12. $||x - 1| - 4| = 2$
$\Rightarrow S.S. = ?$

$\{-5, -1, 3, 7\}$

13. $||x| - 3| = 4$
$\Rightarrow S.S. = ?$

$\{-7, 7\}$

ÖZELLİK|Property 4

- $|x| = |-x|$
- $|x-y| = |y-x|$
- $|x \cdot y| = |x| \cdot |y|$
- $\left|\frac{x}{y}\right| = \frac{|x|}{|y|}$
- $|x^n| = |x|^n$

1. $|x| + |x| = 4$
$\Rightarrow$ S.S. = ?
{−2, 2}

2. $|3x| - |x| = 6$
$\Rightarrow$ S.S. = ?
{−3, 3}

3. $|-2x| + |-x| = 12$
$\Rightarrow$ S.S. = ?
{−4, 4}

4. $|-2x| + |x| = 9$
$\Rightarrow$ S.S. = ?
{−3, 3}

5. $|x-2| + |2-x| = 10$
$\Rightarrow$ S.S. = ?
{−3, 7}

6. $|2x-6| + |x-3| = 9$
$\Rightarrow$ S.S. = ?
{0, 6}

7. $|2x+2| + |x+1| = 3$
$\Rightarrow$ S.S. = ?
{−2, 0}

8. $|x+1| + |3x+3| - |2x+2| = 8$
$\Rightarrow$ S.S. = ?
{−5, 3}

9. $\frac{|x|+|-x|}{|x|} = ?$
$\Rightarrow$ S.S. = ?
{2}

10. $\frac{|-2x|-|x|}{|3x|+|-x|} = ?$
$\Rightarrow$ S.S. = ?
$\left\{\frac{1}{4}\right\}$

11. $\frac{|2-x|-|3x-6|}{|2x-4|} = ?$
$\Rightarrow$ S.S. = ?
{−1}

12. $\frac{|4x+4|-|x+1|}{|2x+2|} = ?$
$\Rightarrow$ S.S. = ?
$\left\{\frac{3}{2}\right\}$

13. $\frac{3|x-3|}{3-x} + 2 = |x-3|$
$\Rightarrow$ S.S. = ?
{−2}

ÖZELLİK | Property 5

■ $x, y \in R$

$|x| = |y|$

$\Rightarrow x = y$ veya *(or)* $x = -y$

■ $|A(x)| + |B(y)| = 0$

$\Rightarrow A(x) = 0$ ve *(and)* $B(y) = 0$

1. $|x-1| = |2x+1|$

$\Rightarrow$ S.S. = ?

$\{-2, 0\}$

2. $|x+4| = |x|$

$\Rightarrow$ S.S. = ?

-2

3. $|3x-4| = |x-6|$

$\Rightarrow$ S.S. = ?

$\left\{-1, \frac{5}{2}\right\}$

4. $|x-1| = |-x+1|$

$\Rightarrow$ S.S. = ?

R

5. $|2x-1| = |x+3|$

$\Rightarrow$ S.S. = ?

$\left\{4, -\frac{2}{3}\right\}$

6. $|x-2| + |y| = 0$

$\Rightarrow x + y = ?$

2

7. $|x-3| + |y-2| = 0$

$\Rightarrow x \cdot y = ?$

6

8. $|x+y-5| + |y-1| = 0$

$\Rightarrow x \cdot y = ?$

4

9. $|5x+4| = -|2x+6|$

$\Rightarrow$ S.S. = ?

Ø

10. $|x^2-4| = |x+2|$

$\Rightarrow$ S.S. = ?

$\{-2, 1, 3\}$

11. $|x^2-9| = |x-3|$

$\Rightarrow$ S.S. = ?

$\{-4, -2, 3\}$

12. $2|x-1| = |x^2-3x+2|$

$\Rightarrow$ S.S. = ?

$\{0, 1, 4\}$

13. $|x^2-1| = |x^2+5x+4|$

$\Rightarrow$ S.S. = ?

$\left\{-\frac{3}{2}, -1\right\}$

ÖZELLİK|Property 6

Mutlak değerli denklemler ifadenin kritik noktasına göre parçalara ayrılarak çözüm yapılır.

Equations with absolute values are divided into parts according to the critical value of the expression and solution is performed.

$$|x| = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$$ (kritik nokta 0) *(critical point is 0)*

$$|x-2| = \begin{cases} x-2 & x \geq 2 \\ -x+2 & x < 2 \end{cases}$$ (kritik nokta 2) *(critical point is 2)*

1. $|x-6| = x-2$
$\Rightarrow$ S.S. = ? — {4}

2. $|x-6| = 2x-3$
$\Rightarrow$ S.S. = ? — {3}

3. $|2x+6| = x-4$
$\Rightarrow$ S.S. = ? — Ø

4. $|x-8| = 2x$
$\Rightarrow$ S.S. = ? — $\left\{\frac{8}{3}\right\}$

5. $|2x-4| = x+6$
$\Rightarrow$ S.S. = ? — $\left\{-\frac{2}{3}, 10\right\}$

6. $|x-6| = 2x+10$
$\Rightarrow$ S.S. = ? — $\left\{-\frac{4}{3}\right\}$

7. $|x| = 2x-4$
$\Rightarrow$ S.S. = ? — {4}

8. $|x+2| + |x-4| = 6$
$\Rightarrow$ S.S. = ? — [–2, 4]

9. $|x-1| + |x+6| = 7$
$\Rightarrow x$ = ? — [– 6, 1]

10. $|x-4| + |x+8| = 12$
$\Rightarrow$ S.S. = ? — [– 8, 4]

11. $|x-3| + |x+5| = 12$
$\Rightarrow$ S.S. = ? — {– 7, 5}

12. $|x-2| + |x+6| = 10$
$\Rightarrow$ S.S. = ? — {–7, 3}

13. $|x-2| + |x+4| = 4$
$\Rightarrow$ S.S. = ? — Ø

ÖZELLİK|Property 7

$$\sqrt[n]{x^n} = \begin{cases} x & n \text{ tek ise } (\textit{if } n \textit{ is odd}) \\ |x| & n \text{ çift ise } (\textit{if } n \textit{ is even}) \end{cases}$$

Kökün derecesi çift ise sonuç daima pozitiftir.

If the power of the radical is even than the result is always positive.

1. $x < 0$

$\Rightarrow \sqrt{x^2} = ?$

$-x$

2. $x < 0 < y$

$\Rightarrow \sqrt{x^2} + \sqrt[4]{y^4} = ?$

$y - x$

3. $x > 0$

$\Rightarrow \sqrt[3]{(-x)^3} = ?$

$-x$

4. $x < 0 < y$

$\Rightarrow \sqrt{(x-y)^2} = ?$

$y - x$

5. $x < 0 < y$

$\Rightarrow \sqrt{x^2} + \sqrt{y^2} = ?$

$y - x$

6. $x < 0 < y$

$\Rightarrow \sqrt[3]{(-x)^3} + \sqrt{(x-y)^2} = ?$

$y - 2x$

7. $0 < x < 3$

$\Rightarrow \sqrt{x^2 - 8x + 16} + \sqrt[4]{x^4} = ?$

4

8. $1 < x < 3$

$\Rightarrow \sqrt{x^2 - 2x + 1} + \sqrt{x^2 - 6x + 9} = ?$

2

9. $b < 0 < a$

$\Rightarrow \sqrt{a^2 - 2ab + b^2} + \sqrt{b^2} = ?$

$a - 2b$

10. $a = \sqrt{3} + 1$

$b = \sqrt{3} - 2$

$\Rightarrow \sqrt{(b-a)^2} = ?$

3

11. $3 < x < 4$

$\Rightarrow \sqrt{x^2 - 5x + 5 + \sqrt{x^2 - 8x + 16}} = ?$

$x - 3$

12. $1 < x < 2$

$\Rightarrow \sqrt{x^2 - x - 1 + \sqrt{x^2 - 4x + 4}} = ?$

$x - 1$

13. $1 < x < 3$

$\Rightarrow \sqrt{x^2 - x - 2 + \sqrt{x^2 - 6x + 9}} = ?$

$x - 1$

ÖZELLİK|Property 8

Eşitsizlik Denklemleri | Inequality Equations

- $a \in R^+$ $|x| < a \Rightarrow -a < x < a$
  $|x| \le a \Rightarrow -a \le x \le a$
  $a \in R^-$ $|x| < a \Rightarrow$ S.S. = Ø
  $|x| \le a \Rightarrow$ S.S. = Ø

- $a \in R^+$ $|x| > a \Rightarrow x > a$ veya *(or)* $x < -a$
  $|x| \ge a \Rightarrow x \ge a$ veya *(or)* $x \le -a$
  $a \in R^-$ $|x| > a \Rightarrow$ S.S. = R
  $|x| \ge a \Rightarrow$ S.S. = R

1. $|x-2| < 3$
$\Rightarrow$ S.S. = ?

(–1, 5)

2. $|x-1| \le 2$
$\Rightarrow$ S.S. = ?

[–1, 3]

3. $|2x-1| < 3$
$\Rightarrow$ S.S. = ?

(–1, 2)

4. $|3x-6| < -2$
$\Rightarrow$ S.S. = ?

Ø

5. $|x| > 3$
$\Rightarrow$ S.S. = ?

$(-\infty, -3) \cup (3, \infty)$

6. $|x-2| \ge 2$
$\Rightarrow$ S.S. = ?

$(-\infty, 0] \cup [4, \infty)$

7. $|x-5| \ge -3$
$\Rightarrow$ S.S. = ?

R

8. $|2x-2| > 4$
$\Rightarrow$ S.S. = ?

$R \setminus [-1, 3]$

9. $1 < |x| < 3$
$\Rightarrow$ S.S. = ?

$(-3, -1) \cup (1, 3)$

10. $-9 < |x+3| < -3$
$\Rightarrow$ S.S. = ?

Ø

11. $-2 < |x-3| < 4$
$\Rightarrow$ S.S. = ?

(–1, 7)

12. $|x-3| > 0$
$\Rightarrow$ S.S. = ?

$R - \{3\}$

13. $|x| > x$
$|x-1| < 3$
$\Rightarrow$ S.S. = ?

(–2, 0)

ÖRNEK SORU TÜRLERİ ÖRNEK SORU TÜRLERİ

1. $\big||2-|-3||-|5-|-3|\big| = ?$

1

2. $|3-|-2|-2\cdot 6-|-4|| = ?$

15

3. $-1 < x < 4$

$\Rightarrow |x-4|+|2x+2| = ?$

$x+6$

4. $x < |x|$

$\Rightarrow |x|+|-2x| = ?$

$-3x$

5. $\dfrac{|x-3|}{2} = 2$

$\Rightarrow$ S.S. = ?

{–1, 7}

6. $||x|-6| = 2$

$\Rightarrow$ S.S. = ?

{– 8, – 4, 4, 8}

7. $|3x+6|-|x+2| = 12$

$\Rightarrow$ S.S. = ?

{– 8, 4}

8. $2|x-1|+2 = \dfrac{|1-x|}{x-1}$

$\Rightarrow$ S.S. = ?

Ø

ÖRNEK SORU TÜRLERİ ÖRNEK SORU TÜRLERİ

9. $|2x-5| = |x-7|$

$\Rightarrow$ S.S. = ?

$\{-2, 4\}$

10. $|x-y-7| + |x+y-15| = 0$

$\Rightarrow x \cdot y = ?$

44

11. $x-2 = \sqrt{x^2-8}$

$\Rightarrow x = ?$

3

12. $x-3 = \sqrt{x^2+3}$

$\Rightarrow x = ?$

Ø

13. $|x| = 2x+4$

$\Rightarrow$ S.S. = ?

$\left\{-\frac{4}{3}\right\}$

14. $|x-1| + |x+7| = 10$

$\Rightarrow x = ?$

$\{-8, 2\}$

15. $x \in Z$

$|x^2-1| < 3$

$\Rightarrow$ S.S. = ?

$(-2, 2)$

16. $x \in R$

$A = \frac{36}{|x-2|+|3x-12|}$

$\Rightarrow \max(A) = ?$

18

1. $x \in Z$

$3x + 7 \leq -6$

$\Rightarrow \max(x) = ?$

A) -6 B) -5 C) -4 D) -3 E) -2

2. $x \in Z$

$2(x - 5) + 3x > 4x + 11$

$\Rightarrow \min(x) = ?$

A) 20 B) 21 C) 22 D) 23 E) 24

3. $x \in Z$

$8x - 4 > 6$

$\Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $x \in Z$

$3(x - 1) + x - 5 \leq 2x - 11$

$\Rightarrow \max(x) = ?$

A) -3 B) -2 C) -1 D) 0 E) 1

5. $x \in Z$

$5(x + 2) + 3(x - 4) < 2(2x + 6)$

$\Rightarrow \max(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $x \in Z$

$4(x + 1) + 2x \geq 3(x - 1)$

$\Rightarrow \min(x) = ?$

A) -6 B) -5 C) -4 D) -2 E) -1

7. $3(x + 2) > 2(x - 7) + 1$

$\Rightarrow$ S.S. = ?

A) $[-19, +\infty)$ B) $(-21, +\infty)$ C) $(-19, +\infty)$

D) $[-12, +\infty)$ E) $(-\infty, 10]$

8. $4(x - 3) + 2(2 - x) < 4$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 2)$ B) $(-\infty, 6)$ C) $(2, 6)$

D) $(6, \infty)$ E) $(2, \infty)$

9. $7(x-3)+4 \geq 5(x-2)+3$

$\Rightarrow$ S.S. = ?

A) $(12, \infty)$ B) $[6, \infty)$ C) $[12, \infty)$

D) $[5, \infty)$ E) $(-\infty, -5]$

10. $3(x+1)+2x < 6(x-2)+4$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 11)$ B) $(1, \infty)$ C) $(-\infty, 1)$

D) $(11, \infty)$ E) $[1, \infty)$

11. $2(x+1)+3x \geq 5(x-7)+1$

$\Rightarrow$ S.S. = ?

A) $\emptyset$ B) $\{5\}$ C) $\{-36\}$

D) R E) $R \setminus \{5\}$

12. $3(x-2)-2x < x-15$

$\Rightarrow$ S.S. = ?

A) $R \setminus \{1\}$ B) $R \setminus \{9\}$ C) $\{9\}$

D) R E) $\emptyset$

13. $4(1-x)+3(2-3x) > 5(2-7x)$

$\Rightarrow$ S.S. = ?

A) $\emptyset$ B) R^+ C) $[1, \infty)$

D) $(-\infty, 1)$ E) $\left\{\frac{13}{14}\right\}$

14. $5(2x-1)-4x < 3(2x-3)$

$\Rightarrow$ S.S. = ?

A) $\emptyset$ B) R C) $[2, \infty)$

D) $(2, \infty)$ E) $\left(-\infty, -\frac{7}{8}\right)$

15. $\frac{3x+2}{2} - \frac{x}{3} < x + \frac{x}{6}$

$\Rightarrow$ S.S. = ?

A) $\emptyset$ B) $(0, 1)$ C) $R \setminus \{1\}$

D) R^+ E) R

16. $\frac{2-x}{5} > \frac{3x+1}{-15}$

$\Rightarrow$ S.S. = ?

A) $\emptyset$ B) $(-6, 1)$ C) $(-6, 1]$

D) R E) R^-

1. $\frac{1-3x}{2} \geq x-7$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 3]$ B) $(-\infty, 3)$ C) $(3, +\infty)$

D) $[3, +\infty)$ E) $[5, +\infty)$

2. $\frac{2+3x}{4} \leq x+4$

$\Rightarrow$ S.S. = ?

A) $[2, \infty)$ B) $[2, 7]$ C) $(-14, \infty)$

D) $[-14, \infty)$ E) $[7, 14]$

3. $\frac{x-2}{3} < \frac{x+2}{2}$

$\Rightarrow$ S.S. = ?

A) $[10, \infty)$ B) $(10, \infty)$ C) $(-\infty, -10)$

D) $(-10, 10)$ E) $(-10, \infty)$

4. $\frac{3x-2}{-2} \leq 4-x$

$\Rightarrow$ S.S. = ?

A) Ø B) $[-6, \infty)$ C) $[-3, 8)$

D) $[-3, \infty)$ E) $(1, \infty)$

5. $\frac{2x-1}{-3} \geq x-8$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 5]$ B) $(-\infty, 5)$ C) $(5, +\infty)$

D) $[5, +\infty)$ E) $R \setminus \{5\}$

6. $\frac{x-2}{3} - \frac{x}{4} < \frac{x}{12}$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $\left(-\infty, \frac{4}{3}\right)$

D) $(-\infty, 1)$ E) $\left(\frac{4}{3}, \infty\right)$

7. $\frac{1}{6}(2x-3) < \frac{1}{3} - \frac{x+5}{2}$

$\Rightarrow$ S.S. = ?

A) $(-\infty, -2)$ B) $(-2, +\infty)$ C) $(3, 17)$

D) $(5, +\infty)$ E) $(-\infty, -1)$

8. $\frac{3-x}{-3} < \frac{2x-1}{6}$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $(2, \infty)$

D) $(-\infty, 2)$ E) $\left(\frac{1}{2}, \infty\right)$

9. $5 < \frac{2x-1}{3} \leq 7$

$\Rightarrow$ S.S. = ?

A) (5, 7] B) (8, 11] C) (16, 22]

D) $\left[\frac{15}{2}, \frac{21}{2}\right)$ E) [10, 19)

10. $5 < \frac{x-3}{2} \leq 7$

$\Rightarrow$ S.S. = ?

A) (10, 14] B) (13, 17] C) [5, 7)

D) (7, 10] E) [11, 19)

11. $-3 \leq \frac{3(x-2)}{4} \leq 0$

$\Rightarrow$ S.S. = ?

A) [0, 4] B) [1, 3] C) $\left[\frac{1}{4}, \frac{3}{4}\right]$

D) [– 2, 2] E) $\left[\frac{1}{3}, \frac{4}{3}\right]$

12. $2 < \frac{2x+4}{3} < \frac{14}{3}$

$\Rightarrow$ S.S. = ?

A) (0, 5) B) (1, 6) C) (1, 5)

D) $\left(\frac{1}{3}, \frac{7}{3}\right)$ E) (2, 6)

13. $-\frac{7}{2} < \frac{3x-4}{2} \leq 4$

$\Rightarrow$ S.S. = ?

A) [– 2, 3] B) (– 2, ∞) C) (– 1, 4]

D) $\left(5, \frac{13}{2}\right]$ E) (2, 3]

14. $x - 7 < 2x + 1 < x + 4$

$\Rightarrow$ S.S. = ?

A) (– ∞, 3) B) (– 8, 3) C) R \ (– 8, 3)

D) Ø E) R

15. $2x + 1 < 3x + 5 \leq 2x + 9$

$\Rightarrow$ S.S. = ?

A) (– 4, 4] B) R \ [– 4, 4) C) [– 4, 4)

D) Ø E) R

16. $3x - 2 < x + 6 \leq 2x - 4$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) R \ [4, 10)

D) [2, 4) E) R \ [2, 4)

1. $\frac{x}{x-1}+2(x+2)>\frac{1}{x-1}+2x$

$\Rightarrow$ S.S. = ?

A) Ø B) $[5, +\infty)$ C) $R \setminus \{0\}$

D) R E) $R \setminus \{1\}$

2. $\frac{5}{x-3}+3(x-1)\geq\frac{x+2}{x-3}+x$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $[2, \infty)$

D) $[2, \infty) \setminus \{3\}$ E) $R \setminus \{3\}$

3. $\frac{x}{x-4}+3(x-2)>\frac{4}{x-4}+2(x-1)$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $(1, \infty)$

D) $(1, \infty) \setminus \{4\}$ E) $(3, \infty) \setminus \{4\}$

4. $\frac{x}{x-13}+\frac{2}{x-1}-1<\frac{13}{x-13}+\frac{x+1}{x-1}$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $R \setminus \{13\}$

D) $R \setminus \{1\}$ E) $R \setminus \{1, 13\}$

5. $\frac{x}{x-12}+\frac{3}{x-3}<\frac{12}{x-12}+\frac{x}{x-3}+3$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) $R \setminus \{3, 12\}$

D) (3, 12) E) $(12, \infty)$

6. $x > 2$

$\frac{3}{x-2}>\frac{4}{x-1}$

$\Rightarrow$ S.S. = ?

A) $(2, \infty)$ B) $[3, \infty)$ C) (2, 5)

D) $(5, \infty)$ E) $(1, \infty)$

7. $\frac{2}{x-3}>\frac{1}{4}$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 11)$ B) $(11, +\infty)$ C) (3, 11)

D) $(3, +\infty)$ E) [3, 11]

8. $\frac{1}{4}<\frac{3}{x-2}$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 14)$ B) $(14, \infty)$ C) (2, 14)

D) $(-\infty, 14) \setminus \{2\}$ E) Ø

9. $\frac{5}{x-2} \leq \frac{-5}{7}$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 2)$ B) $[-5, 2]$ C) $(-5, 2)$

D) $[-5, 2)$ E) $(-5, +\infty)$

10. $-\frac{7}{4} < \frac{7}{x-5}$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 1)$ B) $(-1, 1)$ C) $(-\infty, 1) \cup (5, \infty)$

D) $(5, \infty)$ E) $\emptyset$

11. $y = 2x - 4$

$-2 < x < 6$

$\Rightarrow ? < y < ?$

A) $-2 < y < 6$ B) $-12 < y < 4$ C) $-8 < y < 8$

D) $2 < y < 8$ E) $-2 < y < 8$

12. $2 < x < 7$

$3x = y + 4$

$\Rightarrow ? < y < ?$

A) $2 < y < 7$ B) $2 < y < 14$ C) $6 < y < 21$

D) $6 < y < 17$ E) $2 < y < 17$

13. $x = 2y + 1$

$2 < 2x - 1 < 5$

$\Rightarrow ? < y < ?$

A) $\frac{1}{4} < y < 1$ B) $1 < y < 3$ C) $4 < y < 7$

D) $3 < y < 4$ E) $3 < y < 7$

14. $\left.\begin{array}{l} 3x + 5 < 14 \\ -x + 7 \leq 2 \end{array}\right\} \Rightarrow$ S.S. = ?

A) $(3, 5]$ B) $[3, 5)$ C) R

D) R \ $[3, 5)$ E) $\emptyset$

15. $\left.\begin{array}{l} 2x - 3 \geq 11 \\ x - 4 < 6 \end{array}\right\} \Rightarrow$ S.S. = ?

A) $[2, 4)$ B) $(2, 4)$ C) $[7, 10)$

D) $\emptyset$ E) R

16. $\left.\begin{array}{l} 13 < 3x - 2 \\ 2x - 2 < x - 5 \end{array}\right\} \Rightarrow$ S.S. = ?

A) $\emptyset$ B) R C) R \ $[-3, 5]$

D) $(-\infty, -3)$ E) $(5, \infty)$

1. $a \cdot b > 0$

$a < b$

Aşağıdakilerden hangisi doğrudur?

Which of the followings is true?

A) $\frac{1}{a} < \frac{1}{b}$ B) $\frac{1}{a} > \frac{1}{b}$ C) $a + b > 0$

D) $a + b < 0$ E) $\frac{a}{b} < 0$

2. $\frac{x}{2} - \frac{x-1}{3} < \frac{x}{5}$

$x \in Z$

$\Rightarrow \min(x) = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

3. $x \in R$

$-7 < x < -2$

$\Rightarrow ? < x^2 < ?$

A) $0 < x^2 < 49$ B) $0 < x^2 < 4$

C) $4 < x^2 < 49$ D) $2 < x^2 < 7$

E) $14 < x^2 < 21$

4. $x \in R$

$-3 < x < 5$

$\Rightarrow ? < x^2 < ?$

A) $9 < x^2 < 25$ B) $0 < x^2 < 9$

C) $0 \leq x^2 < 25$ D) $3 < x^2 < 5$

E) $9 \leq x^2 < 25$

5. $x \in R$

$-9 < x < 4$

$\Rightarrow ? < x^2 < ?$

A) $16 < x^2 < 81$ B) $0 \leq x^2 < 16$

C) $0 \leq x^2 < 81$ D) $4 < x^2 < 9$

E) $0 \leq x^2 < 9$

6. $x, y \in R$

$\left.\begin{matrix} -7 < x < 5 \\ -3 < y < 8 \end{matrix}\right\} \Rightarrow ? < x \cdot y < ?$

A) $21 < x \cdot y < 40$ B) $-15 < x \cdot y < 21$

C) $-56 < x \cdot y < 40$ D) $-56 < x \cdot y < 21$

E) $-15 < x \cdot y < 40$

7. $x, y \in R$

$\left.\begin{matrix} -4 < x < 3 \\ -7 < y < 4 \end{matrix}\right\} \Rightarrow ? < x \cdot y < ?$

A) $12 < x \cdot y < 28$ B) $-12 < x \cdot y < 28$

C) $-28 < x \cdot y < 28$ D) $-21 < x \cdot y < 28$

E) $0 < x \cdot y < 28$

8. $x, y \in Z$

$\left.\begin{matrix} -5 < x < -1 \\ -3 < y < 9 \end{matrix}\right\} \Rightarrow \max(x + y) = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

9. $x, y \in R$

$(x + y) \in Z$

$$\left.\begin{array}{l} -5 < x < -1 \\ -3 < y < 9 \end{array}\right\} \Rightarrow \max(x + y) = ?$$

A) 5 B) 6 C) 7 D) 8 E) 9

10. $x, y \in Z$

$$\left.\begin{array}{l} -3 < x < 4 \\ -4 < y < 5 \end{array}\right\} \Rightarrow \max(3x - y) = ?$$

A) 16 B) 12 C) 8 D) 6 E) 2

11. $x, y \in Z$

$$\left.\begin{array}{l} -1 < x < 8 \\ -5 < y < 6 \end{array}\right\} \Rightarrow \min(2x - 5y) = ?$$

A) -31 B) -29 C) -28 D) -26 E) -25

12. $x, y, z \in Z$

$$\left.\begin{array}{l} -2 < x < 4 \\ -1 < y < 3 \\ 2 < z < 8 \end{array}\right\} \Rightarrow \max(x - y + z) = ?$$

A) 13 B) 12 C) 10 D) 8 E) 6

13. $x, y \in Z$

$$\left.\begin{array}{l} -4 < x \leq 4 \\ -3 \leq y < 5 \end{array}\right\} \Rightarrow \max(x - y) = ?$$

A) -1 B) 0 C) 3 D) 6 E) 7

14. $x, y \in Z$

$$\left.\begin{array}{l} -2 < x < 5 \\ -7 < y < 3 \end{array}\right\} \Rightarrow \max(3x - 2y) = ?$$

A) 8 B) 10 C) 18 D) 24 E) 28

15. $x, y \in R$

$(2x - 3y) \in Z$

$$\left.\begin{array}{l} -7 < x < 3 \\ -4 < y < 5 \end{array}\right\} \Rightarrow \min(2x - 3y) = ?$$

A) -30 B) -28 C) -26 D) -24 E) -22

16. $x, y \in R$, $(2x + 3y) \in Z$

$$\left.\begin{array}{l} -4 < x < 3 \\ -2 < y < 4 \end{array}\right\} \Rightarrow \max(2x + 3y) = ?$$

A) 4 B) 6 C) 12 D) 17 E) 18

1. $\left.\begin{array}{l} a \cdot b < 0 \\ a^2 \cdot c < 0 \\ b \cdot c > 0 \end{array}\right\} \Rightarrow (a, b, c) = (?, ?, ?)$

A) $(-, -, -)$ B) $(+, -, -)$ C) $(+, -, +)$
D) $(+, +, +)$ E) $(-, -, +)$

2. $\left.\begin{array}{l} a \cdot b > 0 \\ a \cdot c < 0 \\ b^2 \cdot c > 0 \end{array}\right\} \Rightarrow (a, b, c) = (?, ?, ?)$

A) $(-, -, -)$ B) $(+, -, -)$ C) $(+, -, +)$
D) $(+, +, +)$ E) $(-, -, +)$

3. $\left.\begin{array}{l} a - b < 0 \\ b - c < 0 \\ a \cdot c < 0 \end{array}\right\} \Rightarrow (a, 2a - c, c) = (?, ?, ?)$

A) $(+, +, +)$ B) $(-, -, -)$ C) $(+, -, +)$
D) $(-, -, +)$ E) $(+, +, -)$

4. $\left.\begin{array}{l} x < 0 \\ x = 3y \\ y = \dfrac{z}{4} \end{array}\right\} \Rightarrow ? < ? < ?$

A) $y < x < z$ B) $x < y < z$ C) $z < x < y$
D) $x < z < y$ E) $z < y < x$

5. $a^2 < a$

$\Rightarrow ? < a < ?$

A) $a > 1$ B) $a < -1$ C) $-1 < a < 0$
D) $0 < a$ E) $0 < a < 1$

6. $a < a^3 < a^2$

$\Rightarrow ? < a < ?$

A) $a > 1$ B) $a < -1$ C) $0 < a < 1$
D) $a < 0$ E) $-1 < a < 0$

7. $x < 0$

$a = \dfrac{x}{20}$, $b = \dfrac{x}{30}$, $c = \dfrac{x}{40}$

$\Rightarrow ? > ? > ?$

A) $a > b > c$ B) $c > b > a$ C) $b > a > c$
D) $c > a > b$ E) $b > c > a$

8. $\left(\dfrac{7}{12}\right)^{2x-1} \geq \left(\dfrac{12}{7}\right)^{x+7}$

$\Rightarrow \max(x) = ?$

A) -2 B) -3 C) -4 D) -5 E) -6

9. $x \in Z$

$0 < a < b$

$x = \dfrac{4a+b}{a} \Rightarrow \min(x) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

10. $a < b < 0$

$x = \dfrac{2a+b}{a}$

$\Rightarrow x \in ?$

A) $(-1, 0)$ B) $(0, 1)$ C) $(1, 2)$

D) $(2, 3)$ E) $(3, 4)$

11. $0 < a < b$

$x = \dfrac{3a+b}{a}$

$\Rightarrow x \in ?$

A) $(3, +\infty)$ B) $(4, +\infty)$ C) $(5, +\infty)$

D) $(6, +\infty)$ E) $(7, +\infty)$

12. $\dfrac{4 - \dfrac{2}{x+1}}{x + \dfrac{1}{2}} \geq 3$

$\Rightarrow$ S.S. = ?

A) $\left(-\infty, \dfrac{1}{3}\right)$ B) $[10, \infty)$

C) $(-\infty, 1] \setminus \{-1\}$ D) $\left(-1, \dfrac{1}{3}\right] \setminus \left\{-\dfrac{1}{2}\right\}$

E) $\left(-\infty, \dfrac{1}{3}\right] \setminus \left\{-1, -\dfrac{1}{2}\right\}$

13. $\dfrac{\dfrac{3}{x-1} + 2}{x - 1 + \dfrac{3}{2}} > 2$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 2)$ B) $(3, 8)$ C) $(1, 2)$

D) $\emptyset$ E) $(1, 5)$

14. $x \in R$

$-3 < x < 6$

$A = x^2 - 2x$

$\Rightarrow ? < A < ?$

A) $12 < A < 24$ B) $-1 \leq A < 24$

C) $-12 < A < 24$ D) $-9 \leq A < 13$

E) $15 < A < 48$

15. $-6 < x < 3$

$A = x^2 - 6x$

$\Rightarrow ? < A < ?$

A) $-9 < A < 0$ B) $-9 < A < 9$

C) $-9 < A < 72$ D) $-18 < A < 72$

E) $18 < A < 72$

16. $A = \dfrac{2x-6}{x-4}$

$5 < x < 9$

$\Rightarrow ? < A < ?$

A) $\left(\dfrac{2}{5}, 2\right)$ B) $(1, 5)$ C) $(1, 4)$

D) $\left(\dfrac{3}{2}, \dfrac{8}{3}\right)$ E) $\left(\dfrac{12}{5}, 4\right)$

1. $\frac{|-6|}{-|3|}+\frac{-|-4|}{|-2|}=?$

A) -4 B) 0 C) 2 D) 4 E) 6

2. $\frac{-|-12|}{|-2|}-\frac{|-2|}{-2}=?$

A) 6 B) 3 C) -3 D) -5 E) -6

3. $\frac{|2|-|-3|+|-7|}{|5-|-3||}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

4. $\Big|14-\big|3-|5-|7|\big|\Big|=?$

A) 4 B) 6 C) 7 D) 10 E) 13

5. $\frac{||-7|-|2||}{|3|}+\frac{|-6+|-2||}{-|4|}=?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 2 D) 4 E) 5

6. $\frac{|-3|-|-4|+|11|}{||-7|-2|}=?$

A) 1 B) 2 C) $\frac{5}{2}$ D) 4 E) 5

7. $x < 0$

$\Rightarrow |3x| + 2x = ?$

A) $5x$ B) $3x$ C) x D) $-x$ E) $-5x$

8. $-1 < x < 4$

$\Rightarrow |x+1| + |x-4| = ?$

A) -1 B) 1 C) 5 D) $2x-3$ E) $12x+5$

9. $3 < x < 10$

$\Rightarrow |1-x| + |20-x| = ?$

A) $21-2x$ B) 21 C) 19

D) $2x-21$ E) $2x$

10. $0 < x < 4$

$\Rightarrow |x-7| + |-x| + |2x-9| = ?$

A) $4x-16$ B) $2-2x$ C) $16-2x$

D) 2 E) $2-x$

11. $x < y < 0$

$\Rightarrow |2x-y| + |-3x| + |-y| = ?$

A) $5x$ B) $2y-x$ C) $5x-2y$

D) $-x$ E) $-5x$

12. $a < 0 < b$

$\Rightarrow \big||a-b| - |b-a|\big| = ?$

A) $2a-2b$ B) $2b-2a$ C) 0

D) $a-b$ E) $b-a$

13. $x < 0 < y$

$\Rightarrow |x-2y| + |-y| - |-x| = ?$

A) $3y$ B) $-x$ C) $x-2y$

D) $2y-x$ E) $3y-2x$

14. $x < y < z$

$\Rightarrow |x-y| + |y-z| - |z-x| = ?$

A) $2z-2x$ B) 0 C) $2x-2z$

D) $2y-2x$ E) $2x-2y$

15. $x < 0 < y$

$\Rightarrow |y| + |x| + |x-y| = ?$

A) $2x-y$ B) $2x$ C) 0

D) $y-x$ E) $2y-2x$

16. $x < 0$

$\Rightarrow |-x| + |x| - |2x-7| = ?$

A) -7 B) $-4x-7$ C) $4x+7$

D) $2x+7$ E) 7

1. $x < 0 < y$

$\Rightarrow |3x - y| + |3y - x| = ?$

A) $2(x + y)$ B) $2(x - y)$ C) $2(y - x)$

D) $4(x - y)$ E) $4(y - x)$

2. $x < 0$

$\Rightarrow |4x - |-7x|| = ?$

A) $-11x$ B) $-3x$ C) x D) $3x$ E) $11x$

3. $a < 0 < b < c$

$\Rightarrow |b + c| + |a| - |a - b| - |c - a| = ?$

A) a B) b C) c D) $-a$ E) $-b$

4. $a < b < 0 < c$

$\Rightarrow |a + b| + |c| + |a - b| - |-a| = ?$

A) $c - a$ B) $c - 3a$ C) $2b + c - a$

D) $c - a - 2b$ E) $2b + c$

5. $x < y < z$

$\Rightarrow |2x - 2y| + |y - z| - |x - z| = ?$

A) $3y - 3x$ B) $2x$ C) $y - x$

D) $2z - 2x$ E) $z - x$

6. $a < 0 < b$

$\Rightarrow |b - a| + |a - 2b| - |a| + |-b| = ?$

A) $4b - a$ B) $a - 2b$ C) $2b - a$

D) $-2b - a$ E) $a - 4b$

7. $a < b < 0 < c$

$\Rightarrow |c - a - b| + |a - b| + |a + b| - |-c| = ?$

A) $-b - a$ B) $2c$ C) $-3a - b$

D) $-3a - 2b$ E) 0

8. $a < 0 < b$

$\Rightarrow |a - b + |b - a|| = ?$

A) a B) b C) 0

D) $2b - 2a$ E) $2a - 2b$

9. $x < 0$

$\Rightarrow \big||-x| - |3x| + 2x\big| = ?$

A) $5x$ B) $4x$ C) $-3x$ D) $-4x$ E) $-5x$

10. $x < 0 < y$

$\Rightarrow \big|-|2x-y| - |-y|\big| = ?$

A) $2x$ B) $-2y$ C) $-2x+2y$

D) $2x+2y$ E) y

11. $x < 0 < y$

$\Rightarrow \big||x-y| + |-x|\big| - |y| = ?$

A) $-2y$ B) $2y-2x$ C) $-2x$

D) $2x$ E) $2y$

12. $x < 0 < y$

$\Rightarrow |x-|x-y|| + |2y| - |-2x| = ?$

A) $3y$ B) $2x$ C) $3y-3x$

D) $2y-x$ E) x

13. $\big||5-2x| - 7 - |2x-5|\big| = ?$

A) 7 B) $4x-17$ C) $4x+3$

D) $3-4x$ E) $4x$

14. $0 < x < \frac{3}{2}$

$\Rightarrow |3-2x+|2x-3|| = ?$

A) 0 B) $4x-6$ C) $2x-3$

D) $6-4x$ E) $3-2x$

15. $3 < x < 6$

$\big||3-x| - 3\big| = \frac{3}{2}$

$\Rightarrow x = ?$

A) $\frac{9}{4}$ B) 3 C) $\frac{10}{3}$ D) 4 E) $\frac{9}{2}$

16. $a = b-3$

$\Rightarrow |3a-3b| + 2a - 2b = ?$

A) -6 B) -3 C) 3 D) 6 E) 9

1. $|x+1| = 7$

$\Rightarrow$ S.S. = ?

A) $\{6, -6\}$ B) $\{6, 8\}$ C) $\{8, -6\}$ D) $\{6, 5\}$ E) $\{6, -8\}$

2. $|2x-1| = 15$

$\Rightarrow$ S.S. = ?

A) $\{8\}$ B) $\{8, -7\}$ C) $\{7, -8\}$ D) $\{8, -8\}$ E) $\{5, -8\}$

3. $|2x+3| = 7$

$\Rightarrow$ S.S. = ?

A) $\{-5, 2\}$ B) $\{-5, 5\}$ C) $\{2, 5\}$ D) $\{-2, 5\}$ E) $\{-2, -5\}$

4. $|x-3| + |x+y-5| = 0$

$\Rightarrow x \cdot y = ?$

A) 15 B) 12 C) 8 D) 6 E) 3

5. $\left|\frac{x-3}{4}\right| = 3$

$\Rightarrow$ S.S. = ?

A) $\{7, 15\}$ B) $\{-9, -15\}$ C) $\{-9, 15\}$ D) $\{-9, 9\}$ E) $\{-15, 9\}$

6. $\left|\frac{7x-4}{3}\right| = 0$

$\Rightarrow$ S.S. = ?

A) $\left\{\frac{4}{7}\right\}$ B) $\{0\}$ C) $\{1\}$ D) $\emptyset$ E) R

7. $|3x-1| + |x-7| = 0$

$\Rightarrow$ S.S. = ?

A) $\{7\}$ B) $\left\{-\frac{1}{3}\right\}$ C) $\left\{-\frac{1}{3}, 7\right\}$ D) R E) $\emptyset$

8. $\left|\frac{2x+3}{5}\right| = 7$

$\Rightarrow$ S.S. = ?

A) $\{16, -19\}$ B) $\{16, -16\}$ C) $\{19, 13\}$ D) $\{13, -5\}$ E) $\{21, 30\}$

9. $\left|\frac{3x+1}{7}\right| = -2$

$\Rightarrow$ S.S. = ?

A) $\{-5\}$ B) $\left\{-5, \frac{13}{3}\right\}$ C) $\emptyset$

D) $\left\{\frac{13}{3}\right\}$ E) $\{-5, 1\}$

10. $|x-5| = -|7-2x|$

$\Rightarrow$ S.S. = ?

A) $\left\{\frac{2}{7}\right\}$ B) $\{4\}$ C) $\{5\}$

D) $\left\{\frac{7}{2}, 5\right\}$ E) $\emptyset$

11. $|x-3| + |2x-y+2| = 0$

$\Rightarrow x + y = ?$

A) -1 B) 2 C) 3 D) 5 E) 11

12. $|x-1| = |2x-3|$

$\Rightarrow$ S.S. = ?

A) $\{1\}$ B) $\left\{\frac{3}{2}\right\}$ C) $\{2\}$

D) $\left\{2, \frac{4}{3}\right\}$ E) $\left\{1, \frac{4}{3}\right\}$

13. $|x-1| - |x-3| = 0$

$\Rightarrow$ S.S. = ?

A) $\{0\}$ B) $x > 2$ C) $x < 2$

D) $\{2\}$ E) $\{-2\}$

14. $|3x+1| = -|x+2|$

$\Rightarrow$ S.S. = ?

A) $\{-2\}$ B) $\left\{-2, -\frac{1}{3}\right\}$ C) $\left\{-\frac{1}{3}\right\}$

D) $\{0\}$ E) $\emptyset$

15. $|2x-1| = |x-8|$

$\Rightarrow$ S.S. = ?

A) $\{3, -7\}$ B) $\{3\}$ C) $\{-7\}$

D) $\{9, -3\}$ E) $\{9, 5\}$

16. $|2x-4| + |y+3| + |x+y-z| = 0$

$\Rightarrow x \cdot y \cdot z = ?$

A) -6 B) -2 C) 4 D) 6 E) 12

1. $|3x| + |-x| + |-2x| = 18$
$\Rightarrow$ S.S. = ?

A) {3} B) {3, – 3} C) {9, – 9}
D) {5, 6} E) {6, 3}

2. $|-x| + |2x| + |-3x| = 12$
$\Rightarrow$ S.S. = ?

A) {– 1, 1} B) {– 1, 2} C) {– 2 , 2}
D) {1, 2} E) {– 3, 2}

3. $||x| - 5| = 3$
$\Rightarrow$ S.S. = ?

A) {8, 2} B) {8, – 8} C) {2, – 2}
D) {8, 2, 5, 3} E) {8, – 8, 2, – 2}

4. $||2x| + 3| = 5$
$\Rightarrow$ S.S. = ?

A) {– 4, 4} B) {– 2, 2} C) {– 1, 1}
D) {– 1, 1, 8} E) {– 8, – 1, 1, 8}

5. $||x - 1| - 3| = 2$
$\Rightarrow$ S.S. = ?

A) {2, 6} B) {0, 2} C) {– 4, 6}
D) {0, 1} E) {– 4, 0, 2, 6}

6. $||2x - 4| + 6| = 2$
$\Rightarrow$ S.S. = ?

A) {– 2, 4} B) {– 4, – 2} C) {4, 8}
D) {– 4, 8} E) Ø

7. $|4 - |2x|| = 2$
$\Rightarrow$ S.S. = ?

A) {– 3, – 1, 1, 3} B) {– 1, 1} C) {– 3, 3}
D) {– 1, 3} E) Ø

8. $||2x - 3| + 5| = 12$
$\Rightarrow$ S.S. = ?

A) Ø B) {5, – 2} C) {– 7, 10}
D) {5, 10} E) {5, – 2, – 7, 10}

9. $||x-2|-5| = 9$

$\Rightarrow$ S.S. = ?

A) {16} B) {16, – 12} C) {– 2, 6}
D) {16, 6} E) {16, – 12, – 2, 6}

10. $||7x-5|+2| = 0$

$\Rightarrow$ S.S. = ?

A) {2, 0} B) {– 2, 0} C) {– 1, 0}
D) $\left\{0, \frac{3}{7}\right\}$ E) Ø

11. $\left|\left|\frac{x-3}{4}\right|-7\right| = 5$

$\Rightarrow$ S.S. = ?

A) {– 5, 11} B) {– 45, 51} C) {– 5, 51}
D) Ø E) {– 45, – 5, 11, 51}

12. $||x-4|-3| = 5$

$\Rightarrow \sum x = ?$

A) – 8 B) – 6 C) 0 D) 5 E) 8

13. $||x+3|-2| = 6$

$\Rightarrow \sum x = ?$

A) – 10 B) – 8 C) – 6 D) – 4 E) – 2

14. $|x^2-4| = |x-2|$

$\Rightarrow$ S.S. = ?

A) {– 1, – 3} B) {– 3, 2} C) {2}
D) {– 1, – 3, 2} E) {5, 4}

15. $|x^2-16| = |x-4|$

$\Rightarrow$ S.S. = ?

A) {– 5} B) {– 5, – 3} C) {– 5, 4}
D) {4} E) {– 5, – 3, 4}

16. $3 \cdot |a-2| = |a^2+a-6|$

$\Rightarrow$ S.S. = ?

A) {0} B) {2} C) {3}
D) {– 6, 0, 2} E) {0, 3}

1. $|-2x| - |x| = 8$

$\Rightarrow$ S.S. = ?

A) $\left\{\frac{-3}{2}, \frac{3}{2}\right\}$ B) $\{-4, 4\}$ C) $\{-8, 8\}$ D) $\{-4, 8\}$ E) $\{0, 8\}$

2. $|-x| + |-2x| + |5x| = 24$

$\Rightarrow$ S.S. = ?

A) $\{-1, 1\}$ B) $\{-2, 2\}$ C) $\{-3, 3\}$ D) $\{-2, 12\}$ E) $\{-2, 8\}$

3. $|x-2| + |2-x| = 12$

$\Rightarrow$ S.S. = ?

A) $\{8\}$ B) $\{-4\}$ C) $\{6, -6\}$ D) $\{8, -4\}$ E) $\{6\}$

4. $|2x-1| + |1-2x| = 10$

$\Rightarrow$ S.S. = ?

A) $\{-3\}$ B) $\{3\}$ C) $\{-2\}$ D) $\{-2, 3\}$ E) $\{-2, 2\}$

5. $|4-2x| + |3x-6| = 5$

$\Rightarrow$ S.S. = ?

A) $\{3\}$ B) $\{3, 1\}$ C) $\{0\}$ D) $\emptyset$ E) $\{1\}$

6. $|x-3| + |9-3x| = 24$

$\Rightarrow$ S.S. = ?

A) $\{3, 6\}$ B) $\{-3, -6\}$ C) $\{9, -3\}$ D) $\{3, 9\}$ E) $\{-3, -9\}$

7. $|3-2x| + |9-6x| - |4x-6| = 14$

$\Rightarrow$ S.S. = ?

A) $\{1\}$ B) $\{-2, 1\}$ C) $\{-2, 5\}$ D) $\{1, 5\}$ E) $\left\{\frac{3}{2}\right\}$

8. $x > 2$

$|2-x| + 3 = 10$

$\Rightarrow x = ?$

A) 9 B) 7 C) 5 D) 3 E) -7

9. $-3 < x < 2$

$|x+3| + |x-2| + a = 13$

$\Rightarrow a = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

10. $x < 0$

$|3x + |x|| + 8 = 2x$

$\Rightarrow$ S.S. = ?

A) Ø B) R C) 2 D) 4 E) 8

11. $-3 < x < 4$

$|2x-9| - |x+4| = 4$

$\Rightarrow x = ?$

A) -2 B) 0 C) $\frac{1}{3}$ D) 2 E) 3

12. $x - y - 2 = 0$,

$a \cdot |y-x| + 3 \cdot |x-y| = 16$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $|x-2| + 3x + 8 = 2$

$\Rightarrow$ S.S. = ?

A) $\{-4\}$ B) $\{-1\}$ C) $\{-4, -1\}$

D) Ø E) $\{2\}$

14. $|x-3| + x = 1$

$\Rightarrow$ S.S. = ?

A) $\{2\}$ B) R C) R^+

D) $[3, +\infty)$ E) Ø

15. $|4-x| - x = 2$

$\Rightarrow$ S.S. = ?

A) $\{0\}$ B) $\{1\}$ C) $\{0, 1\}$

D) $\{-1\}$ E) $\{3\}$

16. $2x - 2 = |x-7| + 3$

$\Rightarrow$ S.S. = ?

A) $\{-2\}$ B) $\{4\}$ C) $\{2, 4\}$

D) Ø E) $\{-2, 4\}$

1. $|x-5| + |x+1| = 10$

$\Rightarrow$ S.S. = ?

A) {7} B) {– 3} C) {5, 1}

D) {5, – 1} E) {7, – 3}

2. $|x-2| + |8-2x| = 20$

$\Rightarrow$ S.S. = ?

A) $\left\{-\frac{10}{3}, 10\right\}$ B) {– 3, 7}

C) {– 10, 10} D) $\left\{-10, -\frac{10}{3}, 10\right\}$

E) {– 2, 6}

3. $|x-3| + |x+2| = 5$

$\Rightarrow$ S.S. = ?

A) {– 2, 3} B) (– 2, 3) C) [– 2, 3]

D) Ø E) R

4. $|x-3| + |x+5| = 8$

$\Rightarrow$ S.S. = ?

A) {– 5} B) {3} C) [– 5, 3]

D) {4} E) {– 4, 4}

5. $|x+4| + |x-3| = 7$

$\Rightarrow$ S.S. = ?

A) [– 4, 3] B) {– 4, 3} C) (– 4, – 3)

D) Ø E) R

6. $|x-4| + |x-3| = 7$

$\Rightarrow \prod x = ?$

A) 0 B) 2 C) 7 D) 12 E) 42

7. $\frac{6\cdot|x-5|}{5-x} + 4 = |x-5|$

$\Rightarrow$ S.S. = ?

A) {– 5} B) {0} C) {5}

D) {– 5, 5} E) Ø

8. $3|x-2| + 7 = \frac{x-2}{|x-2|}$

$\Rightarrow$ S.S. = ?

A) {– 2} B) {2} C) $\left\{0, \frac{14}{3}\right\}$

D) $\left\{\frac{14}{3}\right\}$ E) Ø

9. $\frac{|x^2-x-6|}{|x^2-8x+15|}=1$

$\Rightarrow x = ?$

A) 3 B) 2 C) $\frac{3}{2}$ D) 1 E) -3

10. $x^2-5|x|+6=0$

$\Rightarrow$ S.S. = ?

A) $\{2, 3\}$ B) $\{3, -3\}$ C) $\{2, -2\}$

D) $\{1, 6\}$ E) $\{2, -2, 3, -3\}$

11. $x^2-8|x|+15=0$

$\Rightarrow$ S.S. = ?

A) $\{-3\}$ B) $(-3, 5)$ C) $\{-3, -5\}$

D) $\{-5, -3, 3, 5\}$ E) Ø

12. $x^2+5|x|+6=0$

$\Rightarrow$ S.S. = ?

A) $\{2, -2\}$ B) $\{3, -3\}$ C) $\{2, 3\}$

D) $\{-2, -3\}$ E) Ø

13. $(x+3)^2-|x+3|-6=0$

$\Rightarrow$ S.S. = ?

A) $\{0, -6\}$ B) $\{-5, -1\}$ C) $\{-1, 0\}$

D) Ø E) R

14. $|4^x|-10|2^x|+16=0$

$\Rightarrow$ S.S. = ?

A) $\{2, 8\}$ B) $\{-2, 2, 8, -8\}$ C) $\{1, 3\}$

D) $\{1, -1, 3, -3\}$ E) Ø

15. $x-1=\sqrt{x^2-5}$

$\Rightarrow$ S.S. = ?

A) $\{1\}$ B) $\{3\}$ C) $\{2, 3\}$

D) $\{1, 3\}$ E) Ø

16. $\sqrt{4x^2+3}-2x=1$

$\Rightarrow x = ?$

A) -2 B) -1 C) $\frac{1}{2}$ D) 1 E) 2

1. $x < 0 < y$

$\Rightarrow \sqrt{y^2} + \sqrt{x^2} = ?$

A) $x + y$ B) $-x - y$ C) $y - x$

D) $x - y$ E) $x \cdot y$

2. $x < 0 < y$

$\Rightarrow |-x| - \left(\sqrt{x^2} + \sqrt{y^2}\right) = ?$

A) $-2x$ B) $-y$ C) $y - x$

D) $y - 2x$ E) $2x - y$

3. $x < 0 < y$

$\Rightarrow \sqrt{(x-y)^2} + \sqrt[3]{(x+y)^3} = ?$

A) $-2x$ B) $2y$ C) $2x - 2y$

D) $2y - 2x$ E) 0

4. $x < y < 0$

$\Rightarrow \left|\sqrt{y^2} - \sqrt{x^2}\right| = ?$

A) $x + y$ B) $x - y$ C) $y - x$

D) $-x - y$ E) 0

5. $x < y < 0 < z$

$\Rightarrow \sqrt{(x-y)^2} + \sqrt[3]{x^3} + \sqrt{(-z)^2} + \sqrt[4]{(y-z)^4} = ?$

A) $2z - 2x$ B) 0 C) $x - z$

D) $2z$ E) $2y - 2x$

6. $x < 7$

$\Rightarrow \sqrt{x^2 - 14x + 49} - \sqrt[3]{x^3} = ?$

A) -7 B) 7 C) $2x - 7$

D) $7 - 2x$ E) $2x$

7. $|x| < 3$

$\Rightarrow |2x - 6| - \sqrt{x^2 - 6x + 9} = ?$

A) $x - 3$ B) $3 - x$ C) $3x - 9$

D) $2x - 6$ E) $3x$

8. $b < 0 < a$

$\Rightarrow \sqrt{b^2 - 2ab + a^2} + \sqrt{b^2} - \sqrt{a^2} = ?$

A) $2a$ B) $-2b$ C) $2(b - a)$

D) $2b + 2a$ E) 0

9. $\sqrt{x^2-4x+4}+|4-2x|=6$

$\Rightarrow$ S.S. = ?

A) {0, 2} B) {0, 4} C) (2, 4)
D) (– 2, 2) E) {– 1, 0}

10. $3 < x < 4$

$\Rightarrow \sqrt{x^2-7x+13-\sqrt{x^2-6x+9}}=?$

A) $x-4$ B) $4-x$ C) $3-x$
D) $x+3$ E) 4

11. $2 < x < 3$

$\Rightarrow \sqrt{x^2-3x+1+\sqrt{x^2-6x+9}}=?$

A) $2-x$ B) $x-2$ C) $3-x$
D) $x-3$ E) $x+2$

12. $4 < x < 8$

$\Rightarrow \sqrt{x^2-17x+68+\sqrt{x^2-8x+16}}=?$

A) $x-4$ B) $4-x$ C) $x-8$
D) $8-x$ E) $x+8$

13. $\left.\begin{matrix} x=\sqrt{3}-2 \\ y=\sqrt{3}-1 \end{matrix}\right\} \Rightarrow \sqrt[4]{x^4}+\sqrt{(x-y)^2}=?$

A) $2\sqrt{3}$ B) $3-\sqrt{3}$ C) 1
D) $\sqrt{3}-3$ E) 3

14. $b \in R^+$

$|a-5|=9$

$|b-2|=a$

$\Rightarrow b=?$

A) 12 B) 14 C) 16 D) 18 E) 20

15. $b \in R^-$

$|a-3|=4$

$|b-3|=a$

$\Rightarrow b=?$

A) – 10 B) – 7 C) – 4 D) – 2 E) – 1

16. $a, b \in Z^+$

$a > b$

$|b-a|+|b-1|=10$

$\Rightarrow a=?$

A) 7 B) 8 C) 9 D) 10 E) 11

1. $a < b < 0 < c$

$\Rightarrow \frac{|a \cdot b|}{a \cdot b} + \frac{|b|}{b} + \frac{|c|}{c} - \frac{|a \cdot c|}{a \cdot c} = ?$

A) 4 B) 2 C) 0 D) – 2 E) – 4

2. $a \cdot b \cdot c \neq 0$

$|a| = a$

$|b| = -b$

$|-c| = c$

$\Rightarrow (a, b, c) = (?, ?, ?)$

A) (+, – , –) B) (+, – , +) C) (– , +, +)

D) (– , +, –) E) (+ +, +)

3. $a \cdot b \cdot c \neq 0$

$a < |a|$

$|b| = b$

$|-c| = c$

$\Rightarrow (a, b, c) = (?, ?, ?)$

A) (+, – , –) B) (+, +, +) C) (– , +, –)

D) (– , +, +) E) (+, +, –)

4. $|-a| = -a$

$\Rightarrow |-3a| - |2a| - |-a| = ?$

A) – 4a B) – 3a C) – a D) 0 E) a

5. $|x| = -x$

$|y| = y$

$\Rightarrow |x - y| + |2x - |y|| = ?$

A) – 3x B) 2y C) 3x – 2y

D) 2y – 3x E) y – x

6. $|x| > x$

$\Rightarrow \frac{4|-x| + |2x|}{|-6x| - |3x|} = ?$

A) 6 B) 4 C) 3 D) 2 E) 1

7. $-3 < a < |a|$

$\Rightarrow |a| + |a + 3| = ?$

A) 3a + 3 B) – 3a C) 1

D) 3 E) – 3

8. $a^2 \cdot b^5 < 0$

$a^3 \cdot b < 0$

$\Rightarrow |2a - b| + |a| - |-b| = ?$

A) a B) 3a C) a – b

D) 2b – a E) a – 2b

9. $a \cdot b^5 < 0$

$a \cdot c^2 > 0$

$c - b < 0$

$\Rightarrow |c| - |b - c| + |-a| = ?$

A) $a - b$ B) $b - a$ C) $a - c$

D) $b - c$ E) $c - b$

10. $x^2 < |x|$,

$\Rightarrow |3 - 2x| + |x - 1| = ?$

A) $2 - 2x$ B) $3x - 3$ C) $x + 2$

D) $x - 11$ E) $4 - 3x$

11. $|2x - 4| = 4 - 2x$

$\Rightarrow$ S.S. = ?

A) $\{-2\}$ B) $\{2\}$ C) $[2, \infty)$

D) $(2, \infty)$ E) $(-\infty, 2]$

12. $a \cdot |a| < 0$

$\Rightarrow$ S.S. = ?

A) $\{0\}$ B) $\{1\}$ C) $(1, \infty)$ D) R E) R^-

13. $y < 0$

$|x - y| = y - x$

$\Rightarrow |x| - |y - x| = ?$

A) $2y - x$ B) $y + 2x$ C) x

D) $-x$ E) $-y$

14. $|x - 12| = 12 - x$

$|2x - 10| = 2x - 10$

$\Rightarrow ? \leq x \leq ?$

A) $5 \leq x \leq 20$ B) $5 \leq x \leq 12$ C) $3 \leq x \leq 12$

D) $1 \leq x \leq 10$ E) $5 \leq x \leq 6$

15. $\left.\begin{array}{l} |x - 6| = 6 - x \\ |3x - 12| = 3x - 12 \end{array}\right\} \Rightarrow ? < x < ?$

A) $3 \leq x \leq 6$ B) $4 < x < 6$ C) $6 \leq x \leq 12$

D) $4 \leq x \leq 6$ E) $-4 \leq x \leq 6$

16. $a \cdot |a| < 0$

$\frac{|b|}{b} > 0$

Aşağıdakilerden hangisi yanlıştır?

Which of the following is false?

A) $a - b^2 < 0$ B) $a \cdot b < 0$ C) $a^2 \cdot b > 0$

D) $|a - b| = b - a$ E) $a^3 \cdot b > 0$

1. $|x-1| < 5$

$\Rightarrow$ S.S. = ?

A) $(-6, 6)$ B) $(-5, 5)$ C) $(-4, 6)$

D) $(-6, 4)$ E) $[-4, 4]$

2. $|2x+1| \leq 7$

$\Rightarrow$ S.S. = ?

A) $(-4, 4)$ B) $[-4, 3]$ C) $(3, 7]$

D) $[2, 6]$ E) $[5, 9)$

3. $\left|\frac{3x-1}{2}\right| < -2$

$\Rightarrow$ S.S. = ?

A) R B) $R \setminus \{2\}$ C) $(-1, 1)$

D) $\emptyset$ E) $(-1, 4]$

4. $|x+1| > 3$

$\Rightarrow$ S.S. = ?

A) R B) $\emptyset$ C) $R \setminus [-4, 2]$

D) $R \setminus (-4, 2)$ E) $(-4, 2)$

5. $|2x-1| \geq 7$

$\Rightarrow$ S.S. = ?

A) R B) $\emptyset$ C) $[-3, 4]$

D) $R \setminus (-3, 4)$ E) $R \setminus [-3, 4]$

6. $|2x-10| > 0$

$\Rightarrow$ S.S. = ?

A) $\{5\}$ B) R C) $R \setminus \{0\}$

D) $\emptyset$ E) $R \setminus \{5\}$

7. $|4x+1| > -9$

$\Rightarrow$ S.S. = ?

A) R B) $\emptyset$ C) $R \setminus \left\{-\frac{1}{4}\right\}$

D) $R \setminus \{-9\}$ E) $\left\{-\frac{1}{4}\right\}$

8. $|x-3| \leq 4$

$\Rightarrow$ S.S. = ?

A) $[-4, 4]$ B) $[-7, 7]$ C) $(-3, 3)$

D) $[-1, 7]$ E) $(-7, 1)$

9. $|2x-3| < 5$

$\Rightarrow$ S.S. = ?

A) $\left(-\frac{5}{2}, \frac{5}{2}\right)$ B) $(-4, 4)$ C) $(-1, 4)$

D) $[1, 4]$ E) $\emptyset$

10. $|2x-8| \geq 4$

$\Rightarrow$ S.S. = ?

A) $[2, 6]$ B) $\emptyset$ C) R

D) R \ (2, 6) E) $(2, \infty)$

11. $|3x-6| > 0$

$\Rightarrow$ S.S. = ?

A) $\{2\}$ B) R C) R \ {2}

D) $(2, \infty)$ E) $(-\infty, 2)$

12. $|x-5| \leq -1$

$\Rightarrow$ S.S. = ?

A) $(-1, 1)$ B) $(-4, 4)$ C) $(-6, 4)$

D) $\emptyset$ E) R

13. $\left|\frac{4x-1}{3}\right| < 7$

$\Rightarrow$ S.S. = ?

A) $\left(-5, \frac{11}{2}\right)$ B) $(-5, 7)$ C) $(-7, 7)$

D) $(-5, 5)$ E) $\left(-\frac{11}{3}, \frac{11}{2}\right)$

14. $|x-3| > 4$

$\Rightarrow$ S.S. = ?

A) R B) $\emptyset$ C) $(-1, 7)$

D) $(7, \infty)$ E) R \ $[-1, 7]$

15. $\frac{|x^2-9|}{|x+3|} < 4$

$\Rightarrow$ S.S. = ?

A) $(-1, 4)$ B) $(-6, 7) \setminus \{3\}$

C) $(-4, 4) \setminus \{-3\}$ D) $(-7, 7)$

E) $(-1, 7)$

16. $x \in Z$

$|x^2-1| \leq 8$

$\Rightarrow$ S.S. = ?

A) $\{1, 2, 3\}$ B) $\{0, 1, 2, 3\}$

C) $\{-3, -2, -1, 0, 1, 2, 3\}$ D) $\{1\}$

E) $\{1, 2\}$

1. $7 \leq |2x+3| < 11$

$\Rightarrow$ S.S. = ?

A) $[-5, 2]$ B) $[-7, -5] \cup [2, 4]$

C) $(-5, -2)$ D) $[-7, -5) \cup (2, 4]$

E) $(-7, -5] \cup [2, 4)$

2. $5 \leq |2x-1| < 7$

$\Rightarrow$ S.S. = ?

A) $[3, 4)$ B) $R \setminus [5, 7)$

C) $(-3, 2]$ D) $\emptyset$

E) $(-3, -2] \cup [3, 4)$

3. $-2 \leq |x-1| < 3$

$\Rightarrow$ S.S. = ?

A) $[-2, 3]$ B) $[-3, 3)$ C) $(-2, 4)$

D) $(1, \infty)$ E) $\emptyset$

4. $||a-2|-5| < 1$

$\Rightarrow$ S.S. = ?

A) $(-4, -2)$ B) $(-4, 8)$

C) $(6, 8)$ D) $(-2, 6)$

E) $(-4, -2) \cup (6, 8)$

5. $\dfrac{|2-x|+|3x-2|}{1+|x-2|} \leq 1$

$\Rightarrow$ S.S. = ?

A) $\left[\frac{1}{3}, 1\right]$ B) $[-1, 1]$ C) $[-2, 2]$

D) $\left[\frac{1}{2}, 2\right]$ E) $\emptyset$

6. $\dfrac{|x|-5}{|4-x|} < 0$

$\Rightarrow$ S.S. = ?

A) $(-5, 5)$ B) $(-5, 5) \setminus \{4\}$

C) $(-4, 4) \cup (-5, 5)$ D) $\emptyset$

E) $R \setminus \{4\}$

7. $\dfrac{|2x|+5}{|x|} > 3$

$\Rightarrow$ S.S. = ?

A) $(-3, 3)$ B) $(-1, 3)$ C) $\emptyset$

D) $R \setminus \{0\}$ E) $(-5, 5) \setminus \{0\}$

8. $|x| < 3$

$-x + 2y = 3$

$\Rightarrow ? < y < ?$

A) $(0, 3)$ B) $(-6, 3)$ C) $(-3, 0)$

D) $(-3, 3)$ E) $(0, 2)$

9. $|a-1| \leq 2$

$a-b=2$

$\Rightarrow ? < b < ?$

A) [1, 4] B) [– 3, 1] C) [2, 6] D) [2, 7] E) [2, ∞)

10. $x \in R$

$A = |x-3| + |2x+10|$

$\Rightarrow \min(A) = ?$

A) 8 B) 10 C) 12 D) 13 E) 16

11. $a \in R$

$\min(|2a-3| + |3a+1|) = ?$

A) $\frac{13}{3}$ B) 4 C) $\frac{11}{3}$ D) 3 E) 2

12. $x \in R$

$\max\left(\frac{75}{|x+3|+|x+8|}\right) = ?$

A) 2 B) 5 C) 10 D) 15 E) 18

13. $x \in R$

$A = \frac{120}{|x+2|+|2x-6|}$

$\Rightarrow \max(A) = ?$

A) 10 B) 12 C) 15 D) 18 E) 24

14. $x, y \in R$

$(2x-y) \in Z$

$\left.\begin{matrix} |x-7| < 10 \\ |y-2| < 3 \end{matrix}\right\} \Rightarrow \min(2x-y) = ?$

A) – 11 B) – 10 C) – 8 D) – 6 E) 2

15. $x, y \in R$

$x^2 + 1 = 2x - \sqrt{y-5}$

$\Rightarrow x \cdot y = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

16. $|3a-2| \leq |2a-3|$

$\Rightarrow$ S.S. = ?

A) $(-\infty, 1]$ B) $[1, +\infty)$ C) $(-\infty, -1]$ D) $[-1, 1]$ E) $(-\infty, -1] \cup [1, \infty)$

BASİT EŞİTSİZLİK VE MUTLAK DEĞER
Yanıt Anahtarı

SIMPLE INEQUALITY AND ABSOLUTE VALUE
Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	B	B	C	D	C	B	D	D	D	E	B	A	A	D

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	E	B	A	B	A	B	B	B	D	C	C	B	A	A

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	E	E	C	C	C	C	D	C	C	E	A	E	C	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	C	C	C	C	D	B	C	B	E	C	E	D	B	D

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	E	D	C	E	E	B	A	D	D	B	D	C	B	C	E

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	C	E	B	B	D	C	C	C	E	C	A	B	E	A

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	A	A	A	C	A	C	C	D	C	C	A	A	D	E	C

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	B	A	D	C	A	E	A	C	E	E	D	D	E	A	D

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	E	C	E	E	A	B	B	E	E	E	C	D	E	D

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	D	D	B	C	C	A	D	A	C	E	A	E	B	B

TEST 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	A	C	C	A	A	A	E	C	E	D	E	A	C	B	C

TEST 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	B	C	D	D	B	B	B	B	B	D	B	C	C	E

TEST 13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	D	D	D	D	D	B	A	E	E	E	E	B	D	E

TEST 14

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	D	C	D	E	A	D	C	D	C	D	A	E	E	C

TEST 15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	E	C	E	A	B	E	A	B	A	C	D	E	B	A	D

DOĞAL SAYILARDA ÇÖZÜMLEME VE TABAN ARİTMETİĞİ

ANALYSIS IN NATURAL NUMBERS AND BASE ARITHMETIC

ÖZELLİK | Property 1

Onluk Sayma Sistemi | Decimal System with Base Ten

a, b, c, d rakam *(numerals)*

$a \neq 0$

$abcd = (abcd)_{10}$

$abcd = 1000a + 100b + 10c + d$

$10^0 = 1$

$10^1 = 10$

$10^2 = 100$

$10^3 = 1000$

$4517 = 4 \cdot 1000 + 5 \cdot 100 + 1 \cdot 10 + 7 \cdot 1$

$\rightarrow (4517)_{10}$

1. $(ab) + (ba) = 66$

$\Rightarrow a + b = ?$

6

2. $(ab) - (ba) = 27$

$\Rightarrow a - b = ?$

3

3. $(ab) - (ba) = 45$

$\Rightarrow \max(a \cdot b) = ?$

36

4. $(ab) = 3(a + b)$

$\Rightarrow a + b = ?$

9

5. $(abc) + (cba) = 1170$

$\Rightarrow a + b + c = ?$

18

6. $(ab) + (ba) = 99$

$\Rightarrow \min(a - b) = ?$

-7

7. $\dfrac{(xy) + (yx)}{(xx) + (yy)} = ?$

1

8. $(ab) - (ba) = 3 \cdot b$

$\Rightarrow \min(a \cdot b) = ?$

12

9. $(abc) - (cba) = 495$

$\Rightarrow \min(a + c) = ?$

7

10.

$$\begin{array}{r} a\,b\,c \\ b\,c\,a \\ +\ c\,a\,b \\ \hline x\,y\,6\,5 \end{array}$$

$\Rightarrow x + y = ?$

7

11. $a \neq b \neq c$

$(ab) + (bc) - b = 34$

$\Rightarrow a + b + c = ?$

7

12. $(abc) + (ab) = 381$

$\Rightarrow a + b + c = ?$

14

13. $(abc) - 9 \cdot b - c = 203$

$\Rightarrow \max(a + b + c) = ?$

14

ÖZELLİK|Property 2

Taban Aritmetiği | Base Arithmetic

$a, b, c, d \in N \qquad a \neq 0$

$(abcd)_x = ax^3 + bx^2 + cx + d$

$\rightarrow x^0$	$a < x$
$\rightarrow x^1$	$b < x$
$\rightarrow x^2$	$c < x$
$\rightarrow x^3$	$d < x$

1. $(5a3)_8$
$\Rightarrow \max(a) = ?$

7

2. $(34)_x$
$\Rightarrow \min(x) = ?$

5

3. $(324)_6 = (x)_{10}$
$\Rightarrow x = ?$

124

4. $(64)_8 = (x)_{10}$
$\Rightarrow x = ?$

52

5. $(420)_5 = (x)_{10}$
$\Rightarrow x = ?$

110

6. $(210)_4 = (xy)_{10}$
$\Rightarrow x \cdot y = ?$

18

7. $(1111)_3 = (x)_{10}$
$\Rightarrow x = ?$

40

8. $(131)_4 = (x)_{10}$
$\Rightarrow x = ?$

29

9. $(24,03)_5 = (x)_{10}$
$\Rightarrow x = ?$

14,12

10. $(13,12)_4 = (x)_{10}$
$\Rightarrow x = ?$

7,375

11. $(3,\overline{2})_5 = ?$

3,5

12. $(3,\overline{3})_4 = ?$

4

13. $(2,2\overline{4})_5 = ?$

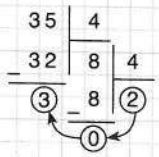
2,6

ÖZELLİK|Property 3

Onluk sayma sistemindeki bir sayı farklı sistemde yazılmak istenirse sayı, istenilen tabandaki sayıya bölünür. Bölme işlemi; bölüm, bölen sayıdan küçük olana kadar devam eder. Kalanlı bölme işleminde en son bölüm ve kalanlar tersten yazılır.

If a number in decimal counting system is to be written in another system, the number is divided to the base value of the desired system. This operation continues until the quotient is smaller than the divisor. In divisions with remainders, the last quotient and the remainders are written in reverse order. In divisions with remainders, the remainders are written in reverse order.

$35 = (x)_4$



$\Rightarrow 35 = (203)_4$

1. $27 = (x)_2$
$\Rightarrow x = ?$
11011

2. $1515 = (x)_5$
$\Rightarrow x = ?$
22030

3. $24 = (x)_6$
$\Rightarrow x = ?$
40

4. $306 = (x)_3$
$\Rightarrow x = ?$
102100

5. $(54)_6 = (x)_5$
$\Rightarrow x = ?$
114

6. $(53)_6 = (x)_7$
$\Rightarrow x = ?$
45

7. $(36)_7 = (3x)_8$
$\Rightarrow x = ?$
3

8. $(321)_4 = (x)_5$
$\Rightarrow x = ?$
212

9. $(408) = (ababc)_4$
$\Rightarrow a \cdot b = ?$
2

10. $(52)_6 = (2xx)_4$
$\Rightarrow x = ?$
0

11. $2 \cdot 3^5 + 3^2 + 2 = (x)_3$
$\Rightarrow x = ?$
200102

12. $a > 4$
$3a^4 + 2a^3 + 4a + 2 = (x)_a$
$\Rightarrow x = ?$
32042

13. $3 \cdot 6^2 + 2 \cdot 6 + 3 + \frac{1}{6} = (A)_6$
$\Rightarrow A = ?$
323,1

ÖZELLİK|Property 4

Aynı tabandaki farklı sayılar onluk sayma sistemine çevrilmeden, aynı tabanda toplama, çıkarma, çarpma ve bölme işlemleri yapılabilir.

Addition, subtraction, multiplication and division operations on different numbers in the same base can be performed in the same base, without converting them to decimal counting system.

1.
$$\begin{array}{r} (2\,3\,5)_7 \\ +\ (5\,0\,6)_7 \\ \hline (x)_7 \end{array}$$
$\Rightarrow x = ?$

1044

2.
$$\begin{array}{r} (4\,3\,2)_6 \\ +\ (5\,1\,5)_6 \\ \hline (x)_6 \end{array}$$
$\Rightarrow x = ?$

1351

3.
$$\begin{array}{r} (7\,7\,7)_8 \\ +\ (1)_8 \\ \hline (x)_8 \end{array}$$
$\Rightarrow x = ?$

1000

4.
$$\begin{array}{r} (4\,1\,5)_7 \\ -\ (2\,6\,2)_7 \\ \hline (x)_7 \end{array}$$
$\Rightarrow x = ?$

123

5.
$$\begin{array}{r} (4\,2\,1\,3)_6 \\ -\ (1\,0\,5\,4)_6 \\ \hline (x)_6 \end{array}$$
$\Rightarrow x = ?$

3115

6.
$$\begin{array}{r} (1\,0\,0\,0)_9 \\ -\ (1)_9 \\ \hline (x)_9 \end{array}$$
$\Rightarrow x = ?$

888

7.
$$\begin{array}{r} (4\,3)_6 \\ \times\ (2\,5)_6 \\ \hline (x)_6 \end{array}$$
$\Rightarrow x = ?$

2043

8.
$$\begin{array}{r} (3\,2)_7 \\ \times\ (4\,5)_7 \\ \hline (x)_7 \end{array}$$
$\Rightarrow x = ?$

2133

9. $(24)_5 + (41)_6 = (x)_6$
$\Rightarrow x = ?$

103

10. $(42)_5 + (33)_5 = (x)_6$
$\Rightarrow x = ?$

104

11. $(40)_6 - (21)_4 = (x)_5$
$\Rightarrow x = ?$

30

12. $\dfrac{(60)_7}{(10)_7} = (x)_7$
$\Rightarrow x = ?$

6

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $(abc) + (cb) = 255$

$\Rightarrow a + b + c = ?$

7

2. $(ab) = 2(a + b)$

$\Rightarrow \frac{a}{b} = ?$

$\frac{1}{8}$

3. $(ab) - (ba) = 72$

$\Rightarrow a + b = ?$

10

4. $(321)_5 = (x)_{10}$

$\Rightarrow x = ?$

86

5. $A = (241)_x + (2x1)_6$

$\Rightarrow A = ?$

174

6. $2424 = (x)_6$

$\Rightarrow x = ?$

15120

7.
$$\begin{array}{r} (2\,3\,4\,1)_6 \\ -\,(1\,5\,2\,3)_6 \\ \hline (x)_6 \end{array}$$

$\Rightarrow x = ?$

414

8.
$$\begin{array}{r} (2\,0\,1\,3)_5 \\ -\,(1\,4\,2\,1)_5 \\ \hline (x)_5 \end{array}$$

$\Rightarrow x = ?$

42

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

9. $(32)_5 = (2a)_6$

$\Rightarrow a = ?$

5

10. $(52)_6 - (35)_4 = (x)_7$

$\Rightarrow x = ?$

21

11. $(41,2\overline{3})_5 = ?$

21,55

12. $(32,2\overline{4})_5 = ?$

17,6

13. $5 \cdot 6^4 + 3 \cdot 6^3 + 25 = (x)_6$

$\Rightarrow x = ?$

53041

14. $7 \cdot 9^3 + 5 \cdot 3^5 + 2 \cdot 9 + 8 = (x)_3$

$\Rightarrow x = ?$

22200222

15. $(ab) \cdot c = 135$

$(ab) \cdot d = 162$

$\Rightarrow (ab) \cdot (cd) = ?$

1512

16. $(333)_4 = 4^x - 1$

$\Rightarrow x = ?$

3

1. $a + b = 12$

$\Rightarrow (ab) + (ba) = ?$

A) 77 B) 88 C) 121 D) 132 E) 154

2. $(ab) + (ba) = 77$

$\Rightarrow a + b = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

3. $(ab) + (ba) = 143$

$\Rightarrow a + b = ?$

A) 11 B) 12 C) 13 D) 14 E) 15

4. $(ab) - (ba) = 45$

$\Rightarrow a - b = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

5. $(ab) - (ba) = 72$

$\Rightarrow a - b = ?$

A) 9 B) 8 C) 7 D) 6 E) 5

6. $(aa) - (ab) + (ba) - (bb) = 8$

$\Rightarrow a - b = ?$

A) 1 B) 2 C) 3 D) 4 E) 8

7. $(ab) + (ba) + (aa) + (bb) = 176$

$\Rightarrow a + b = ?$

A) 3 B) 5 C) 8 D) 10 E) 11

8. $(abc) - (cba) = 693$

$\Rightarrow a - c = ?$

A) 3 B) 5 C) 6 D) 7 E) 9

9. (abc) – (bac) = 540

⇒ a – b = ?

A) 7 B) 6 C) 5 D) 4 E) 3

10. (abc) + (cba) = 1837

⇒ a + b + c = ?

A) 17 B) 19 C) 21 D) 23 E) 25

11. (abc) + (cba) = 1796

⇒ a + b + c = ?

A) 17 B) 23 C) 25 D) 26 E) 27

12. (abc) + (bca) + (cab) = 2553

⇒ a + b + c = ?

A) 9 B) 13 C) 17 D) 18 E) 23

13. (abc) + (bca) + (cab) = 2997

⇒ a = ?

A) 9 B) 8 C) 7 D) 6 E) 5

14. (5x2y3) – (1x7y5) = ?

A) 30498 B) 39498 C) 39598
D) 49498 E) 49598

15.
$$\begin{array}{r} 2\,x\,y\,3 \\ -\;1\,x\,y\,4 \\ \hline A \end{array}$$
⇒ A = ?

A) 1199 B) 1009 C) 999 D) 899 E) 99

16. (A7B3) – (A3B7) = ?

A) 396 B) 386 C) 379
D) 376 E) 369

1. $a + b = 6$

$d - c = 2$

$\Rightarrow (ab) + (ba) + (cd) - (dc) = ?$

A) 48 B) 58 C) 84 D) 100 E) 121

2. $(ab) = 5 \cdot (a + b)$

$\Rightarrow a \cdot b = ?$

A) 12 B) 20 C) 21 D) 24 E) 30

3. $(ab) = 3 \cdot (a + b)$

$\Rightarrow \frac{a}{b} = ?$

A) $\frac{2}{7}$ B) $\frac{4}{13}$ C) 1 D) $\frac{13}{4}$ E) $\frac{7}{2}$

4. $(ab) = 6 \cdot (a + b)$

$\Rightarrow a \cdot b = ?$

A) 18 B) 20 C) 21 D) 28 E) 35

5. $(ab) - (ba) = 5 \cdot (a + b)$

$\Rightarrow 2a - b = ?$

A) 3 B) 5 C) 6 D) 12 E) 14

6.
$$\begin{array}{r} abc \\ bca \\ +\ cab \\ \hline xy53 \end{array}$$

$\Rightarrow x + y = ?$

A) 9 B) 8 C) 7 D) 6 E) 5

7.
$$\begin{array}{r} abc \\ bca \\ +\ cab \\ \hline xy98 \end{array}$$

$\Rightarrow x + y = ?$

A) 5 B) 7 C) 8 D) 10 E) 12

8.
$$\begin{array}{r} a,bc \\ b,ca \\ +\ c,ab \\ \hline 27,75 \end{array}$$

$\Rightarrow a + b + c = ?$

A) 15 B) 17 C) 20 D) 25 E) 26

9.
$$\begin{array}{r} abc \\ bca \\ +\ cab \\ \hline xy8z \end{array} \quad \Rightarrow x+y+z=?$$

A) 24 B) 21 C) 19 D) 17 E) 16

10. $(abc)-(cba)=297$

$\Rightarrow \max(a+c)=?$

A) 5 B) 7 C) 11 D) 13 E) 15

11. $(ab)+(ba)=165$

$\Rightarrow \min(a-b)=?$

A) –3 B) –2 C) –1 D) 2 E) 3

12. $(abc)-(cba)=396$

$\Rightarrow \min(a+c)=?$

A) 4 B) 5 C) 6 D) 8 E) 10

13. $a \neq b \neq c$

$(abc)-(cba)=198$

$\Rightarrow \max(a+b+c)=?$

A) 25 B) 24 C) 23 D) 22 E) 20

14. $(abc)-a-c=208$

$\Rightarrow a+b=?$

A) 2 B) 3 C) 4 D) 6 E) 7

15. $a+b+c=(ab)$

$\Rightarrow c=?$

A) 3 B) 5 C) 6 D) 7 E) 9

16. $a>b>2>c>0$

$(abc)-(cba)=297$

$\Rightarrow a+b+c=?$

A) 8 B) 10 C) 12 D) 14 E) 16

1. $\frac{(a0a)}{a} + \frac{(aa0)}{a} = ?$

A) 110 B) 210 C) 211 D) 420 E) 421

2. $\frac{(aa00)}{a} + \frac{(xy0)}{(xy)} = ?$

A) 110 B) 120 C) 1010 D) 1100 E) 1110

3. $\frac{(ab)-(ba)}{b-a} = ?$

A) -11 B) -9 C) 1 D) 9 E) 11

4. $\frac{(abab)}{(ab)} + \frac{(aaa)}{a} = ?$

A) 112 B) 122 C) 211 D) 212 E) 222

5. $\frac{(abab)}{(ab)} - \frac{(bb)}{b} = ?$

A) 90 B) 91 C) 100 D) 101 E) 110

6. $\frac{(aa)+(bb)}{(ab)+(ba)} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $\frac{(xxyy)-(yyxx)}{(xy)-(yx)} = ?$

A) 88 B) 99 C) 101 D) 121 E) 132

8. $\left.\begin{array}{l} A = (ab) + (ba) \\ B = (ab) - (ba) \\ A \cdot B = 495 \end{array}\right\} \Rightarrow a^2 - b^2 = ?$

A) -2 B) 0 C) 2 D) 4 E) 5

9. $\frac{4x-y}{x+y}=\frac{5}{2}$

$\Rightarrow (xy)-(yx)=?$

A) 18 B) 27 C) 36 D) 45 E) 54

10. $\left.\begin{array}{l}(abc)-(cba)=396\\(ab)+(ba)=77\end{array}\right\} \Rightarrow b+c=?$

A) –4 B) –3 C) 3 D) 4 E) 7

11. $(abc)-(cba)=(xy3)$

$\Rightarrow x+y-a+c=?$

A) 1 B) 3 C) 5 D) 6 E) 8

12. $A=(abc)$

$234<A<250$

$b=\frac{a+c}{3}$

$\Rightarrow A=?$

A) 235 B) 237 C) 242 D) 246 E) 248

13. $a>b>c>3$

$(ab)+(bc)+(ca)=165$

$\Rightarrow a-b+c=?$

A) 3 B) 4 C) 5 D) 6 E) 7

14. $(abc)+(ab)=239$

$\Rightarrow a+b+c=?$

A) 9 B) 11 C) 12 D) 13 E) 15

15. $(abc)+(ab)=389$

$\Rightarrow a+b+c=?$

A) 10 B) 11 C) 12 D) 13 E) 14

16. $(AB6)=3\cdot(1AB)$

$\Rightarrow A+B=?$

A) 3 B) 4 C) 5 D) 6 E) 8

1. $(3a5)_9 \Rightarrow \max(a) = ?$

A) 7 B) 8 C) 9 D) 10 E) 11

2. $(3214)_x \Rightarrow \min(x) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

3. $(2a3)_7$
$(45)_a$
$\Rightarrow a = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

4. $(34)_5 = ?$

A) 95 B) 79 C) 35 D) 19 E) 10

5. $(432)_5 = ?$

A) 112 B) 115 C) 117 D) 119 E) 122

6. $(11011)_2 = ?$

A) 28 B) 27 C) 26 D) 25 E) 24

7. $(1221)_3 = ?$

A) 65 B) 52 C) 40 D) 22 E) 10

8. $(21012)_3 = ?$

A) 184 B) 185 C) 188 D) 191 E) 194

9. $(145)_6 = (xy)_{10}$
$\Rightarrow x + y = ?$

A) 7 B) 9 C) 11 D) 13 E) 65

10. $40 = (x)_5 \Rightarrow x = ?$

A) 134 B) 130 C) 124 D) 120 E) 103

11. $32 = (x)_4$
$\Rightarrow x = ?$

A) 200 B) 202 C) 211 D) 212 E) 213

12. $124 = (x)_7$
$\Rightarrow x = ?$

A) 165 B) 175 C) 230 D) 235 E) 245

13. $100 = (x)_3 \Rightarrow x = ?$

A) 121 B) 1021 C) 1201 D) 10101 E) 10201

14. $1212 = (x)_6 \Rightarrow x = ?$

A) 5340 B) 4340 C) 4040 D) 3040 E) 340

15. $(22ab)_3 = 78$
$\Rightarrow a + b = ?$

A) 7 B) 5 C) 4 D) 2 E) 1

16. $(10,2)_4 = ?$

A) 4,2 B) 4,5 C) 8,2 D) 8,4 E) 8,5

1. $(34)_5 = (x)_3$
$\Rightarrow x = ?$

A) 101 B) 102 C) 201 D) 202 E) 221

2. $(45)_6 = (x)_5$
$\Rightarrow x = ?$

A) 44 B) 102 C) 104 D) 122 E) 144

3. $(4!)_{3!} = x$
$\Rightarrow x = ?$

A) 10 B) 14 C) 16 D) 40 E) 41

4. $(213)_x + (x2)_5 = ?$

A) 59 B) 60 C) 61 D) 62 E) 63

5. $(1a)_5 + (23)_a = ?$

A) 10 B) 12 C) 16 D) 17 E) 20

6. $A = (2x)_5 + (20)_x$
$\Rightarrow \min(A) = ?$

A) 12 B) 14 C) 16 D) 19 E) 22

7. $(4a)_5 - (32)_a = ?$

A) 10 B) 12 C) 16 D) 20 E) 22

8. $(32)_a + (a2)_7 = 54$
$\Rightarrow a = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

9. $(34)_x = (25)_{x+2}$
$\Rightarrow x = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

10. $(31,02)_4 = ?$

A) 13,002 B) 13,003 C) 13,025
D) 13,125 E) 13,25

11. $(21,12)_5 = ?$

A) 11,28 B) 11,3 C) 11,4 D) 11,48 E) 11,52

12. $(32,12)_4 = ?$

A) 10, 14 B) 12, 6 C) 14, 375
D) 16, 275 E) 14, 14

13. $(3,12)_4 = (x)_{10}$
$\Rightarrow x = ?$

A) $\frac{13}{2}$ B) $\frac{27}{8}$ C) $\frac{7}{2}$ D) $\frac{41}{12}$ E) $\frac{13}{4}$

14. $(2,1\overline{3})_5 = (x)_{10}$
$\Rightarrow x = ?$

A) 2,025 B) 2,125 C) 2,175
D) 2,275 E) 2,35

15. $(31,2\overline{4})_5 = (x)_{10}$
$\Rightarrow x = ?$

A) 16,2 B) 16,4 C) 16,6 D) 16,7 E) 16,8

16. $(2,0\overline{4})_5 = (x)_{10}$
$\Rightarrow x = ?$

A) 1,7 B) 2,1 C) 2,2 D) 2,6 E) 4,2

1. $(43)_5 - 12 = (x)_5$
$\Rightarrow x = ?$

A) 11 B) 21 C) 31 D) 32 E) 40

2. $(342)_5 + (122)_5 = (x)_5$
$\Rightarrow x = ?$

A) 304 B) 404 C) 414 D) 1014 E) 1104

3. $(245)_6 + (454)_6 = (x)_6$
$\Rightarrow x = ?$

A) 1043 B) 1143 C) 1243 D) 1033 E) 2143

4. $(45)_6 + (55)_6 + (42)_6 = (x)_6$
$\Rightarrow x = ?$

A) 130 B) 132 C) 220 D) 230 E) 320

5. $(324)_7 - (165)_7 = (x)_7$
$\Rightarrow x = ?$

A) 116 B) 126 C) 216 D) 226 E) 236

6. $(465)_8 - (277)_8 = (x)_8$
$\Rightarrow x = ?$

A) 100 B) 160 C) 166 D) 172 E) 176

7. $(653)_7 - (156)_7 = (x)_7$
$\Rightarrow x = ?$

A) 364 B) 374 C) 376 D) 460 E) 464

8. $(204)_6 + 12 = (x)_6$
$\Rightarrow x = ?$

A) 210 B) 215 C) 220 D) 224 E) 310

9. $(23)_7 \cdot (45)_7 = (x)_7$

$\Rightarrow x = ?$

A) 1431 B) 1331 C) 1332 D) 1021 E) 1011

10. $(43)_6 \cdot (25)_6 = (x)_6$

$\Rightarrow x = ?$

A) 1053 B) 1453 C) 1454 D) 1543 E) 2043

11. $(34)_5 \cdot (23)_5 = (x)_5$

$\Rightarrow x = ?$

A) 1042 B) 1132 C) 1442 D) 2012 E) 2142

12. $7 < x$

$3 \cdot x^4 + 7 \cdot x^3 + 5 \cdot x + 4 = (a)_x$

$\Rightarrow a = ?$

A) 3754 B) 4054 C) 30054 D) 30754 E) 37054

13. $a > 5$

$(A)_a = 2 \cdot a^5 + 3 \cdot a^4 + 4 \cdot a + 1$

$\Rightarrow A = ?$

A) 2341 B) 23041 C) 230041 D) 10 E) 234

14. $2 \cdot 3^7 + 5 \cdot 3^6 + 21 = (x)_9$

$\Rightarrow x = ?$

A) 12023 B) 11023 C) 10223 D) 1323 E) 1223

15. $(A)_5 = 6 \cdot 5^2 + 8 \cdot 5 + 1$

$\Rightarrow A = ?$

A) 1231 B) 1281 C) 681 D) 1201 E) 1081

16. $4 \cdot 7^3 + 3 \cdot 7 + \frac{1}{7} = (A)_7$

$\Rightarrow A = ?$

A) 431 B) 4030,1 C) 43,1 D) 1003,1 E) 4003

1. $(ab) - (ba) = 72$

$\Rightarrow a + b = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

2. $a \neq b$

$(ab)^2 - (ba)^2 = x \cdot (a^2 - b^2)$

$\Rightarrow x = ?$

A) 9 B) 11 C) 20 D) 39 E) 99

3. $(ab) = x \cdot (a + b)$

$(ba) = y \cdot (a + b)$

$\Rightarrow x + y = ?$

A) 11 B) 10 C) 9 D) 8 E) 7

4. $(478) + (xx) = (xyy)$

$\Rightarrow x \cdot y = ?$

A) 3 B) 6 C) 8 D) 15 E) 18

5. $(ab) \cdot c = 108$

$(ab) \cdot d = 144$

$\Rightarrow (ab) \cdot (cd) = ?$

A) 1128 B) 1224 C) 1348 D) 1462 E) 1548

6. $(ab)_7 - (ba)_7 = 30$

$\Rightarrow \frac{a}{b} = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

7. $(203)_a \cdot (3)_a = (1221)_a$

$\Rightarrow a = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

8. $(36)^2 + 36 + 1 = (A)_6$

$\Rightarrow A = ?$

A) 101 B) 1011 C) 10101 D) 101001 E) 100101

9. $a > 4$

$(A)_a = \left(2a + \frac{1}{a}\right)^2$

$\Rightarrow A = ?$

A) 12,01 B) 12,02 C) 40,1 D) 404,01 E) 44,1

10. $(xxx)_4 = (xx)_y$

$\Rightarrow y = ?$

A) 10 B) 12 C) 16 D) 17 E) 20

11. $(abcd) = 51 \cdot (bcd)$

$\Rightarrow \frac{(bcd)}{a} = ?$

A) 10 B) 20 C) 30 D) 40 E) 50

12. $(1331)_a = (1000)_7$

$\Rightarrow a = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

13. $\frac{(234234)_5}{(234)_5} = ?$

A) 26 B) 125 C) 126 D) 625 E) 626

14. $a > 4$

$\frac{3 \cdot a^5 + a^4 + a^2 + a + 2}{a^2} = (x)_a$

$\Rightarrow x = ?$

A) 310112 B) 31112 C) 311,12 D) 3101,12 E) 310,12

15. $(ab8) + 73 = 13 \cdot (ab)$

$\Rightarrow b = ?$

A) 8 B) 7 C) 5 D) 3 E) 1

16. $(4444)_5 = 5^x - 1$

$\Rightarrow x = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

DOĞAL SAYILARDA ÇÖZÜMLEME VE TABAN ARİTMETİĞİ
Yanıt Anahtarı

ANALYSIS IN NATURAL NUMBERS AND BASE ARITHMETIC
Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	C	A	B	D	C	D	B	D	C	E	A	B	C	A

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	A	B	D	C	D	D	E	E	A	C	B	B	E	A

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	E	B	D	A	A	D	E	C	C	E	B	C	B	C	D

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	D	D	C	B	B	E	C	B	A	D	E	A	D	B

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	C	C	E	D	A	C	A	D	A	C	B	E	C	C

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	B	D	B	C	E	D	A	E	C	E	C	A	A	B

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	E	A	D	B	E	A	C	D	E	B	B	C	D	B	C

SAYILAR
NUMBERS

ÖZELLİK | Property 1

$n \in N^+$

- $1 + 2 + 3 + 4 + \ldots + n = \dfrac{n \cdot (n+1)}{2}$
- $1 + 3 + 5 + 7 + \ldots + (2n-1) = n^2$
- $2 + 4 + 6 + 8 + \ldots + (2n) = n(n+1)$

Artış miktarı sabit olan ardışık sayıların toplamı aşağıdaki iki formül yardımıyla bulunur:

The sum of consecutive numbers with a constant order of increase is determined with the help of the following two formulas:

$$\text{Terim Sayısı} = \frac{\text{Son Terim} - \text{İlk Terim}}{\text{Artış miktarı}} + 1$$

$$\textit{Number of Terms} = \frac{\textit{Last Term} - \textit{First Term}}{\textit{Amount of Increase}} + 1$$

$$\text{Toplam} = \frac{(\text{Son Terim} + \text{İlk Terim}) \cdot \text{Terim Sayısı}}{2}$$

$$\textit{Sum} = \frac{(\textit{Last Term} + \textit{First Term}) \cdot \textit{Number of Terms}}{2}$$

Örnek | Example

+3 +3

$\textcircled{7} + 10 + 13 + \ldots + \textcircled{46} = ?$

$$\text{Terim Sayısı} = \frac{46 - 7}{3} + 1 = 14 \quad (\textit{Number of Terms})$$

$$\text{Toplam} = \frac{(46 + 7) \cdot 14}{2} = 371 \quad (\textit{Total})$$

1. $1 + 2 + 3 + 4 + \ldots + 19 = ?$ — 190

2. $1 + 2 + 3 + \ldots + 30 = ?$ — 465

3. $10 + 11 + 12 + \ldots + 18 = ?$ — 126

4. $13 + 14 + 15 + \ldots + 21 = ?$ — 153

5. $1 + 2 + 3 + \ldots + x = 55$
$\Rightarrow x = ?$ — 10

6. $1 + 2 + 3 + \ldots + x = 45$
$\Rightarrow x = ?$ — 9

7. $7 + 8 + 9 + \ldots + x = 70$
$\Rightarrow x = ?$ — 13

8. $2 + 4 + 6 + \ldots + 20 = ?$ — 110

9. $10 + 12 + 14 + \ldots + 28 = ?$ — 190

10. $12 + 14 + 16 + \ldots + 24 = ?$ — 126

11. $2 + 4 + 6 + 8 + \ldots + x = 420$
$\Rightarrow x = ?$ — 40

12. $2 + 4 + 6 + 8 + \ldots + x = 156$
$\Rightarrow x = ?$ — 24

13. $12 + 14 + 16 + ... + x = 210$
$\Rightarrow x = ?$

30

14. $1 + 3 + 5 + 7 + ... + 19 = ?$

100

15. $1 + 3 + 5 + 7 + ... + 25 = ?$

169

16. $9 + 11 + 13 + ... + 29 = ?$

209

17. $13 + 15 + 17 + ... + 23 = ?$

108

18. $1 + 3 + 5 + 7 + ... + (2n - 1) = 400$
$\Rightarrow n = ?$

20

19. $9 + 11 + 13 + ... + (2n - 1) = 128$
$\Rightarrow n = ?$

12

20. $11 + 13 + 15 + 17 + ... + x = 96$
$\Rightarrow x = ?$

21

21. $A = -17 - 15 - 13 - ..... - 1$
$B = 2 + 4 + 6 + ... + 18$
$\Rightarrow A + B = ?$

9

22. $5 + 8 + 11 + 14 + ... + 35 = ?$

220

23. $15 + 20 + 25 + 30 + ... + 55 = ?$

315

24. $13 - 14 + 15 - 16 + 17 - 18 + ... + 27 - 28 = ?$

-8

25. $-2 + 3 - 4 + 5 - 6 + 7 ..... - 20 + 21 = ?$

10

26. $-6 + 8 - 10 + 12 - 14 + 16 - 18 + ... + 24 - 26 = ?$

-16

ÖZELLİK|Property 2

Asal Sayılar | Prime Numbers

Yalnızca 1'e ve kendisine bölünebilen 1'den büyük pozitif sayılara asal sayılar denir.

Pozitive numbers greater than 1 which are only divisible by 1 and itself are called prime numbers.

2, 3, 5, 7, 11, 13, 17, ...

Aralarında Asal Sayılar | Relatively Prime Numbers

1'den başka ortak pozitif böleni olmayan doğal sayılara aralarında asal sayılar denir.

Numbers which do not have a common positive factor other than 1 are called relatively prime numbers.

Örneğin 8 ve 15 aralarında asal sayılardır.

(For example 8 and 15 are relatively prime numbers)

■ Bir ifadedenin en küçüğü veya en büyük değerleri bulunurken sayının türüne dikkat edilir. Ayrıca tamsayılı eşitliklerde ifadenin katsayıları aralarında asal hale getirilir.

When determining the minimum or maximum value of the expression, the kinds of the number must be taken into consideration. Also, in equations with integers the coefficients of the expression are made relatively prime.

1. $a, b \in Z^+$

$a \neq b$

$\Rightarrow \min(2a + 3b) = ?$

7

2. $a, b \in N$

$a \neq b$

$\Rightarrow \min(3a + 4b) = ?$

3

3. $a, b, c \in Z^+$

$\Rightarrow \min(2a + 3b + 4c) = ?$

9

4. $a, b, c \in Z^-$

$a \neq b \neq c$

$\Rightarrow \max(7a + b + 3c) = ?$

−16

5. $a, b, c \in Z^-$

$\Rightarrow \max(3a + 2b + 6c) = ?$

−11

6. $a, b, c \in Z^+$

$\Rightarrow \min(3a + 2b + 6c) = ?$

11

7. $a, b, c \in Z^+$

$a \neq b \neq c$

$\Rightarrow \min(a + b + 3c) = ?$

8

8. $a, b \in Z^+$

$4 \cdot a = 5 \cdot b$

$\Rightarrow \min(a + b) = ?$

9

9. $a, b \in Z^+$

$15 \cdot a = 12 \cdot b$

$\Rightarrow \min(a + b) = ?$

9

10. $a, b \in Z^-$

$20 \cdot a = 15 \cdot b$

$\Rightarrow \max(a + b) = ?$

−7

11. $a, b, c \in Z^+$

$2 \cdot a = 3 \cdot b$

$5 \cdot b = 4 \cdot c$

$\Rightarrow \min(a + b + c) = ?$

15

12. $a, b, c \in Z^+$

$a \cdot b = 18$

$b \cdot c = 21$

$\Rightarrow \min(a + b + c) = ?$

16

13. $a, b, c \in Z^+$

$a \cdot b = 18$

$b \cdot c = 21$

$\Rightarrow \max(a + b + c) = ?$

40

ÖZELLİK|Property 3

Faktöriyel | Factorials

$n \in N^+$

$n! = 1 \cdot 2 \cdot 3 \cdot ..... \cdot n$

- $1! = 1$

  $2! = 1 \cdot 2$

  $3! = 1 \cdot 2 \cdot 3 = 6$

  $4! = 1 \cdot 2 \cdot 3 \cdot 4 = 24$

- $0! = 1$

- $7! = \underbrace{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6}_{6!} \cdot 7$

  $7! = 6! \cdot 7$

  $7! = 5! \cdot 6 \cdot 7$

  $7! = 4! \cdot 5 \cdot 6 \cdot 7$

- $n! = \underbrace{1 \cdot 2 \cdot 3 \cdot 4 \cdot ..... \cdot (n-1)}_{(n-1)!} \cdot n$

  $n! = (n-1)! \cdot n$

  $n! = (n-2)! \cdot (n-1) \cdot n$

1. $\frac{6!}{4!} = ?$ — 30

2. $\frac{7! + 8!}{6! + 7!} = ?$ — $\frac{63}{8}$

3. $\frac{20! \cdot 8!}{9! \cdot 19!} = ?$ — $\frac{20}{9}$

4. $\frac{(n+1)!}{n!} = ?$ — $n + 1$

5. $\frac{(n+1)! - n!}{n!} = 10$

$\Rightarrow n = ?$ — 10

6. $\frac{8! - 6!}{6! + 7!} = ?$ — $\frac{55}{8}$

7. $\frac{3! + 4! + 5!}{2! + 3! + 4!} = ?$ — $\frac{75}{16}$

8. $6! + 7! = 6! \cdot x$

$\Rightarrow x = ?$ — 8

9. $\frac{1}{2!} + \frac{1}{3!} + \frac{2}{4!} = ?$ — $\frac{3}{4}$

10. $6! \cdot 7 \cdot 8 \cdot 9 \cdot 10 = x!$

$\Rightarrow x = ?$ — 10

11. $\frac{(n-2)!}{(n-1)!} = \frac{1}{6}$

$\Rightarrow n = ?$ — 7

12. $\frac{n!}{(n-2)!} = 72$

$\Rightarrow n = ?$ — 9

13. $x, y \in Z^+$

$7 \cdot 8 \cdot 9 \cdot ..... \cdot 15 = \frac{y!}{x!}$

$\Rightarrow x + y = ?$ — 21

ÖZELLİK | Property 4

Faktöriyelli ifadede asal çarpan sayısı bulunurken sayı asal sayıya bölünür, çıkan bölüm tekrar asal sayıya bölünür. Bölüm, asal sayıdan küçük hale gelene kadar bu işleme devam edilir. Son olarak bütün çıkan bölümler toplanır.

When determining the number of prime factors of an expression, the expression is divided by the prime number, and the result of the division is again divided by the prime number. This is continued until the division is smaller than the prime number. Finally all obtained quotients are added.

Örnek | Example

$20! = 3^n \cdot a$ $\quad a, n \in N^+$

En büyük n değeri için *(For the maximum n value)*

$$\begin{array}{r|l} 20 & 3 \\ \hline -18 & \textcircled{6} \;\; 3 \\ \hline 1 & -6 \;\; \textcircled{2} \\ \hline & 0 \end{array}$$

$6 + 2 = 8$ $\quad$ $\max(n) = 8$

1. $a, n \in N^+$

$20! = 2^n \cdot a$

$\Rightarrow \max(n) = ?$

18

2. $a, n \in N^+$

$15! = 3^n \cdot a$

$\Rightarrow \max(n) = ?$

6

3. $a, n \in N^+$

$\frac{18!}{5^n} = a$

$\Rightarrow \max(n) = ?$

3

4. $a, n \in N^+$

$20 \cdot 21! = 5^n \cdot a$

$\Rightarrow \max(n) = ?$

5

5. $a, n \in N^+$

$30! = 6^n \cdot a$

$\Rightarrow \max(n) = ?$

14

6. $a, n \in N^+$

$\frac{28!}{15^n} = a$

$\Rightarrow \max(n) = ?$

6

7. $a, n \in N^+$

$40! = 9^n \cdot a$

$\Rightarrow \max(n) = ?$

9

8. $a, n \in N^+$

$40! = 8^n \cdot a$

$\Rightarrow \max(a) = ?$

12

9. $a, n \in N^+$

$30! = 12^n \cdot a$

$\Rightarrow \max(n) = ?$

13

10. $a, n \in N^+$

$15! + 16! = 4^n \cdot a$

$\Rightarrow \max(n) = ?$

5

11. $a, n \in N^+$

$20 \cdot 20! = 2^n \cdot a$

$\Rightarrow \max(n) = ?$

20

12. $a, n, m \in N^+$

$360 \cdot 30! = 2^n \cdot 3^m \cdot a$

$\Rightarrow \max(m + n) = ?$

45

13. $a, n \in N^+$

$18! + 19! = 2^n \cdot a$

$\Rightarrow \max(n) = ?$

18

ÖZELLİK|Property 5

Tamsayılı ifadelerde sayı, bir sayının tam kuvveti olması için verilen katsayı asal çarpanlarına ayrılır. Asal çarpanların üssü istenilen kuvvete veya onun en küçük katlarına tamamlanarak en küçük sayı elde edilmiş olur.

In integer expressions, for a number to be the power of another integer, the given number is factorized into its prime factors. The exponent of the prime factors are completed to the desired power or its minimum multiples and the smallest number is obtained.

1. $a, b \in Z^+$
$12 \cdot a = b^2$
$\Rightarrow \min(a) = ?$

3

2. $a, b \in Z^+$
$18 \cdot a = b^2$
$\Rightarrow \min(b) = ?$

6

3. $a, b \in Z^+$
$50 \cdot a = b^2$
$\Rightarrow \min(a \cdot b) = ?$

20

4. $a, b \in Z^+$
$24 \cdot a = b^3$
$\Rightarrow \min(a) = ?$

9

5. $a, b \in Z^+$
$200 \cdot a = b^3$
$\Rightarrow \min(a) = ?$

5

6. $a, b \in Z^+$
$24 \cdot a^2 = b^3$
$\Rightarrow \min(a) = ?$

3

7. $a, b \in Z^+$
$18 \cdot a^2 = b^3$
$\Rightarrow \min(b) = ?$

18

8. $a, b \in Z^+$
$250 \cdot b^2 = a^3$
$\Rightarrow \min(a + b) = ?$

12

9. $a, b \in Z^+$
$32 \cdot b = a^3$
$\Rightarrow \min(a + b) = ?$

6

10. $a, b \in Z^+$
$54 \cdot a^2 = b^3$
$\Rightarrow \min(a) = ?$

2

11. $a, b \in Z^+$
$72 \cdot a^2 = b^3$
$\Rightarrow \min(b) = ?$

18

12. $a, b \in Z^+$
$32 \cdot a^3 = b^4$
$\Rightarrow \min(b) = ?$

4

13. $a, b \in Z^+$
$16 \cdot a^2 = b^3$
$\Rightarrow \min(a \cdot b) = ?$

8

ÖZELLİK|Property 6

- Toplamları sabit olan sayıların çarpımının en büyük değeri için sayılar arasındaki fark en az olacak şekilde seçilir, çarpımın en küçük değeri için sayılar arasındaki fark en fazla olacak şekilde seçilir.

  For finding the maximum value of the multiplication of the numbers with a fixed sum, the numbers are selected so that their difference is the minimum value possible. For finding the minimum value of the multiplication, the numbers are selected so that their difference is the maximum value possible.

- Çarpımları sabit sayıların toplamının en büyük değeri için sayılar arasındaki fark en fazla olacak şekilde seçilir. Toplamın en küçük değeri için sayılar arasındaki fark en az olacak şekilde seçilir.

  For finding the maximum value of the addition of numbers with a fixed product, the numbers are selected so that their difference is the maximum value possible. For finding the minimum value of the addition, the numbers are selected so that their difference is the minimum value possible.

- Sayıların seçiminde sayının türüne dikkat edilir.

  The type of the number is taken into account when selecting the numbers.

1. $a, b \in Z^+$
$a + b = 7$
$\Rightarrow \max(a \cdot b) = ?$

12

2. $a, b \in Z^+$
$a + b = 21$
$\Rightarrow \max(a \cdot b) = ?$

110

3. $a, b \in Z^+$
$a + b = 21$
$\Rightarrow \min(a \cdot b) = ?$

20

4. $a, b \in Z$
$a + b = -17$
$\Rightarrow \max(a \cdot b) = ?$

72

5. $a, b \in Z^-$
$a + b = -11$
$\Rightarrow \min(a \cdot b) = ?$

10

6. $a, b \in Z^-$
$a + b = -13$
$\Rightarrow \max(a \cdot b) = ?$

42

7. $a, b \in Z^-$
$a + b = -20$
$\Rightarrow \max(a \cdot b) = ?$

100

8. $a, b \in Z^+$
$a \cdot b = 42$
$\Rightarrow \min(a + b) = ?$

13

9. $a, b \in Z^+$
$a \cdot b = 40$
$\Rightarrow \min(a + b) = ?$

13

10. $a, b \in Z^+$
$a \cdot b = 72$
$\Rightarrow \max(a + b) = ?$

73

11. $a, b \in Z$
$a \cdot b = 56$
$\Rightarrow \max(a + b) = ?$

57

12. $a, b \in Z$
$a \cdot b = 56$
$\Rightarrow \min(a + b) = ?$

-57

13. $a, b \in Z^-$
$a \cdot b = 30$
$\Rightarrow \max(a + b) = ?$

-11

ÖZELLİK | Property 7

a ve b sıfırdan farklı iki tamsayı olsun.

Let a and b be two non-zero integers.

- a ve b'nin ortak bölenlerinin en büyüğüne a ile b'nin En Büyük Ortak Böleni denir ve EBOB(a, b) ile gösterilir.

  If the greatest common divisor of a and b is called the Greatest Common Divisor, then is is denoted by GCD(a, b).

- a ve b'nin pozitif ortak katlarının en küçüğüne a ile b'nin En Küçük Ortak Katı denir ve EKOK(a, b) ile gösterilir.

  The smallest of the positive common multiples of a and b is called the Least Common Multiple, and it is denoted by LCM(a, b).

- Sayıların EBOB ve EKOK'u bulunurken sayılar asal çarpanlarına ayrılır.
  EBOB için ortak asal çarpanların en küçük üslüsü
  EKOK için ortak asal çarpanların en büyük üslüsü ve ortak olmayan asal çarpanlar seçilir.

  When determining the GCD and LCM of numbers, the numbers are factorized into their prime factors.
  The smallest powers of the common prime factors are selected for GCD and the largest powers of the common prime factors and the uncommon prime factors are selected for LCM.

Örnek | Example

$A = 2^3 \cdot 3^{②} \cdot 5$

$B = 2^{②} \cdot 3^4 \cdot 5^2 \cdot 7$

EBOB (A, B) $= 2^2 \cdot 3^2$

EKOK (A, B) $= 2^3 \cdot 3^4 \cdot 5^2 \cdot 7$

1. $A, x, y, z \in Z^+$

$A = 3x + 2 = 4y + 3 = 5z + 4$

$\Rightarrow \min(A) = ?$

59

2. $A, a, b, c \in Z^+$

$A = 3a + 1 = 4b + 1 = 6c + 1$

$\Rightarrow \min(A) = ?$

13

3. $A, x, y, z \in Z^+$

$A = 2x - 1 = 3y = 5z + 2$

$\Rightarrow \min(A) = ?$

27

4. $A, x, y, z \in Z^+$

$A = 2x = 4y + 6 = 5z + 3$

$\Rightarrow \min(A) = ?$

18

5. $A, x, y, z \in Z^+$

$A = 4x + 1 = 5y - 4 = 6z + 7$

$\Rightarrow \min(A) = ?$

61

6. $A, x, y, z \in Z^+$

$A < 550$

$A = 3x + 2 = 4y + 2 = 5z + 2$

$\Rightarrow \max(A) = ?$

542

7. $A, a, b \in Z^+$

$A > 90$

$A = 3a = 5b + 4$

$\Rightarrow \min(A) = ?$

99

8. $x \in Z$

$\frac{200}{x} \in Z \quad , \quad \frac{240}{x} \in Z$

$\Rightarrow \max(x) = ?$

40

9. $x \in Z$

$\frac{70}{x} \in Z \quad , \quad \frac{45}{x} \in Z$

$\Rightarrow \max(x) = ?$

5

10. $x \in Z$

$\frac{40}{x} \in Z \quad , \quad \frac{48}{x} \in Z$

$\Rightarrow \max(x) = ?$

8

11. $x \in Z$

$\frac{-120}{x} \in Z^+ \quad , \quad \frac{-150}{x} \in Z^+$

$\Rightarrow \min(x) = ?$

−30

12. $x \in Z$

$\frac{-60}{x} \in Z^+ \quad , \quad \frac{-80}{x} \in Z^+$

$\Rightarrow \min(x) = ?$

−20

13. $x \in Z$

$\frac{x}{30} \in Z^+ \quad , \quad \frac{x}{40} \in Z^+$

$\Rightarrow \min(x) = ?$

120

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $1 + 2 + 3 + ... + 25 = ?$

325

2. $2 + 4 + 6 + ... + 30 = ?$

240

3. $1 + 5 + 9 + ... + 21 = ?$

66

4. $10 - 14 + 18 - 22 + ... + 82 - 86 + 90 = ?$

50

5. $a, b, c \in Z^-$

$a \neq b \neq c$

$\Rightarrow \max(2a + b + 4c) = ?$

-11

6. $a, b, c \in Z^+$

$3 \cdot a = 4 \cdot b$

$6 \cdot b = 5 \cdot c$

$\Rightarrow \min(a + b + c) = ?$

53

7. $\frac{8! \cdot 13!}{14! \cdot 7!} = ?$

$\frac{4}{7}$

8. $x, y \in Z^+$

$x! = 72 \cdot y!$

$\Rightarrow \min(x + y) = ?$

16

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

9. $x, y \in Z^+$

$x! = 72 \cdot y!$

$\Rightarrow \max(x + y) = ?$

143

10. $a, n \in N^+$

$78! + 79! = 5^n \cdot a$

$\Rightarrow \max(n) = ?$

19

11. $a, b \in Z^+$

$54 \cdot a = b^3$

$\Rightarrow \min(a + b) = ?$

10

12. $a, b \in Z^+$

$324 \cdot a^2 = b^4$

$\Rightarrow \min(a) = ?$

2

13. $a, b \in Z^-$

$a \cdot b = 35$

$\Rightarrow \max(a + b) = ?$

−12

14. $a, b \in R^+$

$a \cdot b = 20$

$\Rightarrow \min(a + b) = ?$

$4\sqrt{5}$

15. $A, x, y, z \in Z^+$ $\quad 200 < A$

$A = 4x + 1 = 5y + 1 = 7z + 1$

$\Rightarrow \min(A) = ?$

281

16. $x \in Z$

$\frac{120}{x} \in Z \quad , \quad \frac{132}{x} \in Z$

$\Rightarrow \max(x) = ?$

12

1. $1 + 2 + 3 + 4 + \ldots + 30 = ?$

A) 460 B) 465 C) 470 D) 475 E) 480

2. $1 + 2 + 3 + \ldots + n = 210$
$\Rightarrow n = ?$

A) 18 B) 19 C) 20 D) 21 E) 22

3. $2 + 4 + 6 + \ldots + 50 = ?$

A) 635 B) 640 C) 645 D) 650 E) 655

4. $2 + 4 + 6 + \ldots + (2n) = 156$
$\Rightarrow n = ?$

A) 11 B) 12 C) 13 D) 14 E) 15

5. $1 + 3 + 5 + 7 + 9 + \ldots + 39 = ?$

A) 289 B) 324 C) 361 D) 400 E) 441

6. $1 + 3 + 5 + 7 + \ldots + (2n-1) = 529$
$\Rightarrow n = ?$

A) 20 B) 21 C) 22 D) 23 E) 24

7. $10 + 11 + 12 + 13 + \ldots + 40 = ?$

A) 760 B) 765 C) 770 D) 775 E) 780

8. $20 + 22 + 24 + 26 + \ldots + 60 = ?$

A) 800 B) 810 C) 820 D) 830 E) 840

9. $11 + 13 + 15 + \ldots + 69 = ?$

A) 1200 B) 1190 C) 1180 D) 1150 E) 1070

10. $3 + 6 + 9 + \ldots + 60 = ?$

A) 624 B) 627 C) 630 D) 636 E) 672

11. $4 + 8 + 12 + 16 + \ldots + 100 = ?$

A) 1285 B) 1300 C) 1340 D) 1380 E) 1410

12. $2 + 4 + 6 + \ldots + x = 930$

$\Rightarrow x = ?$

A) 30 B) 35 C) 45 D) 55 E) 60

13. $1 + 3 + 5 + \ldots + x = 625$

$\Rightarrow x = ?$

A) 25 B) 31 C) 37 D) 43 E) 49

14. $4 + 8 + 12 + 16 + \ldots + x = 480$

$\Rightarrow x = ?$

A) 52 B) 56 C) 60 D) 64 E) 68

15. $15 + 19 + 23 + \ldots + 59 = ?$

A) 436 B) 440 C) 444 D) 448 E) 452

16. $7 + 12 + 17 + 22 + \ldots + 67 = ?$

A) 476 B) 481 C) 486 D) 491 E) 496

1. $4 + 12 + 20 + 28 + ... + 84 = ?$

A) 484 B) 492 C) 500 D) 508 E) 516

2. $5 + 7 + 9 + ... + (2n-1) = 896$

$\Rightarrow n = ?$

A) 25 B) 27 C) 29 D) 30 E) 32

3. $10 + 12 + 14 + ... + (2n) = 90$

$\Rightarrow n = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

4. $23 + 46 + 69 + ... + 230 = ?$

A) 1180 B) 1190 C) 1210 D) 1245 E) 1265

5. $A = 2 + 4 + 6 + 8 + ... + 98 + 100$

$B = 1 + 3 + 5 + 7 + ... + 97 + 99$

$\Rightarrow A - B = ?$

A) 50 B) 60 C) 70 D) 90 E) 100

6. $A = 3 + 6 + 9 + ... + 57 + 60$

$B = 2 + 4 + 6 + ... + 38 + 40$

$\Rightarrow A - B = ?$

A) 20 B) 105 C) 210 D) 270 E) 320

7. $A = 89 + 90 + 91 + ... + 100$

$B = 99 + 100 + 101 + ... + 110$

$\Rightarrow B - A = ?$

A) 120 B) 110 C) 100 D) 90 E) 80

8. $1 - 2 + 3 - 4 + 5 - ... + 39 - 40 = ?$

A) -40 B) -35 C) -30 D) -25 E) -20

9. $21 - 22 + 23 - 24 + ... + 99 - 100 = ?$

A) -80 B) -60 C) -55 D) -40 E) -20

10. $6 - 9 + 12 - 15 + 18 - ... + 66 - 69 = ?$

A) -39 B) -36 C) -33 D) -30 E) -27

11. $7 - 11 + 15 - 19 + ... + 79 - 83 + 87 = ?$

A) 47 B) 43 C) 39 D) 35 E) 31

12. $-36 - 35 - 34 - ... - 1 + 0 + 1 + ... + 38 = ?$

A) 38 B) 43 C) 59 D) 67 E) 75

13. $\frac{1}{5}+\frac{2}{4}+\frac{3}{5}+\frac{4}{4}+...+\frac{19}{5}+\frac{20}{4} = ?$

A) $\frac{89}{2}$ B) $\frac{91}{2}$ C) $\frac{93}{2}$ D) $\frac{95}{2}$ E) $\frac{97}{2}$

14. $\frac{1}{3}-\frac{2}{5}+\frac{3}{3}-\frac{4}{5}+...+\frac{39}{3}-\frac{40}{5} = ?$

A) 48 B) $\frac{146}{3}$ C) $\frac{148}{3}$ D) $\frac{151}{3}$ E) $\frac{154}{3}$

15. $10{,}1 + 10{,}2 + 10{,}3 + 10{,}4 + ... + 10{,}9 = ?$

A) 108,5 B) 105,5 C) 104,5 D) 98,5 E) 94,5

16. $10{,}1 + 11{,}1 + 12{,}1 + ... + 19{,}1 = ?$

A) 143 B) 144 C) 145 D) 146 E) 147

1. $0! + 1! + 2! + 3! = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

2. $\frac{15!}{13!} = ?$

A) 15 B) 169 C) 170 D) 196 E) 210

3. $\frac{10! + 9!}{9!} = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

4. $\frac{12! + 13!}{13! - 12!} = ?$

A) $\frac{7}{13}$ B) $\frac{6}{7}$ C) $\frac{12}{13}$ D) $\frac{13}{12}$ E) $\frac{7}{6}$

5. $\frac{25! \cdot 8!}{10! \cdot 23!} = ?$

A) $\frac{15}{8}$ B) $\frac{20}{9}$ C) $\frac{20}{3}$ D) $\frac{15}{2}$ E) $\frac{55}{3}$

6. $\frac{5! + 6! + 7!}{5!} = ?$

A) 14 B) 28 C) 35 D) 42 E) 49

7. $\frac{4! + 5! + 6!}{3! + 4! + 5!} = ?$

A) $\frac{36}{25}$ B) $\frac{72}{25}$ C) $\frac{144}{25}$ D) $\frac{169}{25}$ E) $\frac{172}{25}$

8. $\frac{(0! + 2)! + 4!}{3!} = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

9. $\frac{(n+7)!}{(n+6)!} = ?$

A) $\frac{6}{7}$ B) $\frac{7}{6}$ C) 7 D) $n+6$ E) $n+7$

10. $\frac{(n-9)!}{(n-10)!} = ?$

A) $\frac{1}{n-10}$ B) $\frac{1}{n-9}$ C) $\frac{9}{10}$ D) $n-9$ E) $n-10$

11. $\frac{(n+7)!}{(n+5)!} = 420 \Rightarrow n = ?$

A) 12 B) 13 C) 14 D) 15 E) 16

12. $\frac{(n+2)!}{(n-1)!} = 60 \Rightarrow n = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

13. $\frac{n! + (n+1)!}{n!} = 40 \Rightarrow n = ?$

A) 36 B) 37 C) 38 D) 39 E) 40

14. $n! \cdot (n+1) \cdot (n+2) \cdot (n+3) = 12! \cdot 13$
$\Rightarrow n = ?$

A) 10 B) 11 C) 12 D) 13 E) 14

15. $n \cdot n! + 20! = 21!$
$\Rightarrow n = ?$

A) 19 B) 20 C) 21 D) 22 E) 23

16. $\frac{(2n+2)! \cdot (n)!}{(n+2)! \cdot (2n)!} = \frac{10}{3} \Rightarrow n = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

1. $a, b \in N^+$

$10 \cdot 11 \cdot 12 \cdot \ldots\ldots \cdot 30 = \frac{a!}{b!}$

$\Rightarrow a + b = ?$

A) 36 B) 37 C) 38 D) 39 E) 40

2. $a, n \in N^+$

$30! = 2^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 15 B) 18 C) 22 D) 25 E) 26

3. $a, n \in N^+$

$70! = 5^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 17 B) 16 C) 15 D) 14 E) 13

4. $a, n \in N^+$

$360 \cdot 60! = 3^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 20 B) 28 C) 30 D) 120 E) 206

5. $a, n \in N^+$

$80! = 6^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 26 B) 30 C) 34 D) 36 E) 38

6. $a, n \in N^+$

$350! = 14^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 58 B) 57 C) 51 D) 50 E) 48

7. $a, n \in N^+$

$60! = 9^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 14 B) 16 C) 20 D) 22 E) 28

8. $a, n \in N^+$

$90! = 8^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 24 B) 26 C) 28 D) 30 E) 32

9. $a, n \in Z^+$

$40! = 12^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 17 B) 18 C) 19 D) 20 E) 21

10. $a, n \in Z^+$

$90! = 45^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 24 B) 23 C) 22 D) 21 E) 20

11. $n, m \in N^+$

$n! = 72 \cdot m!$

$\Rightarrow \min(m+n) = ?$

A) 16 B) 20 C) 48 D) 72 E) 143

12. $P\binom{n}{r} = \frac{n!}{(n-r)!}$

$\Rightarrow P\binom{7}{2} = ?$

A) 21 B) 24 C) 35 D) 39 E) 42

13. $C\binom{n}{r} = \frac{n!}{(n-r)! \cdot r!}$

$\Rightarrow C\binom{8}{3} = ?$

A) 28 B) 35 C) 42 D) 48 E) 56

14. $1 \cdot 1! + 2 \cdot 2! + 3 \cdot 3! + \ldots + 40 \cdot 40! = ?$

A) $(41!)^2$ B) $40! \cdot 41!$ C) $(40!)^2$ D) $41!$ E) $41! - 1$

15. $\frac{1}{3!} + \frac{1}{4!} + \frac{1}{5!} = ?$

A) $\frac{1}{5}$ B) $\frac{13}{60}$ C) $\frac{7}{30}$ D) $\frac{1}{4}$ E) $\frac{4}{15}$

16. $\frac{1}{n!} + \frac{1}{(n+1)!} = \frac{289}{(n+2)!} \Rightarrow n = ?$

A) 15 B) 16 C) 17 D) 18 E) 19

1. a, b rakam *(numeral)*

$a \neq b$

$\Rightarrow \max(2 \cdot a + 3 \cdot b) = ?$

A) 39 B) 40 C) 41 D) 42 E) 43

2. $a, b, c \in Z^-$

$a \neq b \neq c$

$\Rightarrow \max(5 \cdot a + 2 \cdot b + 3 \cdot c) = ?$

A) – 23 B) – 21 C) – 19 D) – 17 E) – 15

3. $a, b, c \in N^+$

$a \neq b \neq c$

$\Rightarrow \min(3 \cdot a + 7 \cdot b + 2 \cdot c) = ?$

A) 18 B) 19 C) 21 D) 23 E) 25

4. $a, b, c \in N^+$

$a \neq b \neq c$

$\Rightarrow \min(2 \cdot a + 5 \cdot b + 4 \cdot c) = ?$

A) 6 B) 11 C) 19 D) 25 E) 30

5. $a, b, c \in Z^-$

$a \neq b \neq c$

$\Rightarrow \min(|2 \cdot a + 7 \cdot b + 5 \cdot c|) = ?$

A) 0 B) 14 C) 19 D) 21 E) 23

6. $a, b, c \in N^+$

$\Rightarrow \min(3 \cdot a + 2 \cdot b + 4 \cdot c) = ?$

A) 7 B) 9 C) 16 D) 20 E) 21

7. $a, b, c \in Z^-$

$a \neq b \neq c$

$\Rightarrow \max(3 \cdot a + 4 \cdot b + 3 \cdot c) = ?$

A) –30 B) –28 C) –21 D) –19 E) –10

8. $a, b, c \in Z^+$

$3 \cdot a + 7 \cdot b + 4 \cdot c = 34$

$\Rightarrow \max(c) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $x, y, z \in Z^+$

$x + y = 2 \cdot z$

$\Rightarrow \min(x + y + z) = ?$

A) 12 B) 9 C) 6 D) 4 E) 3

10. $x, y, z \in Z^+$

$x \neq y \neq z$

$x + y = 2 \cdot z$

$\Rightarrow \min(x + y + z) = ?$

A) 3 B) 6 C) 9 D) 12 E) 18

11. $x, y, z \in Z^-$

$x \neq y \neq z$

$x + y = 3 \cdot z$

$\Rightarrow \max(x + y + z) = ?$

A) -4 B) -8 C) -12 D) -16 E) -20

12. $a, b \in Z^+$

$5 \cdot a + 13 \cdot b = 49$

$\Rightarrow a = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

13. $a, b \in Z^+$

$6 \cdot a + 11 \cdot b = 62$

$\Rightarrow a \cdot b = ?$

A) 6 B) 8 C) 12 D) 16 E) 18

14. $a, b \in Z^-$

$20 \cdot a = 28 \cdot b$

$\Rightarrow \max(a + b) = ?$

A) -12 B) -14 C) -15 D) -16 E) -18

15. $a, b \in Z^+$

$45 \cdot a = 18 \cdot b$

$\Rightarrow \min(a + b) = ?$

A) 3 B) 5 C) 7 D) 8 E) 10

16. $a, b \in Z^+$

$90 \cdot a = 36 \cdot b$

$\Rightarrow \min(a + b) = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

1. $a, b, c \in Z^+$

$\left.\begin{array}{l} 2 \cdot a = 3 \cdot b \\ 2 \cdot b = 5 \cdot c \end{array}\right\} \Rightarrow \min(a + b + c) = ?$

A) 24 B) 29 C) 32 D) 36 E) 39

2. $a, b \in Z^+$

$a^2 - b^2 = 17$

$\Rightarrow a \cdot b = ?$

A) 17 B) 20 C) 36 D) 45 E) 72

3. $a, b \in Z^+$

$(a + 2b) \cdot (a - b) = 19$

$\Rightarrow a \cdot b = ?$

A) 42 B) 35 C) 30 D) 28 E) 24

4. $a, b \in Z^+$

$a^2 - 4b^2 = 13$

$\Rightarrow a \cdot b = ?$

A) 42 B) 21 C) 18 D) 13 E) 6

5. $a, b, c, d \in Z^+$

$a \neq b \neq c \neq d$

$a \cdot b \cdot c \cdot d = 273$

$\Rightarrow a + b + c + d = ?$

A) 20 B) 21 C) 22 D) 23 E) 24

6. $a, b, c \in Z^+$

$\left.\begin{array}{l} a \cdot b = 21 \\ b \cdot c = 14 \end{array}\right\} \Rightarrow \min(a + b + c) = ?$

A) 6 B) 10 C) 12 D) 19 E) 35

7. $a, b, c \in Z^-$

$\left.\begin{array}{l} a \cdot b = 20 \\ b \cdot c = 12 \end{array}\right\} \Rightarrow \max(a + b + c) = ?$

A) -33 B) -32 C) -12 D) -1 E) 0

8. $a, b, c \in Z^+$

$\left.\begin{array}{l} a \cdot b = 20 \\ b \cdot c = 12 \end{array}\right\} \Rightarrow \min(a + b + c) = ?$

A) 12 B) 16 C) 18 D) 32 E) 33

9. $a, b, c \in Z$

$$\left.\begin{array}{l} a \cdot b = 20 \\ b \cdot c = 12 \end{array}\right\} \Rightarrow \min(a + b + c) = ?$$

A) -33 B) -32 C) 0 D) 12 E) 33

10. $a, b, c \in Z^+$

$$\left.\begin{array}{l} 2 \cdot a = 3 \cdot b \\ 5 \cdot b = 6 \cdot c \end{array}\right\} \Rightarrow \min(a + b + c) = ?$$

A) 11 B) 13 C) 16 D) 18 E) 20

11. $a, b, c \in Z^+$

$$\left.\begin{array}{l} 2 \cdot a = 3 \cdot b \\ 2 \cdot b = 5 \cdot c \end{array}\right\} \Rightarrow \min(a + b + c) = ?$$

A) 24 B) 29 C) 32 D) 36 E) 39

12. $a, b, c \in Z^+$

$$\left.\begin{array}{l} 4 \cdot a = 5 \cdot b \\ 3 \cdot b = 6 \cdot c \end{array}\right\} \Rightarrow \min(a + b + c) = ?$$

A) 1 B) 8 C) 11 D) 14 E) 31

13. $a, b, c \in Z^-$

$12 \cdot a = 20 \cdot b = 24 \cdot c$

$\Rightarrow \max(a + b + c) = ?$

A) -21 B) -20 C) -14 D) -11 E) -1

14. $a, b, c \in Z^+$

$20 \cdot a = 36 \cdot b = 35 \cdot c$

$\Rightarrow \min(a + b + c) = ?$

A) 136 B) 134 C) 130 D) 128 E) 120

15. $a, b, c \in Z^-$

$12 \cdot a = 16 \cdot b = 18 \cdot c$

$\Rightarrow \max(a + b + c) = ?$

A) -21 B) -25 C) -27 D) -29 E) -32

16. $A, x, y, z \in Z^+$

$A = 5 \cdot x + 4 = 7 \cdot y + 6 = 8 \cdot z + 7$

$\Rightarrow \min(A) = ?$

A) 274 B) 276 C) 278 D) 279 E) 281

1. $A, x, y, z \in Z^+$

$A = 5 \cdot x + 3 = 6 \cdot y + 4 = 8 \cdot z + 6$

$\Rightarrow \min(A) = ?$

A) 118 B) 120 C) 122 D) 238 E) 242

2. $A, a, b, c \in Z^+$

$A = 8 \cdot a + 5 = 7 \cdot b + 11 = 5 \cdot c + 12$

$\Rightarrow \min(A) = ?$

A) 137 B) 140 C) 277 D) 280 E) 283

3. $A, x, y, z \in Z^+$

$A = 4 \cdot x + 2 = 9 \cdot y - 2 = 24 \cdot z + 46$

$\Rightarrow \min(A) = ?$

A) 66 B) 70 C) 74 D) 78 E) 82

4. $A, x, y, z \in Z^+$

$A = 3 \cdot x + 2 = 4 \cdot y + 12 = 5 \cdot z + 11$

$\Rightarrow \min(x) = ?$

A) 18 B) 20 C) 22 D) 24 E) 56

5. $A, x, y, z \in Z^+$

$A = 3 \cdot x + 7 = 5 \cdot y = 6 \cdot z - 11$

$\Rightarrow \min(A) = ?$

A) 20 B) 25 C) 85 D) 92 E) 124

6. $A, x, y \in Z^+$

$A = 7 \cdot x + 1 = 5 \cdot y + 2$

$\Rightarrow \min(A) = ?$

A) 18 B) 22 C) 35 D) 67 E) 70

7. $A, a, b \in Z^+$

$A > 80$

$A = 3 \cdot a - 1 = 5 \cdot b + 6$

$\Rightarrow \min(A) = ?$

A) 11 B) 15 C) 86 D) 90 E) 94

8. $A, x, y, z \in Z$

$A = 3 \cdot x + 2 = 7 \cdot y + 4 = 5 \cdot z$

$A > 300 \Rightarrow \min(A) = ?$

A) 305 B) 315 C) 325 D) 335 E) 345

9. $A, x, y, z \in Z^+$

$A < 1000$

$A = 3 \cdot x + 2 = 4 \cdot y + 2 = 5 \cdot z + 2$

$\Rightarrow \max(A) = ?$

A) 932 B) 946 C) 942 D) 954 E) 962

10. $A, x, y, z \in Z^+$

$A > 600$

$A = 3 \cdot x + 8 = 7 \cdot y + 9 = 10 \cdot z + 22$

$\Rightarrow \min(A) = ?$

A) 208 B) 212 C) 602 D) 624 E) 632

11. $A, x, y, z \in Z^+$

$A < 360$

$A = 18 \cdot x + 3 = 24 \cdot y + 3$

$\Rightarrow \max(A) = ?$

A) 75 B) 147 C) 219 D) 291 E) 359

12. $A, a, b, c \in Z^+$

$A > 210$

$A = 3 \cdot a - 2 = 5 \cdot b + 24 = 7 \cdot c - 3$

$\Rightarrow \min(A) = ?$

A) 214 B) 311 C) 315 D) 319 E) 424

13. $x \in Z$

$\frac{300}{x} \in Z$

$\frac{210}{x} \in Z$

$\Rightarrow \max(x) = ?$

A) 10 B) 15 C) 30 D) 40 E) 45

14. $x \in Z$

$\frac{120}{x} \in Z$

$\frac{148}{x} \in Z$

$\Rightarrow \max(x) = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

15. $x \in Z$

$\frac{78}{x} \in Z$

$\frac{90}{x} \in Z$

$\Rightarrow \max(x) = ?$

A) 2 B) 4 C) 6 D) 8 E) 15

16. $x \in Z$

$-\frac{136}{x} \in Z^+$

$-\frac{184}{x} \in Z^+$

$\Rightarrow \min(x) = ?$

A) -12 B) -8 C) 2 D) 4 E) 8

1. $a, b \in Z^+$

$28 \cdot a = b^2$

$\Rightarrow \min(b) = ?$

A) 2 B) 3 C) 4 D) 7 E) 14

2. $a, b \in Z^+$

$120 \cdot a = b^2$

$\Rightarrow \min(a) = ?$

A) 6 B) 15 C) 20 D) 30 E) 60

3. $a, b \in Z^+$

$150 \cdot a = b^2$

$\Rightarrow \min(a) = ?$

A) 2 B) 3 C) 6 D) 10 E) 30

4. $a, b \in Z^+$

$135 \cdot a = b^2$

$\Rightarrow \min(a) = ?$

A) 3 B) 5 C) 6 D) 15 E) 45

5. $a, b \in Z^+$

$180 \cdot a = b^2$

$\Rightarrow \min(a) = ?$

A) 2 B) 3 C) 5 D) 6 E) 8

6. $a, b \in Z^+$

$540 \cdot a = b^2$

$\Rightarrow \min(a) = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

7. $a, b \in Z^+$

$126 \cdot a = b^2$

$\Rightarrow \min(b) = ?$

A) 45 B) 42 C) 36 D) 28 E) 14

8. $a, b \in Z^+$

$60 \cdot a = b^3$

$\Rightarrow \min(a + b) = ?$

A) 300 B) 320 C) 400 D) 450 E) 480

9. $a, b \in Z^+$

$75 \cdot a = b^3$

$\Rightarrow \min(a) = ?$

A) 5 B) 9 C) 15 D) 30 E) 45

10. $a, b \in Z^+$

$48 \cdot a = b^3$

$\Rightarrow \min(a) = ?$

A) 24 B) 36 C) 48 D) 64 E) 72

11. $x, y \in Z^+$

$24 \cdot x^2 = y^3$

$\Rightarrow \min(y) = ?$

A) 2 B) 3 C) 6 D) 18 E) 24

12. $a, b \in Z^+$

$40 \cdot a^2 = b^3$

$\Rightarrow \min(a) = ?$

A) 5 B) 10 C) 20 D) 25 E) 40

13. $a, b \in Z^+$

$24 \cdot a^2 = b^3$

$\Rightarrow \min(a + b) = ?$

A) 3 B) 6 C) 8 D) 9 E) 15

14. $a, b \in Z^+$

$18 \cdot a^2 = b^3$

$\Rightarrow \min(a) = ?$

A) 18 B) 12 C) 9 D) 6 E) 2

15. $a, b \in Z^+$

$96 \cdot a^3 = b^4$

$\Rightarrow \min(a + b) = ?$

A) 24 B) 18 C) 12 D) 8 E) 6

16. $a, b, c \in Z^+$

$(a + b) \cdot c^3 = 640$

$\Rightarrow \min(a \cdot b \cdot c) = ?$

A) 36 B) 48 C) 160 D) 240 E) 260

1. $a, b \in Z^+$

$a + b = 11$

$\Rightarrow \max(a \cdot b) = ?$

A) 24 B) 28 C) 30 D) 32 E) 34

2. $a, b \in Z^+$

$a + b = 17$

$\Rightarrow \min(a \cdot b) = ?$

A) 0 B) 16 C) 18 D) 30 E) 72

3. $a, b \in N$

$a + b = 17$

$\Rightarrow \min(a \cdot b) = ?$

A) 0 B) 16 C) 20 D) 72 E) 100

4. $a, b \in N$

$a + b = 21$

$\Rightarrow \min(a \cdot b) = ?$

A) 110 B) 80 C) 54 D) 20 E) 0

5. $a, b \in N$

$a + b = 21$

$\Rightarrow \max(a \cdot b) = ?$

A) 20 B) 21 C) 42 D) 110 E) 111

6. $a, b \in Z^+$

$a + b = 15$

$\Rightarrow \min(a \cdot b) = ?$

A) 14 B) 15 C) 20 D) 56 E) 60

7. $a, b \in Z^+$

$a + b = 13$

$\Rightarrow \max(a \cdot b) = ?$

A) 12 B) 13 C) 22 D) 36 E) 42

8. $a, b \in R^+$

$a + b = 11$

$\Rightarrow \max(a \cdot b) = ?$

A) 29,75 B) 30 C) 30,25 D) 30,5 E) 30,75

9. $a, b \in Z^+$

$a \cdot b = 48$

$\Rightarrow \min(a + b) = ?$

A) 49 B) 26 C) 19 D) 16 E) 14

10. $a, b \in Z$

$a \cdot b = 48$

$\Rightarrow \min(a + b) = ?$

A) -49 B) -26 C) -14 D) 0 E) 16

11. $a, b \in Z^-$

$a \cdot b = 30$

$\Rightarrow \max(a + b) = ?$

A) -31 B) -17 C) -13 D) -11 E) -6

12. $a, b \in Z^+$

$a \cdot b = 30$

$\Rightarrow \min(a + b) = ?$

A) 31 B) 18 C) 13 D) 11 E) 8

13. $a, b \in Z^+$

$a \cdot b = 30$

$\Rightarrow \max(a + b) = ?$

A) 31 B) 18 C) 13 D) 11 E) 8

14. $a, b \in Z^-$

$a \cdot b = 20$

$\Rightarrow \max(a + b) = ?$

A) -21 B) -12 C) -9 D) -6 E) -1

15. $a, b \in Z^-$

$a \cdot b = 20$

$\Rightarrow \min(a + b) = ?$

A) -21 B) -9 C) 9 D) 12 E) 21

16. $a, b \in R^+$

$a \cdot b = 48$

$\Rightarrow \min(a + b) = ?$

A) 14 B) $8\sqrt{3}$ C) 13 D) $6\sqrt{2}$ E) $4\sqrt{3}$

1. $a, b \in Z^+$

$a \cdot b = 20$

$\Rightarrow \max(a + b) = ?$

A) 8 B) 9 C) 12 D) 20 E) 21

2. $a, b \in Z^+$

$a > b$

$a + b = 16$

$\Rightarrow \max(a \cdot b) = ?$

A) 64 B) 63 C) 60 D) 16 E) 15

3. $a, b, c \in Z^+$

$a > b > c$

$a + b + c = 8$

$\Rightarrow \min(a \cdot b \cdot c) = ?$

A) 6 B) 8 C) 10 D) 12 E) 16

4. $a, b, c \in Z^+$

$a \neq b \neq c$

$a + b + c = 12$

$\Rightarrow \max(a \cdot b \cdot c) = ?$

A) 64 B) 60 C) 48 D) 18 E) 12

5. $a, b, c \in Z^+$

$a \cdot b \cdot c = 216$

$\Rightarrow \min(a + b + c) = ?$

A) 12 B) 18 C) 21 D) 43 E) 49

6. $a, b, c \in Z^+$

$a \neq b \neq c$

$a \cdot b \cdot c = 60$

$\Rightarrow \min(a + b + c) = ?$

A) 8 B) 10 C) 12 D) 20 E) 33

7. $a, b \in R^+$

$a \cdot b = 30$

$\Rightarrow \min(a + b) = ?$

A) 8 B) 11 C) $2\sqrt{30}$ D) $4\sqrt{3}$ E) $4\sqrt{15}$

8. $a, b, c \in Z$

$a \cdot b \cdot c = 30$

$\Rightarrow \min(a + c - b) = ?$

A) -34 B) -32 C) -30 D) 30 E) 32

9. $A, x \in Z^+$

$A = \dfrac{x+7}{x+2} \Rightarrow A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10. $A, x \in Z^+$

$A = \dfrac{x+10}{x+3}$

$\Rightarrow A = ?$

A) 0 B) 1 C) 2 D) 3 E) 7

11. $A, x \in Z^+$

$A = \dfrac{2x+36}{x+2}$

$\Rightarrow \max(A) = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

12. $A, x \in Z^+$

$A = \dfrac{2x+16}{x+2} \Rightarrow \min(A) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $A \in Z, x \in Z^+$

$A = \dfrac{x-12}{x+4} \Rightarrow \max(A) = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

14. $A, x \in N$

$A = \dfrac{3x+21}{x+5} \Rightarrow A = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $a, b, c \in Z^+$

$a < b < c$

$a + b + c = 72$

$\Rightarrow \max(a) = ?$

A) 22 B) 23 C) 24 D) 25 E) 26

16. $a, b, c \in Z^+$

$a < b < c$

$a + b + c = 121$

$\Rightarrow \min(c) = ?$

A) 39 B) 40 C) 41 D) 42 E) 43

1. $\frac{7+14+21+.....+70}{9+18+27+.....+90} = ?$

A) $\frac{1}{63}$ B) $\frac{1}{7}$ C) $\frac{3}{7}$ D) $\frac{7}{9}$ E) $\frac{9}{7}$

2. $a \neq 10$

$C\binom{17}{10} = C\binom{17}{a}$

$\Rightarrow a = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

3. $\frac{204}{x} \in Z \quad \frac{228}{x} \in Z \quad x \in Z^+$

$\Rightarrow \max(x) = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

4. $20 + 22 + 24 + ... + (2a+8) = 560$

$\Rightarrow a = ?$

A) 18 B) 19 C) 20 D) 21 E) 22

5. $x \in Z$

$A \in Z^+$

$A = \frac{3x+47}{x+1}$

$\Rightarrow \max(A) = ?$

A) 19 B) 25 C) 32 D) 47 E) 50

6. $5 \cdot 10 \cdot 15 \cdot 20 \cdot ... \cdot 95 \cdot 100 = ?$

A) $5 \cdot 20!$ B) $\frac{100!}{4!}$ C) $5^{19} \cdot 20!$

D) $5^{20} \cdot 20!$ E) $5^{21} \cdot 20!$

7. $A, x, y, z \in Z^+$

$A > 700$

$A = 6 \cdot x - 1 = 8 \cdot y + 3 = 10 \cdot z + 7$

$\Rightarrow \min(A) = ?$

A) 701 B) 703 C) 707 D) 709 E) 713

8. $a, n \in N^+$

$65! + 40! = 10^n \cdot a$

$\Rightarrow \max(n) = ?$

A) 15 B) 13 C) 9 D) 8 E) 5

9. $n, m, a \in N^+$

$34! + 35! = 2^n \cdot 3^m \cdot a$

$\Rightarrow \max(m+n) = ?$

A) 47 B) 48 C) 49 D) 50 E) 51

10. $1,\overline{3} + 2,\overline{3} + 3,\overline{3} + 4,\overline{3} + \ldots + 12,\overline{3} = ?$

A) 83 B) 82 C) 81 D) 80 E) 79

11. $17 + 19 + 21 + \ldots + (2n+7) = 161$

$\Rightarrow n = ?$

A) 7 B) 9 C) 11 D) 13 E) 15

12. $a, b \in R^+$

$a + b = 13$

$\Rightarrow \max(a \cdot b) = ?$

A) 42 B) 42,25 C) 45,75 D) 46,25 E) 50

13. $a, b, c \in Z^+$

$a \le b \le c$

$a + b + c = 140$

$\Rightarrow \min(c) = ?$

A) 48 B) 47 C) 46 D) 45 E) 44

14. $a, b \in Z^+$

$(a + b - 3) \cdot (a + b + 3) = 16$

$\Rightarrow \min(a \cdot b) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $a, b \in Z^-$

$72 \cdot a = b^3$

$\Rightarrow \max(a + b) = ?$

A) -14 B) -12 C) -9 D) -6 E) -3

16. $A, B \in N$

$A = \dfrac{2a+4}{a-1}$

$B = \dfrac{a-1}{2a+4}$

$\Rightarrow a = ?$

A) -5 B) -3 C) -1 D) 1 E) 3

1. $x = -1$

$y = 2$

$\Rightarrow 3 \cdot (x - y) + 4y - x \cdot y = ?$

A) -4 B) -2 C) 0 D) 1 E) 4

2. $x = -3$

$y = 1$

$\Rightarrow x^2 - x \cdot y + 2 \cdot (x - y) = ?$

A) -2 B) 4 C) 6 D) 9 E) 14

3. $x = -2$

$y = -3$

$\Rightarrow xy + x - y + 2 \cdot (y - x) = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

4.

1212	12
−	x
0	

$\Rightarrow x = ?$

A) 10 B) 11 C) 101 D) 111 E) 1001

5.

aaa	a
−	x
0	

$\Rightarrow x = ?$

A) 1 B) 10 C) 100 D) 110 E) 111

6.

ababa	ab
−	x
3	

$\Rightarrow x + a = ?$

A) 14 B) 104 C) 113 D) 1004 E) 1013

7. $\left(\frac{1}{7} + \frac{5}{11} - \frac{3}{13}\right) - \left(\frac{10}{13} + \frac{5}{11} - \frac{13}{7}\right) = ?$

A) -1 B) 1 C) 2 D) 3 E) 4

8. $2 \cdot \left(\frac{1}{6} - \frac{5}{22} + \frac{3}{14}\right) - \left(\frac{6}{11} - \frac{4}{7} - \frac{2}{3}\right) = ?$

A) -1 B) 1 C) 2 D) 3 E) 4

9. $\frac{1}{3}\cdot\left(\frac{6}{3}-\frac{9}{5}-\frac{15}{6}\right)+\frac{1}{2}\cdot\left(\frac{2}{3}-\frac{14}{5}-\frac{2}{6}\right)=?$

A) -2 B) -1 C) 0 D) 1 E) 2

10. $a, b, c \in Z^+$

$a \cdot b = 5$

$b \cdot c = 13$

$\Rightarrow a + c - b = ?$

A) 14 B) 15 C) 16 D) 17 E) 18

11. $a, c \in Z$

$b \in Z^+$

$b > c$

$a \cdot b = -12$

$b \cdot c = 3$

$\Rightarrow a + b + c = ?$

A) -3 B) -1 C) 0 D) 6 E) 12

12. $\frac{c}{a} \in Z$

$c \in Z^-$

$a, b \in Z$

$\left.\begin{matrix} a \cdot b = -15 \\ c \cdot a = 10 \end{matrix}\right\} \Rightarrow \frac{b+c}{a} = ?$

A) -5 B) -2 C) 1 D) 4 E) 8

13. $a, b, c \in Z^-$

$\left.\begin{matrix} a \cdot b = 6 \\ c \cdot a = 21 \end{matrix}\right\} \Rightarrow \max(a+b+c) = ?$

A) -28 B) -12 C) -10 D) -9 E) -6

14. $2002 \cdot 1998 - 2001 \cdot 1999 = ?$

A) -3 B) -2 C) -1 D) 1 E) 3

15. $\frac{13+15+17+19+21+23+25+27+29}{9} = ?$

A) 17 B) 19 C) 21 D) 23 E) 25

16. $8 \cdot (24242) - 5 \cdot (36363) = ?$

A) 63636 B) 48484 C) 36363 D) 21212 E) 12121

SAYILAR NUMBERS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	D	B	D	D	D	E	A	C	B	E	E	C	C	B

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	B	E	A	C	A	E	D	C	A	E	D	C	E	D

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	E	D	E	C	E	C	A	E	D	C	B	C	A	B	D

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	E	B	C	D	A	A	C	B	D	A	E	E	E	B	A

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	C	E	B	D	E	E	B	B	D	C	A	C	C

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	E	A	B	E	C	C	A	A	E	B	C	A	B	D	D

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	C	B	E	B	B	C	A	E	E	D	A	C	B	C	B

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	C	D	C	C	B	E	E	B	C	A	D	A	B	A

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	A	E	D	A	E	C	E	A	D	D	A	C	A	B

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	B	C	B	B	C	C	B	B	C	D	C	C	D	B	D

TEST 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	E	D	D	D	C	C	E	B	C	B	B	D	C	A

TEST 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	B	A	C	E	E	B	B	A	D	C	A	B	A	C	E

ORAN-ORANTI
RATIO AND PROPORTION

ÖZELLİK|Property 1

Aynı cins iki skaler büyüklüğü karşılaştırmaya oran denir.

a'nın b'ye oranı $\frac{a}{b}$ şeklinde gösterilir.

$\frac{a}{b} = k \rightarrow$ oran sabiti

The comparison of two scalar magnitudes of the same kinds is known as ratio. Ratio of a to b is denoted by $\frac{a}{b}$

$\frac{a}{b} = k \rightarrow$ *proportionality constant*

- $\frac{a}{b} = \frac{3}{5} \Rightarrow \begin{matrix} a = 3k \\ b = 5k \end{matrix}$
- $\frac{a}{3} = \frac{b}{5} \Rightarrow \begin{matrix} a = 3k \\ b = 5k \end{matrix}$
- $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} \Rightarrow \begin{matrix} a = 2k \\ b = 3k \\ c = 4k \end{matrix}$
- $(a : b : c) = (2 : 3 : 4) \Rightarrow \frac{a}{2} = \frac{b}{3} = \frac{c}{4}$

1. $\frac{x}{y} = \frac{2}{3}$

$x + y = 20$

$\Rightarrow x = ?$

8

2. $\frac{x}{y} = \frac{1}{3}$

$y - x = 6$

$\Rightarrow x = ?$

3

3. $\frac{x}{3} = \frac{y}{5}$

$x + y = 16$

$\Rightarrow x \cdot y = ?$

60

4. $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$

$x + y - z = 8$

$\Rightarrow x \cdot y = ?$

192

5. $\frac{2}{x} = \frac{3}{y} = \frac{4}{z}$

$2x + y - z = 3$

$\Rightarrow x \cdot y \cdot z = ?$

24

6. $(a : b) = (2 : 3)$

$2a + b = 14$

$\Rightarrow a \cdot b = ?$

24

7. $(a : b : c) = (2 : 3 : 5)$

$\Rightarrow \frac{a+b}{c} = ?$

1

8. $(a : b : c) = (3 : 4 : 5)$

$2a + b + c = 45$

$\Rightarrow a = ?$

9

9. $(a : b : c) = (2 : 3 : 4)$

$a - b + c = 3$

$\Rightarrow a = ?$

2

ÖZELLİK|Property 2

- $2a = 3b \Rightarrow a = 3k,\ b = 2k$ (3k, 2k)
- $2a = 3b = 5c \Rightarrow a = 15k,\ b = 10k,\ c = 6k$ ($3\cdot5k$, $2\cdot5k$, $2\cdot3k$)

1. $3x = 4y$, $x + y = -21$, $\Rightarrow x = ?$ — **−12**

2. $2x = 5y$, $2x + y = 24$, $\Rightarrow y = ?$ — **4**

3. $x = 5y$, $3x - y = 28$, $\Rightarrow x = ?$ — **10**

4. $2a = 3b = 4c$, $\Rightarrow \frac{a+b}{b+c} = ?$ — **$\frac{10}{7}$**

5. $x = 3y = 4z$, $x + y + z = -38$, $\Rightarrow x = ?$ — **−24**

6. $2x = 4y = 6z$, $x + y - z = 14$, $\Rightarrow x \cdot y = ?$ — **72**

7. $x = 2y = 4z$, $2x + 3y + z = 45$, $\Rightarrow x = ?$ — **12**

8. $2a = 3b$, $5b = 4c$, $2a + 3b + c = 29$, $\Rightarrow b = ?$ — **4**

9. $5a = 4c$, $3b = 2c$, $\Rightarrow \frac{a+b}{b-c} = ?$ — **$-\frac{22}{5}$**

10. $2a = 3b$, $5b = 6c$, $a + c = 28$, $\Rightarrow b = ?$ — **12**

11. $2a = 3b$, $5b = 4c$, $a - b + c = 42$, $\Rightarrow b = ?$ — **24**

12. $\frac{1}{2a} = \frac{1}{6b} = \frac{1}{4c}$, $a + b + c = 11$, $\Rightarrow a = ?$ — **6**

13. $\frac{1}{2a} = \frac{1}{3b} = \frac{1}{4c}$, $a + b - c = 28$, $\Rightarrow b \cdot c = ?$ — **192**

14. $\frac{1}{a} = \frac{1}{2b} = \frac{1}{4c}$, $a + b + c = -\frac{7}{4}$, $\Rightarrow a = ?$ — **−1**

15. $\frac{1}{a} = \frac{1}{2b} = \frac{1}{3c}$, $a + b + c = 11$, $\Rightarrow a = ?$ — **6**

ÖZELLİK|Property 3

$\frac{a}{b}=\frac{2}{3}$ (4) $\quad \frac{b}{c}=\frac{4}{5}$ (3)

Aynı ifadeler eşitlenir.

Same expressions are made equal.

$\frac{a}{b}=\frac{8}{12} \quad \frac{b}{c}=\frac{12}{15} \Rightarrow \begin{matrix} a=8k \\ b=12k \\ c=15k \end{matrix}$

1. $\frac{a}{b}=\frac{1}{2} \quad \frac{b}{c}=\frac{2}{3}$

$a+b+c=18$

$\Rightarrow a\cdot b-c=?$

9

2. $\frac{a}{2}=\frac{b}{3} \quad \frac{b}{4}=\frac{c}{5}$

$a+b+c=-70$

$\Rightarrow a=?$

−16

3. $\frac{a}{3}=\frac{b}{4} \quad \frac{b}{6}=\frac{c}{5}$

$a+b-c=22$

$\Rightarrow a=?$

18

4. $\frac{a}{4}=\frac{c}{3} \quad \frac{b}{4}=\frac{c}{6}$

$a+b+c=18$

$\Rightarrow a+c=?$

14

5. $\frac{a}{b}=\frac{2}{3} \quad \frac{b}{c}=\frac{6}{5}$

$2a+b-c=9$

$\Rightarrow a=?$

4

6. $\frac{a}{b}=\frac{2}{3} \quad \frac{b}{c}=2$

$\Rightarrow \frac{a+b}{b-c}=?$

$\frac{10}{3}$

ÖZELLİK|Property 4

$\frac{a}{b}=\frac{c}{d}$ orantısı için *(For $\frac{a}{b}=\frac{c}{d}$ ratio)*

- $a\cdot d=b\cdot c$
- $\frac{a}{c}=\frac{b}{d}$
- $\frac{d}{b}=\frac{c}{a}$
- $\frac{b}{a}=\frac{d}{c}$

1. $\frac{x+y}{x-y}=\frac{3}{2}$

$\Rightarrow \frac{x}{y}=?$

5

2. $\frac{2x-y}{x+y}=\frac{1}{3}$

$\Rightarrow \frac{x}{y}=?$

$\frac{4}{5}$

3. $\frac{x+y}{6}=\frac{y}{4}$

$x+y=12$

$\Rightarrow y=?$

8

4. $\frac{x-y}{2}=\frac{y}{3}$

$x+y=16$

$\Rightarrow x\cdot y=?$

60

5. $\frac{x+2y}{3}=\frac{y-x}{5}$

$y+x=-1$

$\Rightarrow x=?$

7

6. $\frac{2x+y}{x-y}=\frac{3}{2}$

$\Rightarrow \frac{x}{y}=?$

−5

ÖZELLİK|Property 5

$2xy = 3yz = 5xz$

Eşitliğin hepsi xyz ile bölünür.

Entire equation is divided by xyz.

$$\frac{2xy}{xyz} = \frac{3yz}{xyz} = \frac{5xz}{xyz}$$

$$\frac{2}{z} = \frac{3}{x} = \frac{5}{y} \Rightarrow \begin{matrix} x = 3k \\ y = 5k \\ z = 2k \end{matrix}$$

1. $4xy = 2yz = 3xz$

$(x : y : z) = (? : ? : ?)$

$(2 : 3 : 4)$

2. $\frac{x \cdot y}{2} = \frac{y \cdot z}{3} = \frac{x \cdot z}{6}$

$x + y + z = 24$

$\Rightarrow x = ?$

8

3. $\frac{2}{x \cdot y} = \frac{3}{x \cdot z} = \frac{4}{y \cdot z}$

$3x - 3y + z = 12$

$\Rightarrow y = ?$

16

4. $a, b, c \in R^+$

$\frac{3}{ab} = \frac{4}{bc} = \frac{8}{ac}$

$\Rightarrow ? < ? < ?$

$b < a < c$

5. $a, b, c \in R^-$

$\frac{4}{ab} = \frac{6}{bc} = \frac{5}{ac}$

$\Rightarrow ? < ? < ?$

$c < b < a$

6. $x < 0$

$\frac{x \cdot y}{2} = \frac{y \cdot z}{-5} = \frac{x \cdot z}{4}$

$\Rightarrow ? < ? < ?$

$x < y < z$

7. $a, b, c \in R^-$

$\frac{a}{0,3} = \frac{b}{1,2} = \frac{c}{0,6}$

$\Rightarrow ? < ? < ?$

$b < c < a$

ÖZELLİK|Property 6

$ax = by = cz = k$

$$\Rightarrow \frac{a}{\frac{1}{x}} = \frac{b}{\frac{1}{y}} = \frac{c}{\frac{1}{z}} = k$$

$$\Rightarrow \frac{a+b+c}{\frac{1}{x}+\frac{1}{y}+\frac{1}{z}} = k$$

1. $2x = 3y = 4z$

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 36$

$\Rightarrow x = ?$

$\frac{1}{8}$

2. $3x = 4y = 5z$

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 24$

$\Rightarrow x = ?$

$\frac{1}{6}$

3. $4x = 5y = 6z$

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 30$

$\Rightarrow y = ?$

$\frac{1}{10}$

4. $ax = by = cz = 12$

$a + b + c = 6$

$\Rightarrow \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = ?$

$\frac{1}{2}$

5. $ax = by = cz = 8$

$a + b + c = 24$

$\Rightarrow \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = ?$

3

6. $ax = by = cz = 12$

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$

$\Rightarrow \frac{a+b+c}{4} = ?$

3

7. $ax = by = cz = 12$

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 4$

$\Rightarrow \frac{a+b+c}{3} = ?$

16

ÖZELLİK|Property 7

Örnek | Example

$$\left.\begin{array}{l} 3x-\dfrac{5}{2y}=4 \\ 2y-\dfrac{5}{3x}=7 \end{array}\right\} \Rightarrow \frac{y}{x}=?$$

Çözüm | Solution

$3x-\dfrac{5}{2y}=4 \Rightarrow 6xy-5=8y$ .....①

$2y-\dfrac{5}{3x}=7 \Rightarrow 6xy-5=21x$.....②

① ve ② den $8y=21x \Rightarrow \dfrac{y}{x}=\dfrac{21}{8}$

1. $a+\dfrac{1}{2b}=3$

$2b+\dfrac{1}{a}=4$

$\Rightarrow \dfrac{a}{b}=?$

$\boxed{\frac{3}{2}}$

2. $x-\dfrac{1}{3y}=4$

$3y-\dfrac{1}{x}=2$

$\Rightarrow \dfrac{x+y}{x}=?$

$\boxed{\frac{7}{6}}$

3. $2x-\dfrac{3}{4y}=5$

$8y-\dfrac{3}{x}=2$

$\Rightarrow \dfrac{y}{x}=?$

$\boxed{\frac{1}{10}}$

4. $a+\dfrac{2}{3b}=4$

$3b+\dfrac{2}{a}=5$

$\Rightarrow \dfrac{a-b}{a}=?$

$\boxed{\frac{7}{12}}$

5. $a \cdot b > 0$

$2b^2+\dfrac{1}{a^2}=25$

$a^2+\dfrac{1}{2b^2}=18$

$\Rightarrow \dfrac{a}{b}=?$

$\boxed{\frac{6}{5}}$

6. $3a-\dfrac{2}{5b}=2$

$15b-\dfrac{2}{a}=3$

$\Rightarrow \dfrac{a}{b}=?$

$\boxed{\frac{10}{3}}$

7. $2a+\dfrac{3}{b}=4$

$b+\dfrac{3}{2a}=5$

$\Rightarrow \dfrac{a}{b}=?$

$\boxed{\frac{2}{5}}$

8. $3a-\dfrac{1}{b}=4$

$3b-\dfrac{1}{a}=8$

$\Rightarrow \dfrac{a}{b}=?$

$\boxed{\frac{1}{2}}$

ÖZELLİK|Property 8

$$\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$$

- $\frac{a\cdot c}{b\cdot d}=k^2$
- $\frac{a\cdot c\cdot e}{b\cdot d\cdot f}=k^3$
- $\frac{a\cdot c\cdot f}{b\cdot d\cdot e}=k$
- $\frac{b\cdot d\cdot f}{a\cdot c\cdot e}=\frac{1}{k^3}$
- $\frac{a}{b}+\frac{c}{d}+\frac{e}{f}=3k$
- $\frac{a+c+e}{b+d+f}=k$
- $\frac{na+mc+pe}{nb+md+pf}=k$

1. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{3}$

$\Rightarrow \frac{a\cdot c\cdot e}{b\cdot d\cdot f}=?$

$\frac{8}{27}$

2. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{5}$

$\Rightarrow \frac{a^2\cdot c\cdot e}{b^2\cdot d\cdot f}=?$

$\frac{81}{625}$

3. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$\Rightarrow \frac{a^2\cdot d\cdot e}{b^2\cdot c\cdot f}=?$

4

4. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{1}{2}$

$\Rightarrow \frac{a^2\cdot c\cdot f^2}{b^2\cdot d\cdot e^2}=?$

$\frac{1}{2}$

5. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$

$\Rightarrow \frac{a^2\cdot d\cdot f^3}{b^2\cdot c\cdot e^3}=?$

$\frac{1}{k^2}$

6. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$\Rightarrow \frac{b^3\cdot c\cdot e}{a^3\cdot d\cdot f}=?$

$\frac{1}{2}$

7. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{3}$

$\Rightarrow \frac{a\cdot e\cdot d}{f\cdot c\cdot b}=?$

$\frac{2}{3}$

8. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$

$\frac{a^2\cdot c\cdot f}{b^2\cdot d\cdot e}=16$

$\Rightarrow k^2=?$

16

9. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{2}$

$\Rightarrow \frac{a+c+e}{b+d+f}=?$

$\frac{3}{2}$

10. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$\Rightarrow \frac{a-2c+3e}{b-2d+3f}=?$

2

11. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{5}$

$a+c+3e=8$

$b+d=5$

$\Rightarrow f=?$

5

12. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{2}$

$3a+c-e=12$

$3b+d=7$

$\Rightarrow f=?$

-1

13. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$a-c+3e=10$

$b+3f=6$

$\Rightarrow d=?$

1

14. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{4}$

$\Rightarrow \frac{(a+c)\cdot e}{(b+d)\cdot f}=?$

$\frac{9}{16}$

15. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{5}$

$\frac{(a+2c)\cdot e^2}{(b+2d)\cdot f^2}=?$

$\frac{8}{125}$

16. $\frac{a+2b}{c}=\frac{c-b}{a+b}=k$

$\Rightarrow k=?$

1

17. $\frac{2a+c}{b}=\frac{2b+c}{a+c}=\frac{c}{4}$

$\Rightarrow c=?$

8

18. $\frac{a+b}{2}=\frac{b+c}{3}=\frac{a+c}{4}$

$a+b+c=9$

$\Rightarrow c=?$

5

19. $\frac{a+2b}{3}=\frac{b-c}{-2}=\frac{3c}{5}$

$a+b+c=9$

$\Rightarrow c=?$

3

20. $\frac{3x+y}{6}=\frac{x-y}{4}=\frac{x-3}{3}$

$\Rightarrow x=?$

−15

21. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=\frac{d}{f}=3$

$\Rightarrow \frac{a}{f}=?$

81

22. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=k$

$\frac{a}{d}=27$

$\Rightarrow k=?$

3

23. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}$

$\left(\frac{a+b}{b}\right)\cdot\left(\frac{b+c}{c}\right)\cdot\left(\frac{c+d}{d}\right)=27$

$\Rightarrow \frac{a}{d}=?$

8

24. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=3$

$\Rightarrow \left(\frac{a-b}{b}\right)\cdot\left(\frac{b-c}{c}\right)\cdot\left(\frac{c-d}{d}\right)=?$

8

25. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=4$

$\Rightarrow \left(\frac{a+b}{b}\right)\cdot\left(\frac{c+d}{d}\right)\cdot\left(\frac{e+f}{f}\right)=?$

125

26. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=k$

$\Rightarrow \left(\frac{a-b}{b}\right)\cdot\left(\frac{b-c}{c}\right)\cdot\left(\frac{c-d}{d}\right)=?$

$(k-1)^3$

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $\frac{x}{3}=\frac{y}{5}=\frac{z}{7}$

$x+y+z=45$

$\Rightarrow z=?$

21

2. $2x=3y=4z$

$x+y+z=65$

$\Rightarrow x=?$

30

3. $\frac{a}{b}=\frac{2}{3}$

$\frac{b}{c}=\frac{2}{4}$

$\Rightarrow \frac{b+c}{b-a}=?$

9

4. $(x:y:z)=(3:5:4)$

$y+z-x=18$

$\Rightarrow x\cdot y=?$

135

5. $\frac{x+y}{x-y}=\frac{5}{7}$

$\Rightarrow \frac{x}{y}=?$

-6

6. $\frac{3}{x\cdot y}=\frac{4}{y\cdot z}=\frac{5}{x\cdot z}$

$x+y+z=94$

$\Rightarrow x=?$

30

7. $2x-\frac{7}{3y}=2$

$6y-\frac{7}{x}=5$

$\Rightarrow \frac{x}{y}=?$

$\frac{6}{5}$

8. $ax=by=cz$

$a+b+c=12$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=3$

$\Rightarrow by=?$

4

1. $\frac{x}{y}=\frac{3}{5}$

$x+y=24$

$\Rightarrow x=?$

A) 3 B) 6 C) 9 D) 12 E) 15

2. $\frac{y}{x}=\frac{3}{7}$

$x-y=12$

$\Rightarrow x=?$

A) 7 B) 14 C) 21 D) 24 E) 28

3. $\frac{x}{y}=\frac{2}{3}$

$x+y=20$

$\Rightarrow x=?$

A) 2 B) 4 C) 6 D) 8 E) 10

4. $\frac{x}{3}=\frac{y}{5}=\frac{z}{2}$

$x+y+z=30$

$\Rightarrow y+z=?$

A) 30 B) 28 C) 24 D) 22 E) 21

5. $\frac{x}{4}=\frac{y}{5}=\frac{z}{6}$

$y-z+x=6$

$\Rightarrow z-x=?$

A) 2 B) 4 C) 6 D) 8 E) 10

6. $\frac{x}{2}=\frac{y}{3}=\frac{z}{4}$

$x-y+z=12$

$\Rightarrow z=?$

A) 8 B) 9 C) 10 D) 14 E) 16

7. $\frac{a}{2}=\frac{b}{3}=\frac{c}{5}$

$b+c-a=24$

$\Rightarrow b+c=?$

A) 32 B) 28 C) 24 D) 20 E) 16

8. $\frac{a}{-12}=\frac{b}{-3}=\frac{c}{5}$

$2a+b+c=-88$

$\Rightarrow a+b+2c=?$

A) 20 B) 12 C) 4 D) -4 E) -20

9. $\frac{2}{x}=\frac{3}{y}=\frac{7}{z}$

$x+y+z=84$

$\Rightarrow x+y=?$

A) 21 B) 28 C) 35 D) 42 E) 49

10. $\frac{2}{x}=\frac{5}{y}=\frac{6}{z}$

$2x+3y-4z=15$

$\Rightarrow x+y-z=?$

A) -39 B) -26 C) -13 D) -3 E) -1

11. $\frac{a}{3}=\frac{b}{4}=\frac{2}{c}$

$\Rightarrow a\cdot c+b\cdot c=?$

A) 4 B) 6 C) 10 D) 12 E) 14

12. $\frac{x}{4}=\frac{y}{7}=\frac{z}{11}$

$\Rightarrow \frac{x}{y}-\left(\frac{y}{z}\right)^{-1}+\frac{z}{x}=?$

A) $\frac{6}{5}$ B) $\frac{7}{4}$ C) 8 D) 9 E) 10

13. $\frac{a}{0,3}=\frac{b}{1,2} \Rightarrow \frac{a+2b}{a}=?$

A) $\frac{3}{2}$ B) 5 C) 9 D) 10 E) 12

14. $\frac{a}{0,9}=\frac{b}{0,81}$

$\Rightarrow \frac{a-b}{a}=?$

A) -8 B) $\frac{1}{10}$ C) $\frac{9}{10}$ D) 8 E) 10

15. $\frac{a}{0,2}=\frac{b}{0,4}=\frac{c}{1,6}$

$c-b-a=10$

$\Rightarrow a+b+c=?$

A) 2,2 B) 4,4 C) 10 D) 11 E) 22

16. $\frac{x}{3}=\frac{y}{5}=\frac{z}{8}$

$\Rightarrow \frac{\sqrt{8z}+\sqrt{20y}}{\sqrt{3x}}=?$

A) 8 B) 6 C) 5 D) 4 E) 3

1. $\frac{a+b}{a-b}=\frac{5}{3}$

$\Rightarrow \frac{a}{b}=?$

A) 5 B) 4 C) 3 D) 2 E) 1

2. $\frac{2x+y}{x-y}=\frac{3}{2}$

$\Rightarrow \frac{x+y}{x-y}=?$

A) $\frac{5}{3}$ B) $\frac{3}{2}$ C) 1 D) $\frac{2}{3}$ E) $\frac{1}{2}$

3. $\frac{x+y}{y}=\frac{3}{2} \Rightarrow \frac{x}{y}=?$

A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

4. $\frac{x-y}{x+y}=\frac{3}{4} \Rightarrow \frac{2x-3y}{2x+y}=?$

A) 7 B) $\frac{11}{15}$ C) $\frac{1}{7}$ D) $-\frac{19}{9}$ E) -7

5. $\frac{3x-y}{4}=\frac{2x-y}{3}$

$x-y=4$

$\Rightarrow x=?$

A) -4 B) -2 C) 2 D) 4 E) 8

6. $\frac{x-2y}{3}=\frac{y}{2}$

$x+y=9$

$\Rightarrow x=?$

A) 5 B) 7 C) 14 D) 21 E) 24

7. $\frac{x+y}{5}=\frac{y}{4}$

$x+y=35$

$\Rightarrow 2x-y=?$

A) -14 B) -7 C) 0 D) 7 E) 14

8. $\frac{b+3a}{3}=\frac{c+4a}{4}$

$b+c=14$

$\Rightarrow b=?$

A) 1 B) 3 C) 4 D) 6 E) 8

9. $\frac{a+b}{a-b}=\frac{5}{3}$

$\Rightarrow \frac{a^2+2ab+b^2}{a^2-2ab+b^2}=?$

A) $\frac{5}{9}$ B) $\frac{5}{3}$ C) $\frac{9}{5}$ D) $\frac{25}{9}$ E) $\frac{25}{3}$

10. $\frac{a}{c}=\frac{c}{8}=\frac{10}{16}$

$\Rightarrow c-8a=?$

A) -22 B) -20 C) -18 D) -10 E) -1

11. $(a:b:c)=(3:7:2)$

$\Rightarrow \frac{b-a}{c}=?$

A) 8 B) 6 C) 5 D) 4 E) 2

12. $(a:b:c)=(2:3:5)$

$\Rightarrow \frac{a+b}{c}\cdot\frac{b}{c-a}=?$

A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) $\frac{2}{3}$ D) 1 E) $\frac{5}{2}$

13. $x:10:18=2:y:9$

$\Rightarrow x+y=?$

A) 6 B) 9 C) 16 D) 18 E) 22

14. $(a:b)=(3:4)$

$3b=2c$

$\Rightarrow \frac{4a-2c}{b}=?$

A) -4 B) 0 C) 2 D) 4 E) 12

15. $a:b:c=2:4:5$

$\Rightarrow (a-c):(b+c):(2a+c)=?:?:?$

A) 7 : 7 : 3 B) (– 3) : 9 : 7 C) 7 : 7 : 7
D) (– 3) : 9 : 9 E) (– 3) : 7 : 9

16. $\frac{a}{\sqrt{3}}=\frac{b}{\sqrt{12}}=\frac{c}{\sqrt{15}}$

$\Rightarrow \frac{a^2+b^2+c^2}{ab}=?$

A) 3 B) 5 C) 12 D) 15 E) 30

1. $5a = 3b = 4c$

$\Rightarrow \frac{b-c}{c-a} = ?$

A) $\frac{2}{3}$ B) 1 C) $\frac{5}{3}$ D) 2 E) $\frac{8}{3}$

2. $x = 3y = 5z$

$x - 3y + z = -15$

$\Rightarrow z = ?$

A) -15 B) -5 C) 3 D) 5 E) 15

3. $2a = 4b = 6c$

$3a - 2b + c = 28$

$\Rightarrow a - b - c = ?$

A) 1 B) 2 C) 4 D) 7 E) 14

4. $3a = 6b = 9c$

$a + b + c = 44$

$\Rightarrow \frac{2a-c}{3b+4} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $2a = 4b = 6c$

$a \cdot b \cdot c = 288$

$\Rightarrow a = ?$

A) 6 B) 12 C) 18 D) 20 E) 24

6. $2x = 3y = 4z$

$x \cdot y \cdot z = 576$

$\Rightarrow x = ?$

A) 6 B) 12 C) 18 D) 24 E) 30

7. $2x = 3y = 4z$

$4x + 6y + 8z = 81$

$\Rightarrow y - x + z = ?$

A) $\frac{9}{2}$ B) 3 C) $\frac{9}{8}$ D) $\frac{3}{4}$ E) $\frac{1}{4}$

8. $\frac{a}{b} = \frac{3}{4}$

$\frac{b}{c} = \frac{2}{5}$

$a + b + c = 34$

$\Rightarrow b = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

9. $\frac{a}{b}=\frac{2}{3}$

$\frac{b}{c}=\frac{4}{3}$

$a+b+c=87$

$\Rightarrow a=?$

A) 42 B) 36 C) 30 D) 27 E) 24

10. $\frac{a}{b}=\frac{4}{5}$

$\frac{b}{c}=\frac{3}{2}$

$a-b+c=21$

$\Rightarrow a+c=?$

A) 6 B) 22 C) 44 D) 48 E) 66

11. $\frac{x}{y}=\frac{5}{3}$

$\frac{z}{y}=\frac{7}{4}$

$x-y+z=58$

$\Rightarrow \frac{x\cdot z}{y}=?$

A) 42 B) 50 C) 66 D) 70 E) 81

12. $a, b, c \in Z^+$

$\frac{a}{b}=\frac{3}{4}$

$\frac{b}{c}=\frac{5}{6}$

$\Rightarrow \max(2a-3b+c)=?$

A) –16 B) –6 C) –3 D) 3 E) 6

13. $2a=3b$

$5b=4c$

$a-b+c=21$

$\Rightarrow b=?$

A) 3 B) 4 C) 8 D) 12 E) 15

14. $3a=4b$

$5b=9c$

$a+b-2c=33$

$\Rightarrow c=?$

A) 3 B) 5 C) 10 D) 15 E) 20

15. $5a=4b$

$3b=2c$

$2a+b-c=33$

$\Rightarrow a=?$

A) 16 B) 20 C) 24 D) 30 E) 45

16. $2xy=5xz=3yz$

$\Rightarrow (x:y:z)=(?:?:?)$

A) (3 : 5 : 2) B) (2 : 5 : 3) C) (3 : 2 : 5)

D) (2 : 3 : 5) E) (5 : 2 : 3)

1. $\frac{2a+5b-3c}{3a+b-2c}=\frac{3}{2}$

$\Rightarrow \frac{a}{b}=?$

A) $\frac{5}{4}$ B) $\frac{9}{7}$ C) $\frac{4}{3}$ D) $\frac{7}{5}$ E) $\frac{3}{2}$

2. $\frac{3a-c+2b}{5b+6a+c}=\frac{2}{5}$

$\Rightarrow \frac{2c-a}{a+c}=?$

A) -10 B) -8 C) $-\frac{1}{10}$ D) $\frac{11}{10}$ E) 2

3. $\frac{a-2b+c}{b-a+c}=-2$

$a+2c=10$

$\Rightarrow \frac{4ab+2a+c+2bc}{2ab+2bc+a+c}=?$

A) -2 B) -1 C) $\frac{7}{4}$ D) $\frac{8}{5}$ E) 2

4. $\frac{a}{b}=\frac{c}{d}=3$

$\Rightarrow \frac{2ad+bc}{bd}=?$

A) 3 B) 6 C) 8 D) 9 E) 12

5. $\frac{x}{y}=\frac{z}{t}=4$

$\Rightarrow \frac{\left(\frac{x+y}{y}\right)\cdot\left(\frac{z-t}{t}\right)}{\frac{y}{x}}=?$

A) 12 B) 15 C) 30 D) 45 E) 60

6. $\frac{x}{y}=\frac{z}{t}=3$

$\Rightarrow \frac{x-y}{y}:\frac{z+t}{t}=?$

A) $\frac{1}{2}$ B) 1 C) 2 D) $\frac{5}{2}$ E) 3

7. $\frac{a}{b}=\frac{b}{c}=\frac{2}{3}$

$\Rightarrow \frac{b+a}{2c-b}\cdot\frac{b}{c-a}=?$

A) 1 B) $\frac{5}{2}$ C) $\frac{15}{4}$ D) 4 E) 5

8. $\frac{a}{x}=\frac{b}{y}=\frac{3}{4}$

$\Rightarrow \frac{x-a}{b}\cdot\frac{y-b}{a}=?$

A) $\frac{1}{9}$ B) $\frac{4}{9}$ C) $\frac{4}{3}$ D) $\frac{3}{2}$ E) $\frac{5}{2}$

9. $\frac{a}{b}=\frac{c}{d}=\frac{4}{7}$

$\Rightarrow \frac{b}{a+b}\cdot\frac{c+d}{2d}=?$

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

10. $\frac{x+y}{x}=\frac{2z-3x}{y}=\frac{x-3z-2y}{z}$

$\Rightarrow \frac{(x+y)\cdot(2z-3x)\cdot(x-3z-2y)}{x\cdot y\cdot z}=?$

A) -8 B) -1 C) 1 D) 8 E) 27

11. $\frac{x}{y}=\frac{y}{z}=3$

$\Rightarrow \frac{x+z}{y}:\frac{y-z}{x}=?$

A) $\frac{20}{27}$ B) $\frac{1}{3}$ C) 1 D) 10 E) 15

12. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=3$

$a+2d=58$

$\Rightarrow 2c-d=?$

A) 5 B) 10 C) 12 D) 15 E) 20

13. $\frac{a}{b}=4$

$\frac{b}{c}=3$

$\frac{c}{e}=2$

$\Rightarrow \frac{a-4e}{b+2c}=?$

A) 5 B) 4 C) 3 D) 2 E) 1

14. $\frac{1}{2a}=\frac{1}{6b}=\frac{1}{4c}$

$\Rightarrow \frac{a-c}{b+a}=?$

A) $\frac{3}{8}$ B) 1 C) $\frac{5}{4}$ D) $\frac{7}{4}$ E) 2

15. $\frac{1}{2a}=\frac{1}{3b}=\frac{1}{8c}$

$\Rightarrow \frac{a+c}{b-c}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $\frac{3}{4a}=\frac{5}{6b}=\frac{4}{3c}$

$a+b+c=35$

$\Rightarrow c+b=?$

A) 30 B) 28 C) 26 D) 20 E) 15

1. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{5}$

$\Rightarrow \frac{a\cdot d\cdot f}{b\cdot c\cdot e}=?$

A) $\frac{25}{9}$ B) $\frac{5}{3}$ C) $\frac{3}{5}$ D) $\frac{1}{3}$ E) $\frac{1}{5}$

2. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$\Rightarrow \frac{a^4\cdot c\cdot f^3}{b^4\cdot d\cdot e^3}=?$

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 2 D) 4 E) 8

3. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=3$

$\Rightarrow \frac{a^2\cdot 2\cdot c\cdot f^3}{e^3\cdot d\cdot b^2}=?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) 2 D) 3 E) 6

4. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$

$\Rightarrow \frac{a^4\cdot d^3\cdot f}{c^3\cdot e\cdot b^4}=?$

A) $\frac{1}{k^2}$ B) $\frac{1}{k}$ C) 1 D) k E) k^2

5. $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=\frac{d}{e}=5$

$\Rightarrow \frac{a}{e}=?$

A) 625 B) 25 C) 5 D) $\frac{1}{5}$ E) $\frac{1}{125}$

6. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{3}$

$\Rightarrow \frac{(a+c)\cdot e}{(b+d)\cdot f}=?$

A) $\frac{2}{3}$ B) $\frac{4}{9}$ C) $\frac{8}{27}$ D) $\frac{16}{27}$ E) 1

7. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$

$\Rightarrow \frac{a\cdot e+c^2}{b\cdot f+d^2}=?$

A) 1 B) $\frac{1}{k}$ C) $\frac{1}{k^2}$ D) k E) k^2

8. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$

$\Rightarrow \frac{a^2\cdot e+2c^3}{b^2\cdot f+2d^3}=?$

A) 1 B) k^2+2 C) k^3 D) k^3+2 E) k^4

9. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=2$

$\Rightarrow \frac{(2a-c)\cdot e^2}{f^2\cdot(d-2b)}=?$

A) –16 B) –8 C) 4 D) 8 E) 16

10. $\frac{a}{b}=\frac{c}{d}=x$

$\frac{2c+10}{2b+2d}=x$

$\Rightarrow a=?$

A) – 10 B) – 5 C) – 2 D) 5 E) 10

11. $\frac{a}{b}=\frac{c}{d}=13$

$\frac{n\cdot a+7\cdot c}{n\cdot b+m\cdot d}=13$

$\Rightarrow m=?$

A) 7 B) 8 C) 9 D) 11 E) 13

12. $\frac{a}{b}=\frac{x}{y}=k$

$\frac{3a-mx}{18y+9b}=\frac{k}{3}$

$\Rightarrow m=?$

A) – 18 B) – 9 C) – 6 D) 6 E) 18

13. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{3}$

$a-2c+e=8$

$b+f=16$

$\Rightarrow d=?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{3}{2}$

$3a+c-e=9$

$3b-f=9$

$\Rightarrow d=?$

A) –1 B) –2 C) –3 D) –4 E) –5

15. $\frac{a}{2}=\frac{b}{4}=\frac{c}{5}=\frac{4a-b+2c}{2t+6}$

$\Rightarrow t=?$

A) 3 B) 4 C) 5 D) 6 E) 7

16. $x:y:z:3=a:b:c:5$

$3x-y+z=21$

$c-b=5$

$\Rightarrow a=?$

A) 1 B) 2 C) 3 D) 10 E) 20

1. $\frac{2a+b}{c} = \frac{b-c}{a+b} = \frac{c}{4}$

$a+b+c=6$

$\Rightarrow c=?$

A) $\frac{4}{3}$ B) $\frac{5}{3}$ C) 2 D) $\frac{7}{3}$ E) $\frac{8}{3}$

2. $\frac{2}{2a-b} = \frac{3}{2b-c} = \frac{4}{2c-a} = \frac{1}{4}$

$\Rightarrow a+b+c=?$

A) 36 B) 30 C) 24 D) 18 E) 15

3. $\frac{a+b}{3} = \frac{b+c}{4} = \frac{a+c}{5}$

$a+b+c=24$

$\Rightarrow 7a-b=?$

A) 52 B) 28 C) 14 D) 6 E) 2

4. $\frac{3a-2b}{3} = \frac{4b+c}{5} = \frac{c-a}{2} = \frac{4}{5}$

$\Rightarrow a+b+c=?$

A) 1 B) 2 C) 4 D) 8 E) 10

5. $\frac{a-2b}{a+b} = \frac{b+c}{b-c} = \frac{4a+2c}{2a+c} = a+b+c$

$\Rightarrow a=?$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $\frac{a+b}{c} = \frac{b-c}{a} = \frac{3c+a}{b}$

$\Rightarrow \frac{a}{c}=?$

A) $\frac{1}{3}$ B) 1 C) 3 D) 4 E) 5

7. $\frac{b-3c+a}{3} = \frac{a+b}{7} = \frac{3c+b}{5}$

$\Rightarrow \frac{b}{c}=?$

A) $\frac{1}{6}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) $\frac{2}{3}$ E) $\frac{3}{4}$

8. $\frac{2a+b+c}{3} = \frac{c-b}{4} = \frac{2a+c}{5}$

$\Rightarrow \frac{a}{c}=?$

A) $\frac{3}{4}$ B) 1 C) $\frac{4}{3}$ D) $\frac{9}{4}$ E) 3

9. $\frac{a}{b}=\frac{c}{d}=\frac{3}{4}$

$\Rightarrow \frac{a+c+2b+2d}{b+d-a-c}=?$

A) 3 B) $\frac{7}{2}$ C) 4 D) 7 E) 11

10. $\frac{b-3a}{a}=\frac{7c+2b}{b}=\frac{b+7a-3c}{c}$

$\Rightarrow \frac{b-7a}{7c}=?$

A) -1 B) 0 C) $\frac{1}{2}$ D) 1 E) 2

11. $\frac{3x+y}{3}=\frac{2y-3x}{4}=\frac{y+10}{14}$

$\Rightarrow y=?$

A) 6 B) 5 C) 4 D) 2 E) 1

12. $a \neq b$

$\frac{a^2}{a+3}=\frac{2ab-b^2}{b+3}=2$

$\Rightarrow a-b=?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $\frac{a\cdot b}{2}=\frac{a\cdot c}{3}=\frac{b\cdot c}{4}$

$3a-3b+c=6$

$\Rightarrow b=?$

A) 4 B) 6 C) 8 D) 10 E) 16

14. $a, b, c \in R^-$

$\frac{4}{a\cdot b}=\frac{6}{b\cdot c}=\frac{18}{a\cdot c}$

$\Rightarrow ? < ? < ?$

A) $b<a<c$ B) $c<a<b$ C) $b<c<a$
D) $a<b<c$ E) $a<c<b$

15. $x<0$

$\frac{x\cdot y}{2}=\frac{y\cdot z}{-3}=\frac{x\cdot z}{5}$

$\Rightarrow ? < ? < ?$

A) $z<y<x$ B) $z<x<y$ C) $x<z<y$
D) $x<y<z$ E) $y<z<x$

16. $a, b, c \in Z^+$

$\frac{2}{a\cdot b}=\frac{6}{a\cdot c}=\frac{5}{b\cdot c}$

$\Rightarrow \min(a+b+c)=?$

A) 18 B) 20 C) 24 D) 26 E) 28

1. $a, b, c \in R^+$

$\left.\begin{matrix} 3a = 2b \\ 4b = 5c \end{matrix}\right\} \Rightarrow ? < ? < ?$

A) $c < b < a$ B) $c < a < b$ C) $a < b < c$
D) $b < a < c$ E) $a < c < b$

2. $a, b, c \in R^+$

$\left.\begin{matrix} \frac{a}{c} = \frac{5}{4} \\ \frac{b}{c} = \frac{3}{2} \end{matrix}\right\} \Rightarrow ? < ? < ?$

A) $c < b < a$ B) $a < c < b$ C) $a < b < c$
D) $c < a < b$ E) $b < c < a$

3. $a, b, c \in R^+$

$\left.\begin{matrix} a = 2b \\ 3b = 5c \end{matrix}\right\} \Rightarrow ? < ? < ?$

A) $c < b < a$ B) $c < a < b$ C) $a < b < c$
D) $a < c < b$ E) $b < a < c$

4. $a, b, c \in R^-$

$\frac{a}{3} = \frac{3b}{4} = c$

$\Rightarrow ? < ? < ?$

A) $c < b < a$ B) $a < b < c$ C) $a < c < b$
D) $c < a < b$ E) $b < c < a$

5. $a, b, c \in R^-$

$\frac{3a}{4} = \frac{b}{2} = \frac{5c}{6} \Rightarrow ? < ? < ?$

A) $b < a < c$ B) $b < c < a$ C) $c < b < a$
D) $c < a < b$ E) $a < c < b$

6. $a, b, c \in R^-$

$3a = 4b$

$\frac{b+c}{3} = \frac{c}{2}$

$\Rightarrow ? < ? < ?$

A) $b < a < c$ B) $c < b < a$ C) $b < c < a$
D) $c < a < b$ E) $a < c < b$

7. $a, b, c \in R^-$

$\frac{a}{0,3} = \frac{b}{1,1} = \frac{c}{0,6}$

$\Rightarrow ? < ? < ?$

A) $a < b < c$ B) $c < b < a$ C) $b < c < a$
D) $b < a < c$ E) $a < c < b$

8. $a < 0$

$a \cdot b = \frac{18}{20}$ $a \cdot c = \frac{8}{10}$ $b \cdot c = \frac{14}{16}$

$\Rightarrow ? < ? < ?$

A) $a < b < c$ B) $c < b < a$ C) $b < c < a$
D) $b < a < c$ E) $c < a < b$

9. $\left.\begin{array}{l} a+\frac{1}{2b}=2 \\ 2b+\frac{1}{a}=3 \end{array}\right\} \Rightarrow \frac{a+b}{a}\cdot\frac{b}{a-b}=?$

A) $\frac{1}{3}$ B) $\frac{7}{12}$ C) $\frac{7}{4}$ D) $\frac{7}{3}$ E) $\frac{21}{4}$

10. $\left.\begin{array}{l} 3y-\frac{1}{2x}=1 \\ x-\frac{1}{6y}=2 \end{array}\right\} \Rightarrow \frac{x+y}{y}=?$

A) 2 B) 3 C) 5 D) 6 E) 7

11. $\left.\begin{array}{l} 2x-\frac{3}{6y}=2 \\ 3y-\frac{3}{4x}=5 \end{array}\right\} \Rightarrow \frac{y-x}{2x-y}=?$

A) 1 B) 2 C) 3 D) 5 E) 7

12. $a<0<b$

$\left.\begin{array}{l} 3a^2+\frac{1}{b^2}=4 \\ 3b^2+\frac{1}{a^2}=9 \end{array}\right\} \Rightarrow \frac{a+b}{2a}\cdot\frac{a-b}{a}=?$

A) $-\frac{5}{4}$ B) $-\frac{5}{8}$ C) $-\frac{1}{4}$ D) $\frac{1}{4}$ E) $\frac{5}{4}$

13. $\left.\begin{array}{l} 2x=3y=4z \\ \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=18 \end{array}\right\} \Rightarrow y=?$

A) 6 B) 5 C) 3 D) $\frac{2}{3}$ E) $\frac{1}{6}$

14. $ax=by=cz=2$

$a+b+c=6$

$\Rightarrow \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $ax=by=cz=6$

$a+b+c=3$

$\Rightarrow \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

16. $ax=by=cz=12$

$x+y+z=6$

$\Rightarrow \frac{ab+bc+ac}{abc}=?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

1. $\frac{a}{b} = 3,5$

$\frac{a}{c} = 1,6$

$a + c = 91$

$\Rightarrow b = ?$

A) 16 B) 8 C) 4 D) 2 E) 1

2. $\frac{x}{4} = \frac{7}{y} = \frac{3}{z}$

$y - z = 8$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $\frac{4}{x} = \frac{y}{3} \Rightarrow \frac{y + \frac{3}{x}}{y - \frac{2}{x}} = ?$

A) $\frac{2}{3}$ B) 1 C) $\frac{3}{2}$ D) $\frac{5}{2}$ E) 3

4. $\left.\begin{array}{l} \frac{a}{a+b} = \frac{2}{7} \\ \frac{b}{b+c} = \frac{5}{6} \end{array}\right\} \Rightarrow \frac{a+c}{a-c} = ?$

A) $\frac{4}{3}$ B) $\frac{5}{2}$ C) 3 D) 4 E) $\frac{9}{2}$

5. $a < 0$

$b < 0$

$\frac{a}{b} = 5$

$a^2 - b^2 = 216$

$\Rightarrow a = ?$

A) –24 B) –20 C) –15 D) 15 E) 24

6. $a \cdot b < 0$

$\frac{a^2}{b^2} = \frac{4}{9} \Rightarrow \frac{a+b}{b} = ?$

A) $\frac{5}{3}$ B) $\frac{4}{3}$ C) 1 D) $\frac{2}{3}$ E) $\frac{1}{3}$

7. $\sqrt{a \cdot b} = 9$

$\sqrt{b \cdot c} = 4$

$a \cdot c = 36$

$\Rightarrow \frac{b^2}{a \cdot c} = ?$

A) $\frac{81}{16}$ B) $\frac{9}{4}$ C) 1 D) $\frac{16}{81}$ E) $\frac{4}{9}$

8. $\frac{5x + 4y}{3} = \frac{1 - x}{4} = \frac{y + 2}{5}$

$\Rightarrow x + y = ?$

A) – 4 B) – 3 C) – 2 D) 1 E) 2

9. $x, y \in R^+$

$\frac{x}{3} = \frac{y}{6} = \frac{4}{x+y}$

$\Rightarrow x = ?$

A) $\frac{9}{2}$ B) $\frac{11}{3}$ C) 3 D) $\frac{8}{3}$ E) 2

10. $\frac{a}{a+b} = \frac{3}{4}$

$\frac{b}{b+c} = \frac{2}{3}$

$\Rightarrow \frac{2c-a}{b+a} = ?$

A) 4 B) $\frac{7}{2}$ C) $\frac{3}{2}$ D) $-\frac{1}{2}$ E) $-\frac{3}{2}$

11. $\frac{x-y}{6} = \frac{9}{x+y} = \frac{x^2-y^2}{12}$

$\Rightarrow x - y = ?$

A) 144 B) 81 C) 27 D) 12 E) 9

12. $a > 0$

$b < 0$

$a^2 + b^2 = 40$

$\frac{a+b}{b} = -2$

$\Rightarrow 2a - b = ?$

A) 28 B) 20 C) 14 D) 12 E) 6

13. $\frac{a+b}{c} = \frac{b}{b+c} = \frac{3}{4}$

$2c + a = 8$

$\Rightarrow a + b + c = ?$

A) – 64 B) – 60 C) – 56 D) 60 E) 64

14. $\frac{a+b}{a-b} = \frac{x-y}{x+y}$

$\Rightarrow \frac{a}{b} = ?$

A) $\frac{x}{y}$ B) $\frac{y}{x}$ C) $-\frac{x}{y}$ D) $-\frac{y}{x}$ E) 1

15. $\frac{m}{n} = \frac{x}{y}$

$\Rightarrow \frac{y+n}{y-n} = ?$

A) $\frac{x-m}{x+m}$ B) $\frac{m-x}{m+x}$ C) $\frac{x+m}{x-m}$

D) $\frac{x+m}{m-x}$ E) –1

16. $\frac{a+2b}{a-b} = \frac{x}{y} \Rightarrow \frac{x-y}{2y+x} = ?$

A) $\frac{a+2b}{a-b}$ B) $\frac{b}{a}$ C) 1

D) $\frac{a}{b}$ E) $\frac{a+b}{a-b}$

1. $\left.\begin{array}{l}\frac{a}{b}=\frac{3}{5}\\ \frac{b}{c}=\frac{4}{9}\\ \frac{c}{d}=\frac{5}{12}\end{array}\right\}\Rightarrow \frac{a}{d}=?$

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{5}$ D) $\frac{1}{9}$ E) $\frac{1}{12}$

2. $\frac{x}{y}=\frac{y}{z}$

$\frac{yz}{y^2-2xz}=1$

$\Rightarrow \frac{x}{y}=?$

A) -2 B) -1 C) 0 D) 2 E) 4

3. $a<0$

$\frac{a}{0,2}=\frac{b}{0,8}=\frac{c}{0,11}$

$\Rightarrow ?<?<?$

A) $c<a<b$ B) $c<b<a$ C) $b<c<a$

D) $b<a<c$ E) $a<b<c$

4. $ax=by=cz=24$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=\frac{1}{4}$

$\Rightarrow \frac{a+b+c}{3}=?$

A) 5 B) 4 C) 3 D) 2 E) 1

5. $\frac{x}{4}+\frac{y}{4}=\frac{1}{\frac{1}{x}+\frac{1}{y}}$

$\Rightarrow \frac{2x+y}{2x-y}=?$

A) 6 B) 5 C) 4 D) 3 E) 2

6. $m=\frac{a-b}{a}$

$\frac{m}{2}=\frac{a-b}{b}$

$\Rightarrow m=?$

A) -1 B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) 1 E) 2

7. $a, b, c \in R^+$

$\left.\begin{array}{l}a\cdot b=\frac{23}{25}\\ b\cdot c=\frac{27}{29}\\ a\cdot c=\frac{25}{27}\end{array}\right\}\Rightarrow ?<?<?$

A) $a<b<c$ B) $c<b<a$ C) $b<c<a$

D) $b<a<c$ E) $a<c<b$

8. $\frac{a-b}{b}=\frac{2c+d}{c}=\frac{e+f}{e}=\frac{4}{9}$

$\Rightarrow \frac{a\cdot c\cdot f}{b\cdot d\cdot e}=?$

A) $\frac{13}{14}$ B) $\frac{5}{9}$ C) $\frac{65}{126}$ D) $\frac{13}{126}$ E) $\frac{5}{14}$

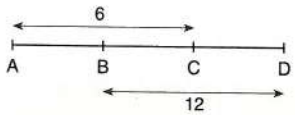
9. $\frac{a}{n!} = \frac{b}{(n+1)!} = \frac{c}{(n+2)!} = \frac{4}{25}$

$a + b + c = (n+1)!$

$\Rightarrow n = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10.



$\frac{|CD|}{|AB|} = \frac{5}{2}$

$\Rightarrow \frac{|BC| + 2|CD|}{2|AD|} = ?$

A) $\frac{11}{15}$ B) $\frac{5}{8}$ C) $\frac{5}{16}$ D) $\frac{11}{16}$ E) $\frac{12}{17}$

11. $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

$\left(\frac{a-b}{b}\right)\cdot\left(\frac{b-c}{c}\right)\cdot\left(\frac{c-d}{d}\right) = 27$

$\Rightarrow \frac{a}{d} = ?$

A) 64 B) 27 C) 16 D) 9 E) 1

12. $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

$\left(\frac{a+b}{b}\right)\cdot\left(\frac{b+c}{c}\right)\cdot\left(\frac{c+d}{d}\right) = 64$

$\Rightarrow \frac{d}{a} = ?$

A) 9 B) 3 C) 1 D) $\frac{1}{6}$ E) $\frac{1}{27}$

13. $x, y \in Z^+$

$\left.\begin{matrix} x^3 + 3x^2y = 9k \\ 3y^3 + y^2x = 16k \end{matrix}\right\} \Rightarrow \frac{x+y}{x-y} = ?$

A) -7 B) -3 C) 3 D) 4 E) 7

14. $\frac{x}{y} = \frac{y}{z} = \frac{z}{t}$

$xz - yt = 24$

$y + z = 8$

$\Rightarrow y - z = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

15. $\frac{a}{2^x} = \frac{b}{2^{y+1}} = \frac{c}{2^{z+3}} = \frac{1}{8}$

$x + y + z = 9$

$\Rightarrow a \cdot b \cdot c = ?$

A) 1 B) 2 C) 4 D) 8 E) 16

16. $\frac{x \cdot y}{x+y} = \frac{1}{3}$

$y + z = 5y \cdot z$

$\Rightarrow \frac{1}{x} - \frac{1}{z} = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

ORAN-ORANTI RATIO AND PROPORTION
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	D	E	B	E	A	E	C	D	E	B	C	B	E	B

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	B	B	C	B	A	D	D	B	E	D	B	B	D	B

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	B	A	B	B	C	D	E	E	D	B	D	D	C	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	C	D	E	A	A	A	A	B	E	B	D	A	C	C

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	C	C	A	B	E	C	B	D	A	C	B	C	B	D

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	A	A	C	C	A	E	A	E	B	D	B	C	B	D	D

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	A	B	A	D	C	D	E	E	B	B	E	C	B	B

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	C	C	C	E	C	C	E	D	C	C	C	C	C	B

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	B	D	D	D	A	A	C	C	D	A	E	A	C	E	A

KÜMELER
SETS

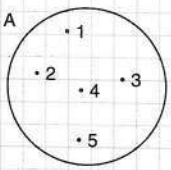
TANIM | Definition

Küme | Set

Özellikleri belirli olan nesneler topluluğuna küme denir.

A collection of objects with specific characteristics is called a set.

$A = \{1, 2, 3, 4, 5\}$



$A = \{x \mid 0 < x < 6,\ x \in Z\}$

Boş Küme | Empty Set

Hiçbir elemanı olmayan kümeye boş küme denir. Ø veya { } sembolü ile gösterilir.

A set which does not have any elements is called an empty set. It is denoted with a Ø or { } symbol.

Eşit Küme | Equal Set

Aynı elemanlardan oluşan kümelere eşit küme denir.

Sets which consist of the same elements are called equal sets.

$A = \{1, 2, 3\}$

$B = \{x \mid 1 \le x \le 3,\ x \in Z\}$ $\Rightarrow A = B$

- $n(A)$ ⇒ A kümesinin eleman sayısı
  is the number of elements of set A
- $a \in A$ ⇒ a, A kümesinin elemanı
  a is an element of set A
- $a \notin A$ ⇒ a, A kümesinin elemanı değil
  a is not an element of set A

Denk Küme | Equivalent Set

$n(A) = n(B) \Rightarrow A \cong B$

$A = \{1, 2, 3\}$

$B = \{a, b, c\}$

Evrensel Küme | Universal Set

Üzerinde işlem yapılan ve tüm kümeleri kapsayan kümeye evrensel küme denir ve U ile gösterilir.

The set, on which operations are performed and which contains all sets is called the universal set and is denoted with U.

Alt Küme | Subset

A ve B birer küme olsun. B kümesinin her elemanı, A kümesinin de elemanı ise B kümesi, A kümesinin alt kümesidir veya A kümesi, B kümesini kapsar denir. $B \subset A$ veya $A \supset B$ sembolleriyle gösterilir.

Let A and B be two sets. Of every element of set B is also an element of set A then it said that set B is a subset of set A, or that set A spans set B. This is notated as $A \supset B$ or $B \subset A$.

$A = \{a, b, c, d, e\}$

$B = \{b, c, e\}$ $\Rightarrow B \subset A$ veya *(or)* $A \supset B$

A, B ve C herhangi kümeler, U evrensel küme

Let A, B and C are any sets and U is the universal set

- $\emptyset \subset A$
- $A \subset A$
- $A \subset U$
- $A \subset B$ ve $B \subset A \Rightarrow A = B$
- $A \subset B$ ve $B \subset C \Rightarrow A \subset C$

ÖZELLİK|Property 1

Gösterimler | Notations

A = {1, 2, 3, a, b, {3}, {4, 5}}

1 ∈ A	Doğru *(Correct)*	{1} ∈ A	Yanlış *(Wrong)*
3 ∈ A	Doğru *(Correct)*	{3} ∈ A	Doğru *(Correct)*
2 ⊂ A	Yanlış *(Wrong)*	{2} ⊂ A	Doğru *(Correct)*
{4, 5} ∈ A	Doğru *(Correct)*	{{4, 5}} ⊂ A	Doğru *(Correct)*

Aşağıdaki gösterimlerden hangileri doğrudur?

Which of the following notations are correct?

1. A = {1, 2, {a}, {b, c}}

I) 2 ∈ A

II) a ∈ A

III) {b, c} ∈ A

I, III

2. A = {1, 4, 9, {3, 1}, {1}}

I) 7 ∉ A

II) {3, 1} ⊂ A

III) {1} ⊂ A

I, III

3. A = {3, 4, 5, {1, 2}}

I) 3 ⊂ A

II) {4, 5} ⊂ A

III) {1, 2} ∈ A

II, III

4. A = {{a, b}, 2, 4, c}

I) {a, b} ⊂ A

II) {2} ∉ A

III) {4, c} ∈ A

II

5. A = {b, e, {1, 3}, 4}

I) b ⊂ A

II) b ∈ A

III) {{1, 3}} ⊂ A

II, III

6. A = {1, 2, 3}

I) {1} ⊂ A

II) {1, 2} ⊂ A

III) {1, 2, 3} ∈ A

I, II

ÖZELLİK|Property 2

A kümesinin eleman sayısı n(A) sembolü ile gösterilir. Liste beçiminde { } ifadesinin arasındaki elemanlar bir kabul edilir.

The number of elements of set A is denoted by n(A). In list form, the elements inside the { } notation are considered as one.

A = {1, 2, {3, 4}, {5, 6, 7}} ⇒ n(A) = 4

1. A = {1, 3, {a, b}}

⇒ n(A) = ?

3

2. A = {2, 3, {1, 5, 6}, – 3, 4}

⇒ n(A) = ?

5

3. A = {1, 2, {0, b}, {c, d, e}}

⇒ n(A) = ?

4

4. A = {x | x ∈ N, – 4 < x < 6}

⇒ n(A) = ?

6

5. A = {x | x ∈ Z, x^2 < 30}

⇒ n(A) = ?

11

6. A = {x | 7 < x < 13, x ∈ Z}

⇒ n(A) = ?

5

7. A = {x | x = 3k, k ∈ Z, 0 < x < 70}

⇒ n(A) = ?

23

ÖZELLİK|Property 3

İki Kümenin Kesişimi| Intersection of Two Sets

$A \cap B = \{x \mid x \in A$ ve *(and)* $x \in B\}$

- $A \cap \emptyset = \emptyset$
- $A \cap A = A$
- $A \cap U = A$
- $A \cap B = B \cap A$
- $(A \cap B) \cap C = A \cap (B \cap C)$
- $A \subset B \Rightarrow A \cap B = A$

1. $A = \{2, 3, 4, 5\}$
$B = \{3, 4, a, b\}$
$\Rightarrow A \cap B = ?$

{3, 4}

2. $A = \{1, \{a, b\}, 2, 3\}$
$B = \{a, \{1, 3\}, 4, 5\}$
$\Rightarrow A \cap B = ?$

$\emptyset$

3. $A = \{-2, 3, \{a, b\}, 4\}$
$B = \{1, 3, 4\}$
$\Rightarrow A \cap B = ?$

{3, 4}

4. $A = \{x \mid x \in Z \ \ -1 < x < 3\}$
$B = \{y \mid y \in N \ \ -2 < x < 4\}$
$\Rightarrow A \cap B = ?$

{0, 1, 2}

6. $A = \{x \mid x \in R \ \ -4 < x < 5\}$
$B = \{y \mid y \in R \ \ -2 < y < 3\}$
$\Rightarrow A \cap B = ?$

(–2, 3)

7. $A = \{x \mid x \in R \ \ -1 < x < 5\}$
$B = \{y \mid y \in R \ \ 0 < y < 4\}$
$\Rightarrow A \cap B = ?$

(0, 4)

ÖZELLİK|Property 4

İki Kümenin Birleşimi | Union of Two Sets

$A \cup B = \{x \mid x \in A$ veya *(or)* $x \in B\}$

- $A \cup \emptyset = A$
- $A \cup A = A$
- $A \cup U = U$
- $A \cup B = B \cup A$
- $(A \cup B) \cup C = A \cup (B \cup C)$
- $A \subset B \Rightarrow A \cup B = B$

1. $A = \{1, 2, 3, 4\}$
$B = \{3, 4, 5\}$
$\Rightarrow A \cup B = ?$

{1, 2, 3, 4, 5}

2. $A = \{1, \{a, b, c\}, 4\}$
$B = \{a, b, c\}$
$\Rightarrow n(A \cup B) = ?$

6

3. $A = \{1, 2, \{a, b\}\}$
$B = \{a, b\}$
$\Rightarrow A \cup B = ?$

{1, 2, a, b, {a, b}}

4. $A = \{1, 2, 3, \{a, b\}\}$
$B = \{1, 3, a\}$
$\Rightarrow n(A \cup B) = ?$

5

5. $A = \{x \mid x \in Z \ \ -2 \leq x < 2\}$
$B = \{y \mid y \in Z \ \ -1 < y < 4\}$
$\Rightarrow A \cup B = ?$

{– 2, –1, 0, 1, 2, 3}

6. $A = \{x \mid x \in R \ \ -5 < x < 3\}$
$B = \{y \mid y \in R \ \ -2 < y < 4\}$
$\Rightarrow A \cup B = ?$

(–5, 4)

ÖZELLİK|Property 5

İki Kümenin Farkı | Difference of Two Sets

$A \setminus B = \{x \mid x \in A \text{ ve } x \notin B\}$

1. $A = \{a, b, c\}$
$B = \{a, 2, 3\}$
$\Rightarrow A \setminus B = ?$

{b, c}

2. $A = \{1, 2, a, b\}$
$B = \{\{1, 2\}, a\}$
$\Rightarrow A \setminus B = ?$

{1, 2, b}

3. $A = \{a, \{b\}, c, d\}$
$B = \{a, b, \{c\}, d, e\}$
$\Rightarrow A \setminus B = ?$

{{b}, c}

4. $A = \{x \mid x \in N \;\; -1 < x < 6\}$
$B = \{y \mid y \in N \;\; 0 < y < 3\}$
$\Rightarrow A \setminus B = ?$

{0, 3, 4, 5}

5. $A = \{x \mid x \in N \;\; -3 \leq x < 5\}$
$B = \{y \mid y \in N \;\; -1 < y < 4\}$
$\Rightarrow n(A \setminus B) = ?$

1

6. $A = \{x \mid x \in Z \;\; -2 < x < 6\}$
$B = \{y \mid y \in R \;\; -1 < x \leq 5\}$
$\Rightarrow A \setminus B = ?$

{−1}

7. $A = \{x \mid x \in Z \;\; |x| < 2\}$
$B = \{y \mid y \in Z \;\; |y - 1| < 2\}$
$\Rightarrow n(A \setminus B) = ?$

1

8. $A = \{x \mid x \in Z \;\; |x| \leq 3\}$
$B = \{y \mid y \in Z \;\; |y| > -2\}$
$\Rightarrow A \setminus B = ?$

Ø

ÖZELLİK|Property 6

Bir Kümenin Tümleyeni | Complement of a Set

$A' = \{x \mid x \notin A \text{ ve } x \in U\}$

- $\emptyset' = U$
- $U' = \emptyset$
- $(A')' = A$
- $A' = U \setminus A$
- $A \cup A' = U$
- $A \cap A' = \emptyset$

1. $U = \{1, 2, 3, 4, 5, 6\}$
$A = \{1, 2\}$
$\Rightarrow A' = ?$

{3, 4, 5, 6}

2. $A \subset U \qquad B \subset U$
$n(U) = 14$
$n(A) = 8$
$n(A \cap B) = 2$
$n(A \cup B) = 12$
$\Rightarrow n(B') = ?$

8

3. $A \subset U \qquad B \subset U$
$n(B') = 6$
$n(A' \cap B') = 2$
$\Rightarrow n(A \setminus B) = ?$

4

4. $A \subset U \qquad B \subset U$
$n(A \cap B') = 3$
$n(B \cap A') = 4$
$n(A \cap B) = 2$
$n((A \cup B)') = 3$
$\Rightarrow n(U) = ?$

12

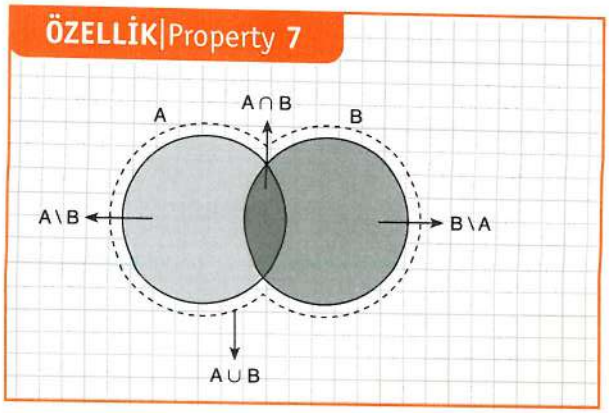
5. $A \subset U \qquad B \subset U$
$n(A) + n(B) = 12$
$n(A') + n(B') = 16$
$\Rightarrow n(U) = ?$

14

6. $A \subset U \qquad B \subset U$
$n(A \cap B') = 4$
$n(B) = 8$
$n((A' \cap B') = 4$
$\Rightarrow n(U) = ?$

16

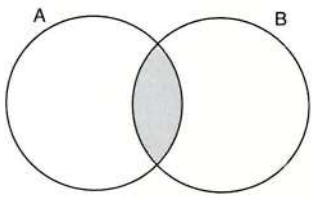
ÖZELLİK|Property 7



Aşağıdaki sorularda verilen taralı bölgeleri küme sembolleri ile ifade ediniz.

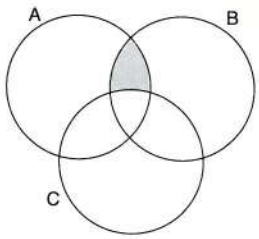
Show the shaded areas given in the following questions using set symbols.

1.



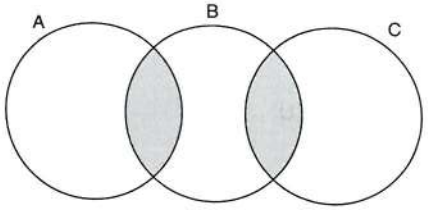
A ∩ B

2.



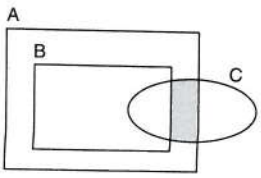
(A ∩ B) \ C

3.



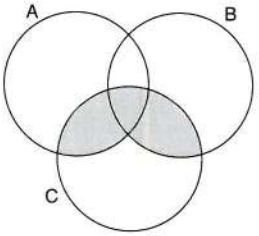
(A ∩ B) ∪ (B ∩ C)

4.



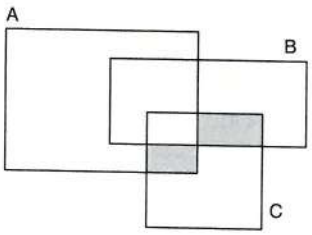
(A ∩ C) \ B

5.



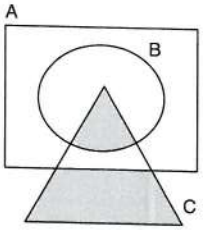
(A ∪ B) ∩ C

6.



[(A ∪ B) ∩ C] – (A ∩ B ∩ C)

7.



(B ∩ C) ∪ (C \ A)

ÖZELLİK|Property 8

- $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- $(A \cup B)' = A' \cap B'$
- $(A \cap B)' = A' \cup B'$
- $A \subset B \Rightarrow B' \subset A'$
- $A \setminus B = A \cap B'$

1. $A = \{a, b, c\}$
$B = \{c, d, e\}$
$C = \{b, c, e\}$
$\Rightarrow (A \cap B) \cup C = ?$

{b, c, e}

2. $A = \{a, b, c\}$
$B = \{a, 2, 3\}$
$C = \{1, 2\}$
$\Rightarrow n((A \setminus B) \cup C) = ?$

4

3. $A = \{a, b, c\}$
$B = \{b, c, e\}$
$C = \{a, c, e, d\}$
$\Rightarrow (A \cap B) \setminus C = ?$

{b}

4. $A = \{\{a\}, b, c, \{e, f\}\}$
$B = \{b, c, e, f\}$
$\Rightarrow n(A \setminus B$

2

5. $A = \{1, 2, 3, 4, 5\}$
$B) = \{1, 2, 5, 6\}$
$C = \{2, 4, 6\}$
$\Rightarrow (A \setminus B) \cap C = ?$

{4}

6. $A = \{1, 2, 4, 5\}$
$B = \{2, 3, 5\}$
$C = \{4, 5, 6\}$
$\Rightarrow n((A \cup B) \setminus C) = ?$

3

7. $A \subset B$
$n(A) = 5$
$n(B) = 12$
$n(B \setminus A) = ?$

7

8. $A \subset B$
$n(B \setminus A) = 5$
$n(A) = 3$
$n(B) = ?$

8

9. $B \subset A$
$A \cap C = \emptyset$
$n(B \cup C) = 6$
$n(C \setminus A) = 4$
$n(A \setminus B) = 10$
$\Rightarrow n(A) = ?$

12

10. $A \subset B$
$n(B \setminus A) = 2 \cdot n(A)$
$n(A) + n(B) = 16$
$\Rightarrow n(A) = ?$

4

11. $A \setminus (A \cap B) = ?$

$A \setminus B$

12. $A \cap B = A$
$\Rightarrow A \setminus B' = ?$

A

13. $A \subset B$
$(A \cap B') \setminus (A \cap B) = ?$

$\emptyset$

14. $A \cap B = \emptyset$
$[(A' \cup B) \cap A] = ?$

$\emptyset$

15. $[A' \cup (A \cap B)]' = ?$

$A \setminus B$

ÖZELLİK|Property 9

- $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
- $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$
- $n(A \setminus B) = n(A) - n(A \cap B)$

1. $A = \{x \mid x = 5k \ , \ k \in Z \ , \ 6 < x < 82\}$

$\Rightarrow n(A) = ?$

15

2. $A = \{x \mid x = 4k \ , \ k \in Z \ , \ -13 < x < 65\}$

$\Rightarrow n(A) = ?$

20

3. $n(A) = 7$

$n(B) = 9$

$n(A \cap B) = 4$

$\Rightarrow n(A \cup B) = ?$

12

4. $A = \{x \mid x = 2k \ , \ k \in Z \ , \ 10 < x < 75\}$

$B = \{y \mid y = 3k \ , \ k \in Z \ , \ 8 < y < 80\}$

$\Rightarrow n(A \cap B) = ?$

11

5. $A = \{x \mid x = 3k \ , \ k \in Z \ , \ 6 < x < 71\}$

$B = \{y \mid y = 4k \ , \ k \in Z \ , \ 5 < y < 60\}$

$\Rightarrow n(A \cap B) = ?$

4

6. $A = \{x \mid x = 3k \ , \ k \in Z \ , \ 20 \leq x < 60\}$

$B = \{y \mid y = 4k \ , \ k \in Z \ , \ 24 \leq y < 48\}$

$\Rightarrow n(A \setminus B) = ?$

11

7. $A = \{x \mid x = 4k \ , \ k \in Z \ , \ 1 < x < 176\}$

$B = \{y \mid y = 5k \ , \ k \in Z \ , \ 3 < y < 171\}$

$\Rightarrow n(A \cup B) = ?$

69

8. $A = \{x \mid 32 < x \leq 420 \ , \ x = 3n \ , \ n \in N\}$

$B = \{y \mid 70 < y \leq 500 \ , \ y = 4m \ , \ m \in N\}$

$\Rightarrow n(A \cup B) = ?$

208

9. $n(A) = 11$

$n(B) = 13$

$n(C) = 10$

$n(A \cap B) = 5$

$n(B \cap C) = 5$

$n(A \cap C) = 4$

$n(A \cap B \cap C) = 3$

$\Rightarrow n(A \cup B \cup C) = ?$

23

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $A = \{1, 3, 4, 5\}$
$B = \{2, 3, 4, 6\}$
$C = \{4, 5, 6, 7\}$
$\Rightarrow (A \setminus B) \cup [B \setminus (A \cup C)] = ?$

{1, 2, 5}

2. $A = \{x \mid x \in Z \;\; -2 \le x < 5\}$
$B = \{y \mid y \in Z \;\; -3 < y < 1\}$
$\Rightarrow A \cap B = ?$

{–2, –1, 0}

3. $A = \{x \mid x \in Z \;\; |x| < 4\}$
$B = \{y \mid y \in R \;\; -1 < y < 3\}$
$\Rightarrow A \cap B = ?$

{0, 1, 2}

4. $A = \{x \mid x \in R \;\; -2 \le x \le 3\}$
$B = y \mid y \in R \;\; -3 < y < 1\}$
$\Rightarrow A \cup B = ?$

(– 3, 3]

5. $n(U) = 18$
$n((A \cup B)') = 6$
$n(B) = 4$
$\Rightarrow n(A \setminus B) = ?$

8

6. $A \subset B \subset C$
$n(A) = 3$
$n(B \setminus A) = 2$
$n(C \setminus B) = 6$
$\Rightarrow n(C) = ?$

11

7. $B \subset A$
$\Rightarrow (B \cap A) \setminus A' = ?$

B

8. $A = \{x \mid x = 2k \;\; k \in Z \;\; 0 < x < 200\}$
$B = \{y \mid x = 3k \;\; k \in Z \;\; 0 < x < 200\}$
$C = \{z \mid z = 5k \;\; k \in Z \;\; 0 < x < 200\}$
$\Rightarrow n[(A \cap B) \setminus C] = ?$

27

1. $A = \{a, b, \{c, d\}, \{a\}, \{e, f, g\}\}$
$\Rightarrow n(A) = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

2. $A = \{\{1, 2\}, 1, a, \{a, 1\}\}$
$\Rightarrow n(A) = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

3. $A = \{x \mid x \in N,\ -2 < x < 7\}$
$\Rightarrow n(A) = ?$

A) 11 B) 9 C) 7 D) 6 E) 5

4. $A = \{x \mid x \in Z,\ 9 \le x < 15\}$
$\Rightarrow n(A) = ?$

A) 9 B) 8 C) 7 D) 6 E) 5

5. $A = \{x \mid x \in Z,\ x^2 < 40\}$
$\Rightarrow n(A) = ?$

A) 13 B) 12 C) 9 D) 7 E) 6

6. $A = \{x \mid x \in Z,\ -9 < x^3 < 60\}$
$\Rightarrow n(A) = ?$

A) 12 B) 11 C) 10 D) 8 E) 6

7. $A = \{(a, b) :\ a + b = 3,\ a, b \in N\}$
$\Rightarrow n(A) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

8. $A = \{a, b, c, d\}$
$B = \{a, b, c, f\}$
$C = \{c, d, e\}$
$\Rightarrow (A \cap C) \cup B = ?$

A) $\{c\}$ B) $\{a, b, c\}$
C) $\{a, b, c, d\}$ D) $\{a, b, c, d, e\}$
E) $\{a, b, c, d, f\}$

9. $A = \{1, 2, 3, 4, 5, 6\}$
$B = \{2, 4, 5, 6, 7\}$
$C = \{1, 3, 4, 5, 8, 9\}$
$\Rightarrow (A \cap B) - C = ?$

A) $\{2, 6\}$ B) $\{4, 5\}$ C) $\{5, 6\}$
D) $\{2, 4, 5, 6\}$ E) $\emptyset$

10. $B = \{a, b, c, d\}$
$A \cup C = \{c, d, e, f\}$
$\Rightarrow (B \cap A) \cup (B \cap C) = ?$

A) $\{a, b\}$ B) $\{c, d\}$ C) $\{d, e\}$
D) $\{c, f\}$ E) $\{b, f\}$

11. $A = \{a, b, c\}$
$B = \{b, c, d, e\}$
$C = \{b, e, f\}$
$\Rightarrow (A \cup B) \cap C = ?$

A) $\{b, e, f\}$ B) $\{b\}$ C) $\{b, f\}$
D) $\{b, e\}$ E) $\{a, b, c, d, e, f\}$

12. $A = \{a, b, c\}$
$B \cup C = \{a, b, d, 1, 2\}$
$\Rightarrow (A \cap C) \cup (A \cap B) = ?$

A) $\{d, 1, 2\}$ B) $\{1, 2\}$ C) $\{a, b\}$
D) $\{b, d\}$ E) $\{a, b, d, 1, 2\}$

13. $A = \{1, 2, \{3\}, \{a, b\}, d, e\}$
$B = \{\{1\}, 2, 3, a, b, \{d\}\}$
$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $A = \{a, b, c, d, \{a, b\}, \{d\}\}$
$B = \{\{a\}, b, e, f, \{a, d\}\}$
$\Rightarrow n(A \setminus B) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

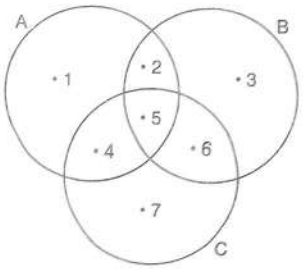
15. $A = \{a, \{b\}, c, \{d, e\}, f\}$
$B = \{\{a\}, b, c, d, e, \{f\}\}$
$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16. $A \subset U$, $B \subset U$
$A = \{a, b, c, d\}$
$B = \{c, d, e\}$
$\Rightarrow n(A \cap (B \cup A')) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

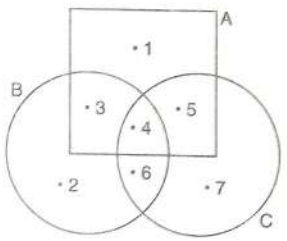
1.



⇒ (A ∪ B) \ C = ?

A) {4, 5, 6} B) {7} C) {1, 2, 3}
D) {1, 2, 3, 4, 5, 6} E) Ø

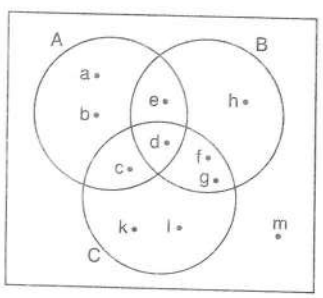
2.



⇒ (A \ B) ∪ [B \ (A ∪ C)] = ?

A) {1} B) {1, 2} C) {1, 2, 5}
D) {4, 6, 7} E) Ø

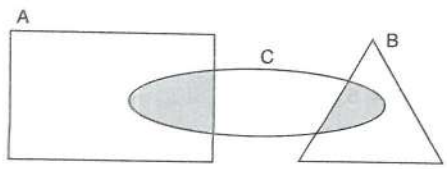
3.



⇒ [A ∪ (B ∩ C)]' = ?

A) {k, l} B) {h, k, l} C) {h, k, l, m}
D) {f, g, m} E) {f, g, m, h, k, l}

4.

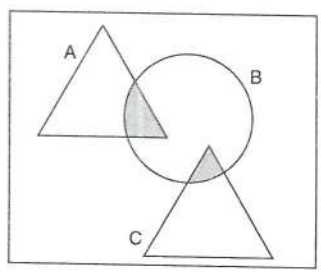


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) (A ∩ C) ∩ B B) (A ∩ B) \ C
C) (A ∪ B) ∩ C D) C \ (A ∪ B)
E) (A \ C) \ (B \ C)

5.

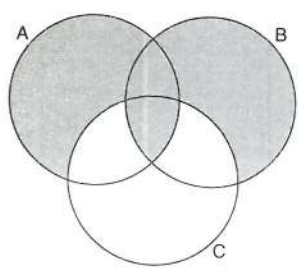


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) A ∩ B ∪ C B) A ∩ B ∩ C
C) (A ∪ B) ∩ (B ∪ C) D) (A ∩ B) ∪ (B ∩ C)
E) (A ∩ B) ∪ (B ∪ C)

6.

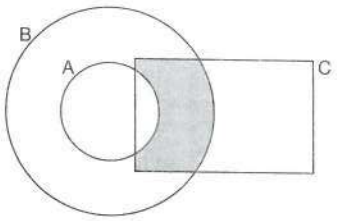


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) A ∩ (B ∪ C) \ C B) A ∩ (B \ C)
C) A ∩ (C – B) \ C D) (A – B)' \ C
E) [(A ∪ B) \ C] ∪ (A ∩ B ∩ C)

7.

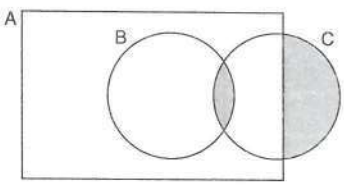


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $(A \cap B) \cap C$
B) $(B \setminus A) \cap C$
C) $(B \cap C) \cup A$
D) $(B \cap A') \cup C$
E) $(C \setminus B) \cap A$

8.

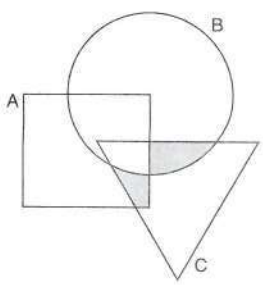


Taralı bölge aşağıdakilerdenhangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $(A \cap B) \cap B'$
B) $(A' \setminus B) \cap C$
C) $A \cap B \cap C$
D) $(B \setminus A) \cap C$
E) $(B \cap C) \cup (C \setminus A)$

9.

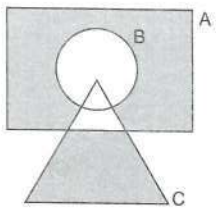


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $(B \cap C) \cup (A \cap C)$
B) $(A \cup B) \setminus (A \cap B \cap C)$
C) $(A \cup B) \setminus C$
D) $(A \cap B') \cup (A \cap C')$
E) $[(A \cup B) \cap C] \setminus (A \cap B \cap C)$

10.

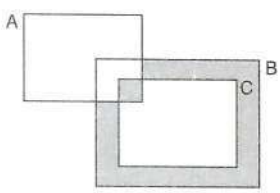


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $A \cap B \cup C$
B) $(B \setminus C) \cup (C \setminus A)$
C) $(A \setminus B) \cup (C \setminus A)$
D) $A \setminus (B \cup C) \cup (C \setminus A)$
E) $(A \cup B \cup C) \setminus B$

11.

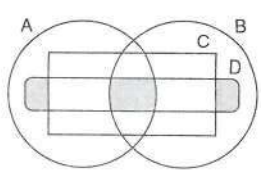


Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $A \cup B \cap C$
B) $A \cap C \cap B$
C) $A \cap C \cup B$
D) $[B \setminus (A \cup C)] \cap (A \cup C)$
E) $[B \setminus (A \cup C)] \cup (A \cap C)$

12.



Taralı bölge aşağıdakilerden hangisi ile ifade edilir?

Which of the following is used to represent the shaded area?

A) $[C \setminus (A \cup B)] \setminus D$
B) $(A \cup B \cup C) \setminus D$
C) $(A \cap C) \setminus (A \cap B)$
D) $[(A \cup B) \setminus C] \cap D$
E) $(D \setminus C) \cup (A \cap B \cap D)$

1. $A = \{x \mid -3 < x < 5,\ x \in R\}$
$B = \{y \mid 0 < y < 18,\ y \in R\}$
$\Rightarrow A \cap B = ?$

A) [0, 5] B) (–3, 0) C) (–3, 18)
D) (0, 18) E) (0, 5)

2. $A = \{x : -2 \le x \le 6,\ x \in R\}$
$B = \{x : -6 \le x < 2,\ x \in R\}$
$\Rightarrow A \cap B = ?$

A) [– 6, 6) B) [2, 4) C) [– 2, 2)
D) [– 2, 6) E) [– 4, 4]

3. $A = \{x \mid x \in R,\ 1 \le x \le 9\}$
$B = \{y \mid y \in R,\ -2 < y \le 4\}$
$\Rightarrow A \cap B = ?$

A) (1, 4] B) [1, 4] C) [1, 4)
D) {2, 3} E) {1, 2, 3, 4}

4. $A = \{x \mid x \in Z,\ 5 < x \le 10\}$
$B = \{y \mid y \in R,\ 1 < y \le 7\}$
$\Rightarrow A \cap B = ?$

A) (5, 7] B) [5, 7) C) (5, 7)
D) {5, 6, 7} E) {6, 7}

5. $A = \{x \mid x \in Z,\ 3 < x < 10\}$
$B = \{x \mid x \in R,\ 5 < x < 100\}$
$\Rightarrow A \cap B = ?$

A) (5, 10) B) [6, 9]
C) (3, 100) D) {5, 6, 7, 8, 9, 10}
E) {6, 7, 8, 9}

6. $U = Z$
$A = \{x \mid x \in Z,\ |x| \ge 4\}$
$B = \{x \mid x \in Z,\ x < 3\}$
$\Rightarrow n((A \cup B)') = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

7. $A = \{x \mid x \in Z,\ |x| < 4\}$
$B = \{y \mid y \in Z,\ |y + 1| \le 3\}$
$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $A = \{x \mid x \in Z,\ |x| \le 7\}$
$B = \{y \mid y \in Z,\ |y - 1| \le 3\}$
$\Rightarrow n(A \setminus B) = ?$

A) 11 B) 10 C) 9 D) 8 E) 7

9. $A \subset R$

$B \subset R$

$A = [-5, 3)$

$B = [-2, 8]$

$\Rightarrow A \cap B' = ?$

A) $[-5, -2)$ B) $[-5, -2]$ C) $[-5, 8]$

D) $[-2, 3)$ E) $(3, 8]$

10. $A \subset R$

$B \subset R$

$A = (-2, 4]$, $B = [3, 7]$

$\Rightarrow A \setminus B = ?$

A) $(-2, 7)$ B) $(-2, 3]$ C) $(-2, 3)$

D) $[-2, 7]$ E) $[4, 7]$

11. $A \subset R$

$B \subset R$

$A' = [-1, 5)$, $B = (1, 7]$

$\Rightarrow A \cap B' = ?$

A) $(-3, 7)$ B) $(0, 6)$

C) $(-\infty, -1) \cup (7, \infty)$ D) $[-1, 1]$

E) $(-\infty, -1] \cup [7, \infty)$

12. $A' \cup B = \{a, b, c, d, e\}$

$A' \cup C = \{a, c, e, f, g\}$

$\Rightarrow A' \cup (B \cap C) = ?$

A) $\{b, d, f, g\}$ B) $\{a, b, c, d\}$ C) $\{a, c, e\}$

D) $\{f, g\}$ E) $\{b, d\}$

13. $A = \{x \mid x \in Z,\ 1 < x \leq 7\}$

$B = \{(x, y) \mid x \in A,\ y \in Z,\ x + y = 10\}$

$\Rightarrow n(B) = ?$

A) 8 B) 7 C) 6 D) 5 E) 4

14. $A - B = \{a, b, c\}$

$A - C = \{x, y, a, z, c\}$

$\Rightarrow n(A - (B \cup C)) = ?$

A) 6 B) 4 C) 3 D) 2 E) 1

15. $A - B = \{1, 2, a, b\}$

$A - C = \{1, a, b, c\}$

$\Rightarrow n(A - (B \cap C)) = ?$

A) 7 B) 6 C) 5 D) 3 E) 2

16. $A \subset U$, $B \subset U$, $U = \{a, b, c, d, e, f\}$

$B \setminus A = \{f\}$, $A' \cap B' = \{a, d\}$

$A' \cup B' = \{a, b, c, d, f\}$

$\Rightarrow A = ?$

A) $\{a, b, d\}$ B) $\{b, c, e\}$ C) $\{a, b, e\}$

D) $\{a, b, c, e\}$ E) $\{c, d, e, f\}$

1. $n(A \setminus B) = 5,\ n(A \cup B) = 14,\ n(B \setminus A) = 3$

$\Rightarrow n(B) = ?$

A) 1 B) 3 C) 5 D) 6 E) 9

2. $n(A \cup B) = 20$

$n(A \cap B) = 4$

$n(A) = n(B)$

$\Rightarrow n(A) = ?$

A) 6 B) 8 C) 10 D) 12 E) 14

3. $n(A \setminus B) = 6$

$n(A \cup B) = 16$

$\Rightarrow n(B) = ?$

A) 7 B) 10 C) 13 D) 16 E) 22

4. $n(A \setminus B) = k$

$n(B \setminus A) = 3k$

$n(A \cap B) = k+1$

$n(A \cup B) = 21$

$\Rightarrow n(A) = ?$

A) 4 B) 5 C) 9 D) 13 E) 17

5. $n(A) = 3x - 1$

$n(B) = 9 - 2x$

$n(A \cap B) = x - 2$

$\Rightarrow n(A \cup B) = ?$

A) 12 B) 10 C) 8 D) 6 E) 4

6. $A \subset U,\ B \subset U$

$n(A) = 4$

$n(B') = 10$

$n(A') = 18$

$\Rightarrow n(B) = ?$

A) 8 B) 10 C) 12 D) 14 E) 16

7. $A \subset B$

$n(B \setminus A) = 7$

$n(A) + n(B) = 17$

$\Rightarrow n(A) = ?$

A) 5 B) 6 C) 7 D) 9 E) 10

8. $A \subset B \subset C$

$n(A) = 5$

$n(B) = 7$

$n(C) = 10$

$\Rightarrow n(A \cap B) + n(B \cup C) = ?$

A) 15 B) 14 C) 13 D) 12 E) 10

9. $n(A \cup B) = 16$
$n(A \cap B) = 4,\ n(B \setminus A) = 8$
$\Rightarrow n(A \setminus B) = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

10. $n(A \cup B) = 24,\ n(A) = 18,\ n(B) = 19$
$\Rightarrow n(A \setminus B) = ?$

A) 4 B) 5 C) 6 D) 8 E) 13

11. $A \subset U,\ B \subset U$
$n(A) + n(B) = 12,\ n(A') = 6$
$n(B') = 14$
$\Rightarrow n(A) = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

12. $2n(A) = n(B)$
$n(A \setminus B) = 4$
$n(B \setminus A) = 16$
$\Rightarrow n(A \cap B) = ?$

A) 8 B) 6 C) 5 D) 4 E) 2

13. $n(A \cap B) = 3,\ n(A \cup B) = 17$
$6n(A \setminus B) = n(B \setminus A)$
$\Rightarrow n(A) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

14. $n(A \cap B') = 3$
$n(B \cap A') = 7$
$n(A \cap B) = 4$
$\Rightarrow n(A \cup B) = ?$

A) 6 B) 7 C) 8 D) 11 E) 14

15. $n(B \setminus A) + n(B) = 20$
$n(A) + n(A \setminus B) = 24$
$\Rightarrow n(A \cup B) = ?$

A) 22 B) 23 C) 24 D) 40 E) 44

16. $n(A) = 6,\ n(B \setminus A) = 4$
$\Rightarrow n(A \cup B) = ?$

A) 5 B) 8 C) 9 D) 10 E) 11

1. $A \subset U$
$B \subset U$
$n(A) + n(B') = 7$
$n(A') + n(B) = 5$
$\Rightarrow n(U) = ?$

A) 2 B) 4 C) 6 D) 12 E) 24

2. $A \subset U$
$B \subset U$
$n(A') = n(B')$
$n(A \setminus B) = n[(A \cup B)'] = n(A \cap B) = 4$
$\Rightarrow n(A \cup B) = ?$

A) 4 B) 8 C) 12 D) 16 E) 20

3. $A \subset U$
$B \subset U$
$n(A) = 7,\ n(U \setminus A) = 5$
$n((B \cup A)') = 3$
$\Rightarrow n(A \cup B) = ?$

A) 7 B) 8 C) 9 D) 10 E) 11

4. $A \subset U$
$B \subset U$
$n(A) = 16$
$n(A') = 7$
$n(B') = 9$
$n(B \setminus A) = 1$
$\Rightarrow n(A \cap B) = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

5. $A \subset U,\ B \subset U$
$n(A) + n(B') = 32$
$n(A') + n(B) = 16$
$\Rightarrow n(U) = ?$

A) 18 B) 20 C) 22 D) 24 E) 26

6. $B \subset A \subset U$
$n(U) = 19$
$n(A') = 5$
$n(B) = 8$
$\Rightarrow n(A \setminus B) = ?$

A) 6 B) 5 C) 4 D) 2 E) 1

7. $A \subset U$
$B \subset U$
$n(B') = 8$
$n(A' \cap B') = 3$
$\Rightarrow n(A \cap B') = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $A \subset U$
$B \subset U$
$n(A) + n(B') = 12$
$n(B) + n(A') = 10$
$n(A \cup B) = 8$
$\Rightarrow n((A \cup B)') = ?$

A) 7 B) 6 C) 4 D) 3 E) 2

9. $A \subset U$, $B \subset U$

$n[(A \cap B)'] = 11$

$n(A') + n(B') = 13$

$\Rightarrow n(A \cup B)' = ?$

A) 2 B) 7 C) 11 D) 13 E) 24

10. $A \subset U$, $B \subset U$

$n(U) = 15$

$n(A) = 8$

$n(A \cup B) = 12$

$n(A \cap B) = 3$

$\Rightarrow n(U \setminus B) = ?$

A) 14 B) 12 C) 10 D) 9 E) 8

11. $A \subset U$

$B \subset U$

$n(A') = 8$

$n(B') = 12$

$\Rightarrow n(A) - n(B) = ?$

A) 15 B) 12 C) 11 D) 5 E) 4

12. $n(A) = 8$

$n(B) = 9$

$n(C) = 10$

$n(A \cap B) = 3$

$n(B \cap C) = 7$

$n(A \cap C) = 4$

$n(A \cup B \cup C) = 15$

$\Rightarrow n(A \cap B \cap C) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

13. $n(A \cap B \cap C) = 3$ $n(B \cap C) = 7$

$n(A \cap B) = 5$ $n(A \cap C) = 6$

$n(A) = 10$ $n(B) = 15$

$n(C) = 12$

$\Rightarrow n(A \cup B \cup C) = ?$

A) 20 B) 22 C) 24 D) 26 E) 28

14. $A \subset U$ $B \subset U$

$n(A') = 16$ $n(B') = 20$

$n(U) = 40$ $n(A' \cap B') = 5$

$\Rightarrow n(A \cap B) = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

15. $A \cap B = \emptyset$ $B \cap C = \emptyset$

$A \cap C = \emptyset$ $n(A \cup B) = 17$

$n(B \cup C) = 25$ $n(A \cup C) = 22$

$\Rightarrow n(A) = ?$

A) 16 B) 15 C) 13 D) 10 E) 7

16. $A \subset U$ $B \subset U$ $C \subset U$

$(A \cap B) = (A \cap C) = (B \cap C) = \emptyset$

$n(A') = 10$

$n(B') = 7$

$n(C') = 8$

$n(A \cup B \cup C) = 11$

$\Rightarrow n(A \cup B) = ?$

A) 8 B) 7 C) 6 D) 5 E) 4

1. $\frac{n(A \cup B)}{9} = \frac{n(A \cap B)}{3} = \frac{n(A)}{5}$

$10 < n(B) < 16$

$\Rightarrow n(A) = ?$

A) 20 B) 14 C) 10 D) 5 E) 1

2. $B \subset A$

$B \cap C = \emptyset$

$n(A) = 14$

$n(C \setminus A) = 8$

$n[(A \cup C) \setminus B] = 20$

$\Rightarrow n(B) = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

3. $2 \cdot n(A \setminus B) = 3 \cdot n(B \setminus A) = 4 \cdot n(A \cap B)$

$n(A \cup B) = 26$

$\Rightarrow n(A) = ?$

A) 18 B) 16 C) 14 D) 12 E) 10

4. $n(A \cap B) = 3 \cdot n(A \setminus B) = 2 \cdot n(B \setminus A)$

$n[(A \cup B)'] = 6$

$n(A') = 12$

$\Rightarrow n(A) = ?$

A) 16 B) 14 C) 12 D) 10 E) 8

5. $4n(A \setminus B) = n(B \setminus A) = 8a$

$n(A \cup B) = 25$

$n(B) = 9a + 3$

$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 2 C) 4 D) 6 E) 8

6. $2n(A) = 3n(B) = 6n(A \cap B)$

$n(A \cup B) = 16$

$\Rightarrow n(B \setminus A) = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

7. $A \subset U$

$B \subset U$

$B \subset A$

$n(A) = 4n(B) = 4n(A')$

$n(A') + n(B) = 8$

$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 2 C) 4 D) 8 E) 12

8. $2 \cdot n(A) = 3 \cdot n(B)$

$n(A \cap B) = 2$

$n(A \cup B) = 18$

$\Rightarrow n(B) = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

9. $A \subset U$
$B \subset U$
$n(A' \setminus B') = 5$
$n(A \setminus B') = 3$
$n(A \setminus B) = 7$
$\Rightarrow n(A \cup B) = ?$

A) 8 B) 10 C) 12 D) 15 E) 16

10. $n(A \setminus B) = 2n(A \cap B)$
$3n(B \setminus A) = 4n(A)$
$n(A \cup B) = 14$
$\Rightarrow n(A \setminus B) + n(B \setminus A) = ?$

A) 8 B) 9 C) 10 D) 12 E) 14

11. $n(A) = 6$
$n(A \cup B) = 12$
$\Rightarrow \max(n(A \cap B)) = ?$

A) 4 B) 5 C) 6 D) 8 E) 9

12. $A \subset U$
$B \subset U$
$n(U) = 20$
$n((A' \cap B) \cup (B' \cap A)) = 12$
$\Rightarrow \max(n(A \cap B)) = ?$

A) 12 B) 9 C) 8 D) 7 E) 6

13. $A \subset U$
$B \subset U$
$A \cap B \neq \emptyset$
$n(A \cup B') = 12$
$n(B \cup A') = 8$
$n[(A \setminus B) \cup (B \setminus A)] = 4$
$\Rightarrow \max(n(A \cup B)') = ?$

A) 3 B) 4 C) 5 D) 6 E) 7

14. $A \not\subset B$
$A \subset U$
$B \subset U$
$n(B \setminus A) = n(A') = 4$
$n(B) = 6$
$\Rightarrow \min(n(U)) = ?$

A) 9 B) 8 C) 7 D) 6 E) 5

15. $A \subset U$
$B \subset U$
$n(A) = 18 - n(B')$
$n(B) = 12 + n(A')$
$\Rightarrow n(A) = ?$

A) 12 B) 14 C) 15 D) 18 E) 20

16. $A = \{x \mid x < 100 \quad x = 3k \quad k \in Z^+\}$
$\Rightarrow n(A) = ?$

A) 33 B) 34 C) 35 D) 36 E) 37

1. $A \setminus (A \setminus B) = ?$

A) $\emptyset$ B) $B \setminus A$ C) $A \cup B$ D) $A \cap B$ E) B

2. $A \cup B = A$
$\Rightarrow A \setminus B' = ?$

A) $\emptyset$ B) A C) B D) A' E) B'

3. $A \subset U$, $B \subset U$
$A \cap B = \emptyset$
$\Rightarrow (A' \setminus B)' \cap B' = ?$

A) A B) B C) $A \cup B$ D) $B \setminus A$ E) $\emptyset$

4. $B \subset A$
$\Rightarrow (B \cup A) \setminus A' = ?$

A) B B) A C) $A \cap B$ D) $A \setminus B$ E) $\emptyset$

5. $A \cap B = \emptyset$
$\Rightarrow [B \cap A'] \cup [(A' \cup B) \cap A] = ?$

A) B B) A C) A' D) B' E) $\emptyset$

6. $(B' \setminus A')' \cap A = ?$

A) $A \cap B$ B) $A - B$ C) $A \cup B$ D) A E) B

7. $[A' \cup (A \cap B)]' \cup B' = ?$

A) A' B) A C) B' D) $A \cap B'$ E) $A' \cap B'$

8. $A = \{x \mid x = 4k,\ k \in Z,\ 15 < x \leq 60\}$
$\Rightarrow n(A) = ?$

A) 7 B) 8 C) 9 D) 11 E) 12

9. $A = \{x \mid x = 3k,\ k \in Z,\ 20 < x < 60\}$
$\Rightarrow n(A) = ?$

A) 12 B) 13 C) 14 D) 15 E) 16

10. $A = \{x \mid x = 2k,\ k \in Z,\ 10 < x < 90\}$
$B = \{y \mid y = 3k,\ k \in Z,\ 20 < y < 150\}$
$\Rightarrow n(A \cap B) = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

11. $A = \{x \mid x = 3k,\ k \in Z,\ 20 \le x \le 120\}$
$B = \{y \mid y = 5k,\ k \in Z,\ 30 < y < 200\}$
$\Rightarrow n(A \setminus B) = ?$

A) 1 B) 12 C) 18 D) 26 E) 28

12. $A = \{x \mid x = 6k,\ k \in Z,\ 0 < x < 200\}$
$B = \{y \mid y = 8k,\ k \in Z,\ 0 < y < 300\}$
$\Rightarrow n(A \cup B) = ?$

A) 42 B) 44 C) 46 D) 54 E) 62

13. $A = \{x \mid 31 < x < 421,\ x = 3n,\ n \in N\}$
$B = \{y \mid 69 < y < 501,\ y = 4m,\ m \in N\}$
$\Rightarrow n(A \cup B) = ?$

A) 205 B) 206 C) 208 D) 227 E) 240

14. $A = \{x \mid x = 4k,\ k \in Z,\ 2 < x \le 173\}$
$B = \{y \mid y = 5k,\ k \in Z,\ 4 \le y < 172\}$
$\Rightarrow n(A \cup B) = ?$

A) 40 B) 45 C) 59 D) 69 E) 79

15. $A = \{x \mid x = 2k,\ k \in Z,\ 0 < x \le 70\}$
$B = \{x \mid x = 3k,\ k \in Z,\ 0 < x \le 70\}$
$C = \{x \mid x = 5k,\ k \in Z,\ 0 < x \le 70\}$
$\Rightarrow n[(A \cap B) \setminus C] = ?$

A) 7 B) 9 C) 11 D) 13 E) 15

16. $A = \{x \mid x = 2k,\ k \in Z,\ 0 \le x \le 100\}$
$B = \{y \mid y = 3k,\ k \in Z,\ 0 \le y \le 100\}$
$C = \{z \mid z = 5k,\ k \in Z,\ 0 \le z \le 100\}$
$\Rightarrow n[(A \cup B) \setminus C] = ?$

A) 52 B) 53 C) 54 D) 55 E) 56

KÜMELER SETS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	C	D	A	E	C	E	A	B	D	C	E	D	D	B

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	C	C	D	E	B	E	E	D	E	E				

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	C	B	E	E	B	A	D	A	C	C	C	C	D	C	B

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	C	B	C	A	A	B	B	A	A	E	E	A	D

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	C	E	D	A	E	D	A	E	E	B	B	D	E	B

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	A	A	C	D	E	A	D	D	C	C	E	C	C	A

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	A	B	A	A	C	E	B	C	E	E	C	D	B	C

KARTEZYEN ÇARPIM, BAĞINTI VE FONKSİYON

CARTESIAN PRODUCT, RELATION AND FUNCTION

ÖZELLİK | Property 1

Sıralı İkili Eşitliği | Equality of Ordered Pairs

a ve b elemanları için (a, b) elemanına sıralı ikili, a'ya birinci bileşen, b'ye ikinci bileşen denir.

For a and b elements, the (a, b) element is called an ordered pair. a is called the first component, and b is called the second component.

$(a, b) = (c, d) \Leftrightarrow a = c$ ve *(and)* $b = d$

1. $x, y \in N$
$(x^2 - 4, y + 2) = (5, 3)$
$\Rightarrow x \cdot y = ?$

3

2. $(2^a, 3^b) = (4, 27)$
$\Rightarrow a + b = ?$

5

3. $(x + y, y - 4) = (10, 6)$
$\Rightarrow x \cdot y = ?$

0

4. $x, y \in Z^+$
$(\sqrt{x}, y^2) = (4, 9)$
$\Rightarrow x \cdot y = ?$

48

5. $(2x, y - 4, z) = (8, x, 6)$
$\Rightarrow x + y + z = ?$

18

6. $(x + 1, y - 1, z - 3) = (4, x, y)$
$\Rightarrow z = ?$

7

7. $(x, x \cdot y, y + 3) = (4, 8, z)$
$\Rightarrow z = ?$

5

ÖZELLİK | Property 2

A ve B bir küme olsun. *(Let A and B sets.)*

$A \times B = \{(x, y) \mid x \in A$ ve $y \in B\}$ kümesine A ile B nin kartezyen çarpımı denir.

$A \times B = \{(x, y) \mid x \in A$ and $x \in B\}$ set is called the cartesian product of A and B.

Örnek *(Example)*

$A = \{1, 2\}$
$B = \{x, y\}$
$\Rightarrow A \times B = = \{(1, x)(1, y)(2, x)(2, y)\}$

- $n(A \times B) = n(A) \cdot n(B)$
- $A \times B \neq B \times A$
- $A \times (B \cap C) = (A \times B) \cap (A \times C)$
- $A \times (B \cup C) = (A \times B) \cup (A \times C)$
- $A \times (B \times C) = (A \times B) \times C$
- $A \times (B \setminus C) = (A \times B) \setminus (A \times C)$

1. $A = \{1, 2\}$
$B = \{a, b\}$
$\Rightarrow A \times B = ?$

$\{(1, a)(1, b)(2, a)(2, b)\}$

2. $A = \{1, 3, 5\}$
$B = \{a, b, c\}$
$\Rightarrow n(A \times B) = ?$

9

3. $A \times B = \{(1, a)(1, b)(2, a)(2, b)\}$
$\Rightarrow B = ?$

$\{a, b\}$

4. $A = \{1, 2, 3\}$
$B = \{a, b\}$
$C = \{b, c, d\}$
$\Rightarrow n[(A \times B) \cap (A \times C)] = ?$

3

5. $A \subset B$
$n[(A \times B) \setminus (A \times A)] = 7$
$\Rightarrow n(B) = ?$

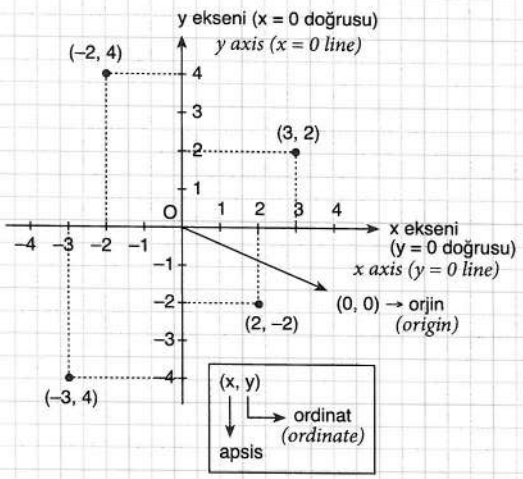
8

6. $A = \{x \mid -1 < x < 5 \quad x \in N\}$
$B = \{y \mid 0 < y < 4 \quad y \in N\}$
$\Rightarrow n(A \times B) = ?$

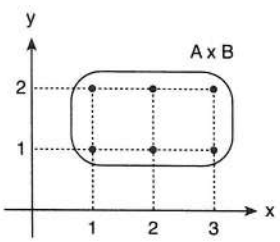
15

ÖZELLİK|Property 3

Koordinat Düzlemi | Coordinate Plane



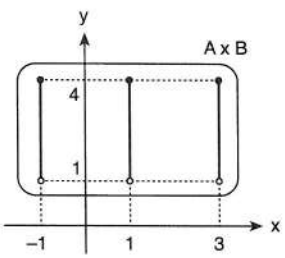
1.



⇒ A \ B = ?

{3}

2.



⇒ A \ B = ?

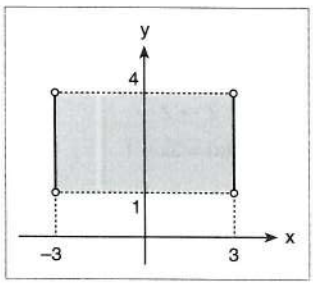
{–1, 1}

3. A = {x | |x| ≤ 3 x ∈ R}

B = {y | 1 < y < 4 y ∈ R}

⇒ Grafik (AxB) = ?

Graph (AxB) = ?



ÖZELLİK|Property 4

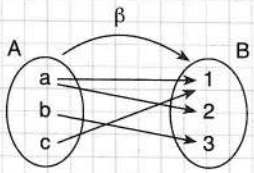
Bağıntı | Relation

A ve B bir küme olsun.

A x B nin herhangi bir alt kümesine A'dan B'ye bir bağıntı denir ve β : A → B şeklinde gösterilir.

Let A and B be sets.

Any subset of A x B is called a relation from A to B and it is denoted as β : A → B



β : A → B

β = {(a, 1)(a, 2)(b, 3)(c, 1)}

β^{-1} = {(x, y) | (x, y) ∈ B}

bağıntısına β bağıntısının tersi denir.

is called inverse β *relation.*

1. β = {(x, y) | x · y = 6 x, y ∈ Z^+}

⇒ β = ?

{(1, 6)(2, 3)(3, 2)(6, 1)}

2. β = {(x, y) | x + y = 6 x, y ∈ N}

⇒ n(β) = ?

7

3. A = {1, 2, 3}

β: A → A

β: {(x, y) | x ≤ y , x, y ∈ A}

⇒ n(β) = ?

6

4. β: {(x, y) | 3x + a = y , x, y ∈ R}

(1, 7) ∈ β

⇒ a = ?

4

5. β = {(1, 2)(1, 3)(4, 4)}

⇒ β^{-1} = ?

{(2, 1)(3, 1)(4, 4)}

6. β: {(x, y) ∈ Z x Z | x + 3y = k}

$(1, 3) \in \beta^{-1}$

⇒ k = ?

6

ÖZELLİK | Property 5

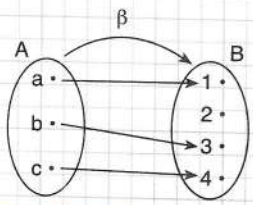
Fonksiyon | Function

A ve B boş olmayan iki küme olsun. A'nın her bir elemanını B'nin bir ve yalnız bir elemanına eşleyen bağıntıya A'dan B'ye bir fonksiyon denir.

f: A → B şeklinde ifade edilir.

Let A and B be two non-empty sets. A relation which matches each element of A to one and only one element of B is called a function from A to B.

It is denoted as f: A → B



- A kümesine tanım kümesi
  Set A is called the domain
- B kümesine değer kümesi
  Set B is called the range
- f(A) = {1, 3, 4} kümesine görüntü kümesi denir.
  f(A) = {1, 3, 4} is called the image set.

Aşağıda verilen bağıntılardan hangileri fonksiyondur?

Which of the following relation is a function?

1. A = {1, 2, 3}

B = {a, b, c}

β: A → B

I. β = {(1, a)(2, b)(3, c)}

II. β = {(1, a)(2, a)(3, a)}

III. β = {(1, a)(2, b)(3, c)(1, b)}

IV. β = {(1, a)(3, b)}

I, II

2. β: R → R

I. β = {(x, y) | x = 2}

II. β = {(x, y) | $x^2 + y^2 = 4$}

III. β = {(x, y) | $y = x^2 + 2$}

IV. β = {(x, y) | $|x| + |y| = 2$}

III

ÖZELLİK | Property 6

f: A → B'ye bir fonksiyon olsun.

Let f: A → B be a function.

- Her $x_1, x_2 \in A$ için *(Her $x_1, x_2 \in A$ için)*

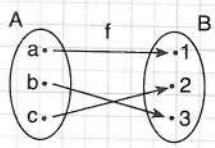
  $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$

  önermesi doğru ise f birebir fonksiyondur denir.

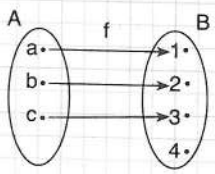
  If proposition is true then it is said that f is a one to one function.

- f(A) = B ise f örten fonksiyondur denir.
  If f(A) = B, then it is said that f is an onto function

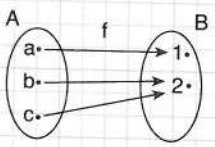
Örnek | Example



f bire bir ve örten fonksiyon
(f is a one to one and onto function)



f bire bir fakat örten fonksiyon değil
(f is one to one but not onto function)



f örten fakat bire bir fonksiyon değil
(f is onto but not one to one function)

Aşağıda verilen fonksiyonların birebir veya örten fonksiyon özelliklerini inceleyiniz.

Analyse the characteristics one to one or onto function which are given below.

1. A = {1, 2, 3}

B = {a, b, c}

f = {(1, a)(2, b)(3, c)}

birebir ve örten
(one to one and onto)

2. f: R → R

f(x) = 2x + 1

birebir ve örten
(one to one and onto)

3. f: Z → Z

f(x) = 3x – 1

birebirdir, örten değildir
(one to one and not onto)

4. f: R → R

f(x) = x^2

birebir değil, örten değil
(not one to one and not onto)

ÖZELLİK|Property 7

R'den R'ye tanımlanan fonksiyonlarda bir değerin sonucunu bulmak için tanımlanan fonksiyondaki değişken yerine, istenilen değer yazılır.

In functions defined from R to R, in order to determine the result of a value, the desired value is substituted in place of the variable in the defined function.

Örnek | Example

$f(x) = x^2 + 3x - 1 \Rightarrow f(2) = ?$

Çözüm | Solution

$f(2) = 2^2 + 3 \cdot 2 - 1 = 9$

1. $f: R \to R$

$f(x) = x + 3$

$\Rightarrow f(4) = ?$

7

2. $f: R \to R$

$f(x) = x^2 + 5x$

$f(2) = ?$

14

3. $f: R \setminus \{3\} \to R \setminus \{2\}$

$f(x) = \dfrac{2x-4}{x-3}$

$\Rightarrow f(4) = ?$

4

4. $f: R^+ \to (-3, \infty)$

$f(x) = \sqrt{x} - 3$

$\Rightarrow f(9) = ?$

0

5. $f: R \to R$

$f(x) = x^3 + 3x^2 + 3x + 1$

$\Rightarrow f(2) = ?$

27

6. $f: R \to R$

$f(x) = 3^{x-2}$

$\Rightarrow f(3) = ?$

3

7. $f: R \to R$

$f(x) = x^2 + kx + 4$

$f(2) = 8$

$\Rightarrow k = ?$

0

ÖZELLİK|Property 8

Örnek | Example

$f: R \to R$

$f\left(\dfrac{x-2}{3}\right) = x^2 + 2x - 7 \Rightarrow f(1) = ?$

Çözüm | Solution

$\dfrac{x-3}{2} = 1$

$x - 3 = 2$

$x = 5 \rightarrow$ fonksiyonda x yerine 5 yazılır.

(in the function 5 is substituted by x)

$f\left(\dfrac{5-3}{2}\right) = 5^2 \cdot 2 \cdot 5 - 7$

$f(1) = 25 + 10 - 7$

$f(1) = 28$

1. $f: R \to R$

$f(x - 3) = x^2 - 1$

$\Rightarrow f(1) = ?$

15

2. $f: R \to R$

$f(x + 2) = 3x - 1$

$\Rightarrow f(4) = ?$

5

3. $f: R \setminus \{3\} \to R \setminus \{1\}$

$f(x + 3) = \dfrac{x+1}{x}$

$\Rightarrow f(1) = ?$

$\dfrac{1}{2}$

4. $f: R \to R$

$f(x - 2) = x^2 + x$

$\Rightarrow f(3) = ?$

30

5. $f: R \to R$

$f(x^2 + x) = x^2 + x - 6$

$\Rightarrow f(5) = ?$

-1

6. $f: R \to R$

$f(x^2 + x) = 2x^2 + 2x + 8$

$\Rightarrow f(4) = ?$

16

ÖZELLİK|Property 9

Parçalı Fonksiyon | Piecewise Function

f fonksiyonu tanım kümesindeki değerlere göre farklı şekilde tanımlanabilir. Bu şekildeki fonksiyonlara parçalı fonksiyon denir.

The f function can be defined in different ways according to the values in its domain. Functions defined as such are called piecewise functions.

$$f(x) = \begin{cases} h(x) & x \geq a \\ g(x) & x < a \end{cases}$$

$x \geq a \Rightarrow f(x) = h(x)$

$x < a \Rightarrow f(x) = g(x)$

1. $f(x) = \begin{cases} x-3 & x > 2 \\ 3x+1 & x \leq 2 \end{cases}$

$\Rightarrow f(1) + f(3) = ?$ 4

2. $f(x) = \begin{cases} \sqrt{x+1} & x > 3 \\ x^2 - 10 & x \leq 3 \end{cases}$

$\Rightarrow f(8) - f(1) = ?$ 12

3. $f(x) = \begin{cases} x^2 - 3 & x < 1 \\ \sqrt{x} + 6 & x \geq 1 \end{cases}$

$\Rightarrow f(4) - f(0) = ?$ 11

4. $f(x) = \begin{cases} x-2 & x > 1 \\ 3 & x = 1 \\ x^2+1 & x < 1 \end{cases}$

$\Rightarrow f(0) + f(1) + f(2) = ?$ 4

ÖZELLİK|Property 10

Birim Fonksiyon | Identity Function

- f: A → A bir fonksiyon olsun. *(let it be a function)*

  $\forall x \in A$ için $f(x) = x$ ise f fonksiyonuna birim fonksiyon denir ve I ile gösterilir.

  If $\forall x \in A$, $f(x) = x$ then the function f is called a identity function and is denoted by I.

Sabit Fonksiyon | Constant Function

- f: A → B bir fonksiyon ve $k \in B$ olsun.
  f: A → B be a function and $k \in B$.

  $\forall x \in A$ için $f(x) = k$ ise f fonksiyonuna sabit fonksiyon denir.

  $\forall x \in A$, $f(x) = k$ then the function f is called a constant function.

  $f(x) = \dfrac{ax+b}{cx+d}$

  $ad = bc$ ise f sabit fonksiyondur.

  If $ad = bc$ then f is a constant function.

1. f: R → R

f sabit fonksiyon *(f constant function)*

$f(x) = (a-2)x^2 + (b-1)x + a \cdot b$

$\Rightarrow f(5) = ?$ 2

2. f: R \ {– a} → R

f sabit fonksiyon *(f constant function)*

$f(x) = \dfrac{2x-6}{x+a}$

$\Rightarrow a = ?$ – 3

3. f: $R \setminus \left\{-\frac{1}{2}\right\} \to R$

f sabit fonksiyon *(f constant function)*

$f(x) = \dfrac{ax+8}{4x+2}$

$\Rightarrow a = ?$ 16

4. f: R → R

f birim fonksiyon *(f identity function)*

$f(x) = (a+1)x^2 + (b+2)x + c - 3$

$\Rightarrow a \cdot b \cdot c = ?$ 3

5. f: R → R

f birim fonksiyon *(f identity function)*

$f(3a-5) = 2a + 7$

$\Rightarrow a = ?$ 12

ÖZELLİK | Property 11

Ters Fonksiyon | Inverse Function

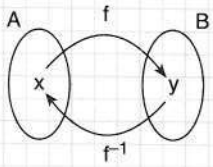
f : A → B'ye birebir ve örten bir fonksiyon olsun.

Let f : A → B be a one to one and onto function.

$f^{-1} : \{(y, x) \mid (x, y) \in f\}$

şeklinde tanımlanan f^{-1} fonksiyonuna, f fonksiyonunun tersi denir.

The f^{-1} function is defined as $f^{-1} : \{(y, x) ; (x, y) \in f\}$



$f(x) = y \Rightarrow f^{-1}(y) = x$

- $f(x) = ax + b \Rightarrow f^{-1}(x) = \dfrac{x - b}{a}$
- $f(x) = \dfrac{ax + b}{cx + d} \Rightarrow f^{-1}(x) = \dfrac{-dx + b}{cx - a}$
- $f(x) = x \Rightarrow f^{-1}(x) = x$
- $f(x) = \dfrac{k}{x} \Rightarrow f^{-1}(x) = \dfrac{k}{x}$
- $f(x) = k - x \Rightarrow f^{-1}(x) = k - x$

1. f: R → R

$f(x) = 3x + 1$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{x - 1}{3}$

2. f: R → R

$f(x) = 4x - 6$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{x + 6}{4}$

3. f: R → R

$f(x) = \dfrac{x - 2}{3}$

$\Rightarrow f^{-1}(x) = ?$

$3x + 2$

4. f: R → R

$f(x) = \dfrac{4x + 2}{3}$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{3x - 2}{4}$

5. f: R \ {2} → R \ {4}

$f(x) = \dfrac{4x - 6}{x - 2}$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{2x - 6}{x - 4}$

6. f: R \ {1} → R \ {−2}

$f(x) = \dfrac{-2x + 5}{x - 1}$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{x + 5}{x + 2}$

7. f: R \ {1} → R \ {2}

$f(x) = \dfrac{5 - 2x}{1 - x}$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{x - 5}{x - 2}$

8. f: R \ {3} → R \ {1}

$f\left(\dfrac{3x + 4}{x - 1}\right) = x$

$\Rightarrow f^{-1}(x) = ?$

$\dfrac{3x + 4}{x - 1}$

9. f: R → R

$f(2x + 1) = 3x$

$\Rightarrow f^{-1}(6) = ?$

5

10. f: R → R

$f(x - 5) = 3x + 1$

$f^{-1}(7) = ?$

−3

11. f: R → R

$f(3x + 1) = \dfrac{x + 1}{3}$

$f^{-1}(2) = k$

$\Rightarrow k = ?$

16

12. $f(x) = \begin{cases} x^2 - 1 & x > 2 \\ x + 1 & x \le 2 \end{cases}$

$\Rightarrow f^{-1}(8) + f^{-1}(0) = ?$

2

13. f: [2, ∞) → [1, ∞)

$f(x) = x^2 - 4x + 5$

$\Rightarrow f^{-1}(x) = ?$

$\sqrt{x - 1} + 2$

ÖZELLİK|Property 12

Örnek | Example

$f(x) = \frac{2x-1}{3x+7} \Rightarrow f(x+3) = ?$

Çözüm | Solution

f(x) verilip f(x + 3) istenildiğinde x yerine x + 3 yazılır.

When f(x) is given and f(x + 3) is asked, x+3 is substituted in place of x.

$f(x+3) = \frac{2(x+3)-1}{3(x+3)+7} \Rightarrow f(x+3) = \frac{2x+5}{3x+16}$

1. $f: R \to R$

$f(x) = 2x + 1$

$\Rightarrow f(x + 1) = ?$

$2x + 3$

2. $f: R \to R$

$f(x) = 3x + 4$

$\Rightarrow f(x - 2) = ?$

$3x - 2$

3. $f: R \to R$

$f(x) = 3x + 1$

$\Rightarrow f(x + 1) = ?$

$3x + 4$

4. $f: R \to R$

$f(x) = 2x + 1$

$\Rightarrow f(x - 1) = ?$

$2x - 1$

5. $f: R \to R$

$f(x) = x^2 - 3$

$\Rightarrow f(x + 1) = ?$

$x^2 + 2x - 2$

6. $f: R \to R$

$f(x) = 3x + 6$

$\Rightarrow f(x^2) = ?$

$3x^2 + 6$

7. $f: R \to R$

$f(x) = x - 5$

$\Rightarrow f(x^2 + 2) = ?$

$x^2 - 3$

ÖZELLİK|Property 13

f(ax + b) bilindiğinde f(x) ifadesini bulmak için x yerine ax + b'nin tersi olan $\frac{x-b}{a}$ yazılır.

To find f(x) when f(ax + b) is known, $\frac{x-b}{a}$ which is the inverse of ax+b is substituted in place of x.

1. $f(x + 1) = 3x - 7$

$\Rightarrow f(x) = ?$

$3x - 10$

2. $f(x - 2) = 2x - 7$

$\Rightarrow f(x) = ?$

$2x - 3$

3. $f(2x - 1) = 4x + 3$

$\Rightarrow f(x) = ?$

$2x + 5$

4. $f\left(\frac{2x-1}{3}\right) = \frac{4x+1}{2x-1}$

$f(x) = ?$

$\frac{2x+1}{x}$

5. $f\left(\frac{x-1}{3}\right) = x^2 + x$

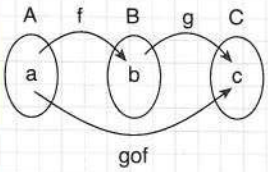
$\Rightarrow f(x) = ?$

$9x^2 + 9x + 2$

ÖZELLİK | Property 14

Bileşke Fonksiyon | Composite Function

f: A → B ve g: B → C



f(a) = b

g(b) = c

(gof)(a) = g(f(a)) = g(b) = c

gof fonksiyonuna f ile g fonksiyonlarının bileşkesi denir.

gof function is called the composite function of f and g.

■ I birim fonksiyon *(I identity function)*

$fof^{-1} = I$	$foI = f$	$(f^{-1})^{-1} = f$
$f^{-1}of = I$	$Iof = f$	$(fog)^{-1} = g^{-1}of^{-1}$

1. f: R → R
f(x) = x + 2
⇒ (fof)(3) = ?
7

2. f(x) = 3x + 1
g(x) = x – 5
⇒ (fog)(2) = ?
– 8

3. f(x) = 2x + 1
$g(x) = \sqrt{x+4}$
⇒ (fog)(5) = ?
7

4. f(x) = x + 4
g(x) = 2x + 5
⇒ (fog)(x) = ?
2x + 9

5. $f(x) = x^2 + 1$
g(x) = 3x + 1
⇒ (gof)(x) = ?
$3x^2 + 4$

6. f(x + 3) = 3x + 1
g(x – 2) = 4x + 6
⇒ (fog)(2) = ?
58

7. f(x – 2) = 2x + 1
g(x + 1) = x
⇒ (gof)(3) = ?
10

8. f(x) = 3x + 1
g(x) = x – 2
⇒ $(gof^{-1})(0)$ = ?
$-\frac{7}{3}$

9. f(x – 2) = 4x – 5
g(x + 1) = 2x + 1
⇒ $(fog^{-1})(7)$ = ?
19

10. f(x) = – 2x + 4
g(x) = x – 5
⇒ $(fog)^{-1}(2)$ = ?
6

11. f(x) = 2x – 5
g(x) = x – 2
$(gof^{-1})^{-1}(2)$ = ?
3

12. f(x) = 2x – 5
g(x) = x + 1
$(fog^{-1})^{-1}(x)$ = ?
$\frac{x+7}{2}$

13. $f^{-1}(x - 2) = g(3x + 1)$
⇒ (fog)(10) = ?
1

14. f(x) = x + 5
$(g^{-1}of)(x) = 2x + 7$
⇒ g(11) = ?
7

15. $f(x - 2) = g^{-1}(x + 5)$
⇒ $(gof)^{-1}(7)$ = ?
0

ÖZELLİK|Property 15

Permütasyon Fonksiyon | Permutation Function

f: A → A bir fonksiyon olsun. f birebir ve örten bir fonksiyon ise f'ye permütasyon fonksiyon denir.

Let f: A → A be a function. If f is a one to one and onto function, f is called a permutation function.

$$f\begin{pmatrix} a & b & c & d \\ \downarrow & \downarrow & \downarrow & \downarrow \\ b & d & a & c \end{pmatrix}$$

⇒ f(a) = b f(b) = d f(c) = a f(d) = c

1. $f\begin{pmatrix} a & b & c & d \\ c & d & a & b \end{pmatrix}$

⇒ f(b) = ?

d

2. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix}$

⇒ f(2) + f(3) = ?

5

3. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 1 & 3 \end{pmatrix}$

⇒ $f(2) - f^{-1}(3) = ?$

−2

4. $f\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 5 & 3 & 2 & 1 & 4 \end{pmatrix}$

⇒ $f^{-1}(4) + f(1) = ?$

10

5. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 1 & 2 \end{pmatrix}$ $g\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 3 & 4 & 2 \end{pmatrix}$

⇒ (fog)(3) = ?

2

6. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 2 & 4 \end{pmatrix}$ $g\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 3 & 4 \end{pmatrix}$

⇒ $(fog^{-1})(1) = ?$

1

7. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 1 & 3 \end{pmatrix}$

⇒ $(fof)^{-1}(3) = ?$

1

ÖZELLİK|Property 16

f: R → R ve g: R → R

$(f + g)(x) = f(x) + g(x)$

$(f - g)(x) = f(x) - g(x)$

$(f \cdot g)(x) = f(x) \cdot g(x)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ $(g(x) \neq 0)$

1. f = {(1, 2)(2, 4)(3, 5)}

⇒ 2f(1) − 3f(2) = ?

−8

2. f = {(2, 3)(3, − 4)(4, 1)}

g = {(2, 4)(3, 1)(4, 0)}

⇒ (f − g)(2) + (f · g)(4) = ?

−1

3. f = {(1, − 2)(2, 5)}

g = {(1, − 3)(2, 2)}

⇒ (2f − g)(1) + (f · g)(2) = ?

9

4. f(x) = 3x + 1

g(x) = 4x − 2

⇒ (f + g)(2) + (2f + g)(1) = ?

23

5. f(x) = x + 5

g(x) = 2x − 1

⇒ (f + 3g)(2) = ?

16

6. f(x) = 3x + 1

g(x − 1) = 2x

⇒ (f + g)(1) = ?

8

7. f(x + 1) = 2x + 1

g(x + 1) = x − 5

⇒ (f · g)(2) = ?

−12

ÖZELLİK|Property 17

Örnek | Example

f: Z → Z

f(x + 1) = f(x) + 7

f(1) = 5

⇒ f(10) = ?

Örnek | Solution

(for) x = 1 için f(2) = f(1) + 7

(for) x = 2 için f(3) = f(2) + 7

(for) x = 4 için f(4) = f(3) + 7

(for) x = 4 için f(5) = f(4) + 7

⋮

(for) x = 9 için *(for)* f(10) = f(9) + 7

+

f(10) = f(1) + 7 · 9

↓

(9 terim) *(9 terms)*

f(10) = 5 + 63 = 68

1. f: Z → Z

f(x + 1) = f(x) + 3

f(1) = 2

⇒ f(4) = ?

11

2. f: Z → Z

f(x + 1) − f(x) = x

f(2) = 3

⇒ f(4) = ?

8

3. $\frac{f(x+1)}{f(x)} = 4$

f(1) = 2

⇒ f(4) = ?

128

4. f: Z → Z

f(x + 1) = f(x) + x + 3

f(2) = 5

⇒ f(20) = ?

248

5. f: Z → Z

f(x) = 2 · f(x − 1)

f(5) = 4

⇒ f(30) = ?

2^{27}

ÖZELLİK|Property 18

Örnek | Example

$f(x) = 2^{x-1}$

⇒ f(x + 3)'ün f(x) türünden değeri nedir?

⇒ *What is the value of f(x + 3) in terms of f(x)?*

Çözüm | Solution

- $f(x+3) = 2^{(x+3)-1} = 2^{x+2}$ ..... ①
- $f(x) = 2^{x-1} = \frac{2^x}{2} \Rightarrow 2^x = 2f(x)$ ..... ②

① ve ② den

$f(x+3) = 2^{x+2} = 2^x \cdot 2^2 = 2 \cdot f(x) \cdot 2^2 = 8f(x)$

1. $f(x) = 4^{x+1}$

f(x + 1) in f(x) cinsinden değeri nedir?

What is the value of f(x + 1) in terms of f(x)?

4 · f(x)

2. $f(x) = 3^{x+2}$

f(x + 2) nin f(x) cinsinden değeri nedir?

What is the value of f(x + 2) in terms of f(x)?

9 · f(x)

3. $f(x-2) = 5^x$

f(x + 1) in f(x) cinsinden değeri nedir?

What is the value of f(x + 1) in terms of f(x)?

5 · f(x)

4. f(x) = 4x

f(x + 3) ün f(x) cinsinden değeri nedir?

What is the value of f(x + 3) in terms of f(x)?

12 + f(x)

5. f(x) = 3x + 1

f(x + 1) in f(x) cinsinden değeri nedir?

What is the value of f(x + 1) in terms of f(x)?

f(x) + 3

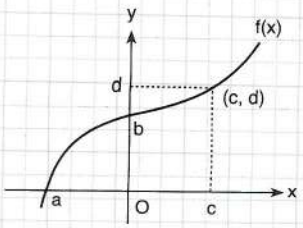
6. $f(x) = \frac{x+1}{x}$

f(2x) in f(x) cinsinden değeri nedir?

What is the value of f(2x) in terms of f(x)?

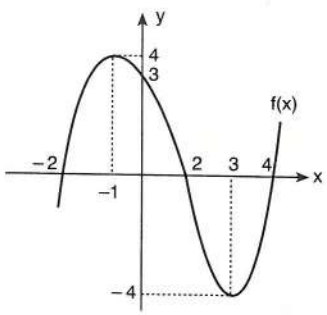
$\frac{f(x)+1}{2}$

ÖZELLİK | Property 19



- a noktası x ekseninde olduğundan
  Since the point a is on the x axis
  $(a, 0) \in f \Rightarrow f(a) = 0$ ve $f^{-1}(0) = a$
- b noktası y ekseninde olduğundan
  Since the point b is on the y axis
  $(0, b) \in f \Rightarrow f(0) = b$ ve $f^{-1}(b) = 0$
- $(c, d) \in f \Rightarrow f(c) = d$ ve $f^{-1}(d) = c$

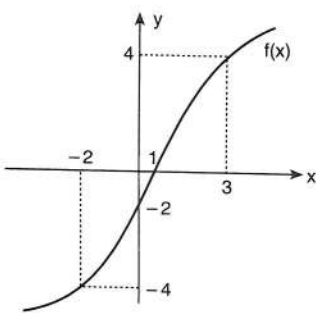
1.



$\Rightarrow f(3) + f(0) = ?$

−1

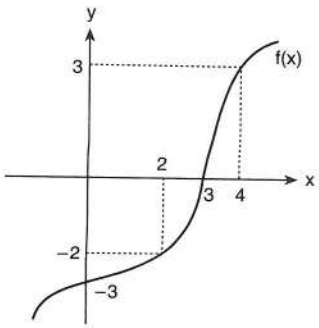
2.



$\Rightarrow \dfrac{f(3) + f(-2)}{f(0)} = ?$

0

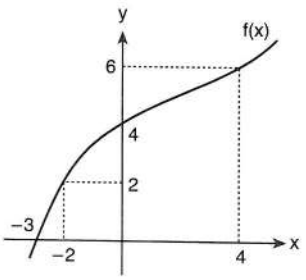
3.



$\Rightarrow f^{-1}(3) + f^{-1}(-2) = ?$

6

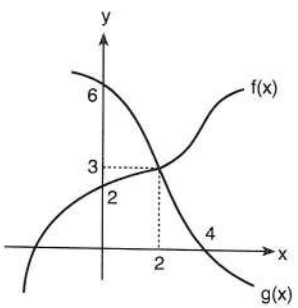
4.



$\Rightarrow \dfrac{f^{-1}(6) + f(-2)}{f^{-1}(0)} = ?$

−2

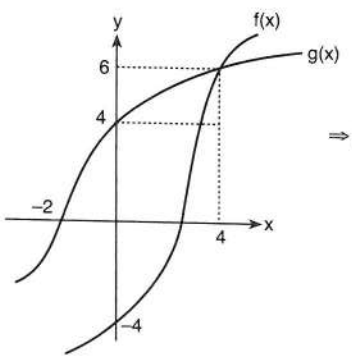
5.



$\Rightarrow (gof^{-1})(3) = ?$

3

6.



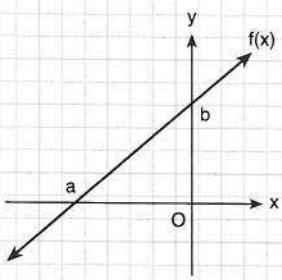
$\Rightarrow (fog)^{-1}(6) + f(0) = ?$

−4

ÖZELLİK | Property 20

Doğrusal Fonksiyon | Linear Function

$f: R \to R$



$f(x) = ax + b$ şeklinde tanımlanan fonksiyonlara doğrusal fonksiyon denir. Doğrusal fonksiyonun herhangi iki noktası biliniyorsa fonksiyonun genel denklemi bulunabilir.

$$y = f(x)$$

$$\frac{x}{a} + \frac{y}{b} = 1$$

Functions defined as $f(x) = ax + b$ are called linear functions. If any two points of a linear function are known as the general equation of the function can be determined.

Aşağıda R'den R'ye tanımlanan doğrusal fonksiyonlar verilmiştir.

Linear functions which are defined from R to R are given below.

1. $f(1) = 3$
$f(2) = 6$
$\Rightarrow f(3) = ?$

9

2. $f(1) = 6$
$f(3) = 10$
$\Rightarrow f(5) = ?$

14

3. $f(0) = -1$
$f(2) = 5$
$\Rightarrow f(3) = ?$

8

4. $f(1) = -7$
$f^{-1}(-5) = 3$
$\Rightarrow f(2) = ?$

-6

5. $f(1) = 5$
$f(3) = 11$
$\Rightarrow f(x) = ?$

$3x + 2$

6. $f(3) = 17$
$f(1) = 7$
$\Rightarrow f(x) = ?$

$5x + 2$

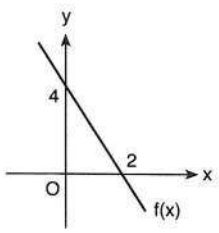
7. $f(x + 1) + f(x - 1) = 4x + 2$
$\Rightarrow f(1) = ?$

3

8. $f(x - 2) + f(x + 2) = 6x + 4$
$\Rightarrow f(4) = ?$

14

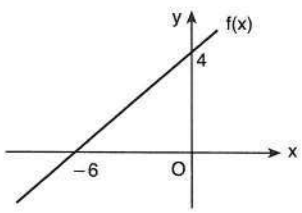
9.



$\Rightarrow f(x) = ?$

$4 - 2x$

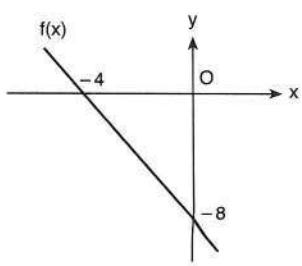
10.



$\Rightarrow f(x) = ?$

$\frac{12 + 2x}{3}$

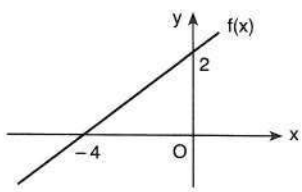
11.



$\Rightarrow f(2) = ?$

-12

12.



$\Rightarrow f(4) = ?$

4

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $(x - y, x + y) = (11, 17)$

$\Rightarrow x = ?$

14

2. $A = \{x \in R \mid x^2 = 4\}$

$B = \{y \in Z \mid |y - 1| = 7\}$

$\Rightarrow n(A \times B) = ?$

4

3. $\beta = \{(x, y) \in Z \times Z \mid x \cdot y = 504\}$

$\Rightarrow n(\beta) = ?$

48

4. $f: R \setminus \{-2\} \to R \setminus \left\{\frac{1}{2}\right\}$

$f(x) = \frac{2x - 3}{4x + 8}$

$\Rightarrow f(3) = ?$

$\frac{3}{20}$

5. $f: R \setminus \{a\} \to R \setminus \{b\}$

$f(x) = \frac{6x - 5}{2x - 12}$

$\Rightarrow a \cdot b = ?$

18

6. $f: R \setminus \{3\} \to R \setminus \{0\}$

$f(x) = \frac{2}{3x - 9}$

$\Rightarrow f^{-1}(x) = ?$

$\frac{9x + 2}{3x}$

7. $f: R \to R$

$f\left(\frac{5x - 4}{2}\right) = \frac{4x - 7}{3}$

$\Rightarrow f^{-1}(3) = ?$

8

8. $f: [8, \infty) \to R$

$f(x^2 + 2x + 9) = 3x^2 + 6x + 1$

$\Rightarrow f(11) = ?$

7

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

9. $f: (-\infty, 3] \to [-8, \infty)$

$f(x) = x^2 - 6x + 1$

$\Rightarrow f^{-1}(x) = ?$

$3 - \sqrt{x+8}$

10. $f(x) = \dfrac{2x+1}{x-1}$

$g(x) = 3x + 7$

$\Rightarrow (fog)(x) = ?$

$\dfrac{2x+5}{x+2}$

11. $f: R \setminus \left\{\dfrac{4}{3}\right\} \to R \setminus \{0\}$

$f(x) = \dfrac{2 + 3f(x)}{3x - 1}$

$\Rightarrow f(1) = ?$

-2

12. $f^{-1}(3x - 5) = g\left(\dfrac{\square\square + \square}{\square}\right)$

$\Rightarrow (fog)(5) = ?$

7

13. $f\begin{pmatrix}1&2&3&4\\4&1&3&2\end{pmatrix}$ $(fog)\begin{pmatrix}1&2&3&4\\2&1&4&3\end{pmatrix}$

$\Rightarrow g = ?$

$g\begin{pmatrix}1&2&3&4\\4&2&1&3\end{pmatrix}$

14. $\forall x, y \in R$

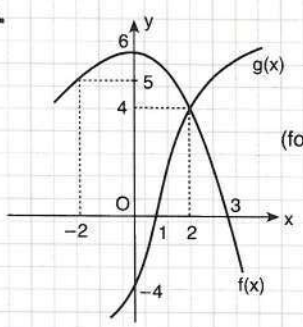
$f(x + y) = 2f(x) \cdot f(y)$

$f(2) = 5$

$\Rightarrow f(6) = ?$

500

15.



$(fog^{-1})(4) + (g^{-1}of)(3) = ?$

5

16. $f: Z \to Z$

$f(x + 1) = f(x) \cdot (x + 1)$

$f(1) = 1$

$\Rightarrow f(20) = ?$

20!

1. $(x^2 + 3, 1 - x) = (7, 3)$
$\Rightarrow x = ?$

A) 3 B) 2 C) 1 D) –1 E) –2

2. $(2^a + 5, a + b) = (9, 6)$
$\Rightarrow a \cdot b = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

3. $(x^3 - 2, x^2 - 2y) = (6, 10)$
$\Rightarrow x \cdot y = ?$

A) – 8 B) – 6 C) 2 D) 6 E) 8

4. $(2x, 3, y+1) = (6, z + 1, 9)$
$\Rightarrow x \cdot y \cdot z = ?$

A) 48 B) 42 C) 36 D) 35 E) 32

5. $(2x - 1, y^2 + x, 2z + x) = (5, 7, 7)$
$\Rightarrow \max(z+y) = ?$

A) 0 B) 2 C) 4 D) 5 E) 6

6. $A = \{1\}$
$B = \{a, b\}$
$C = \{x, y\}$
$\Rightarrow A \times B \times C = ?$

A) {(1, a, x)}
B) {(1, a, x), (1, b, y)}
C) {(1, a, x), (1, b, x), (1, a, y), (1, b, y)}
D) {(1, a, y), (1, b, y)}
E) Ø

7. $A = \{a, b\}$
$\Rightarrow A \times A = ?$

A) {Ø}
B) {(a, a), (b, b)}
C) Ø
D) {(a, a), (a, b), (b, a), (b, b)}
E) {Ø, (a, a), (b, b)}

8. $A \times B = \{(1, 1) (1, 2) (2, 2) (2, 1) (5, 1) (5, 2)\}$
$\Rightarrow n(A \times B) = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

9. A = {3, 5, 7}
B = {a, b, c, d, e}
⇒ n(A x B) = ?

A) 18 B) 15 C) 12 D) 9 E) 8

10. A x B = {(1, a) (1, b) (1, 1) (2, a) (2, b) (2, 1)}
⇒ B = ?

A) {a, b} B) {1, 2, a, b} C) {1, 2, a}
D) {1, 2} E) {a, b, 1}

11. A = {a, b, 2}
B = {1,a}
A x B = {(3, 1) (3, 3) (5, 1) (5, 3) (2, 1) (2, 3)}
⇒ 2a + b = ?

A) 6 B) 8 C) 11 D) 13 E) 16

12. A x B = {(1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 2), (3, 3) (3, 4)}
⇒ A ∩ B = ?

A) {2, 3} B) {1, 2} C) {3, 4}
D) {2, 4} E) {1, 4}

13. n(A x B) = 7
n(B x C) = 3
⇒ n(A x C) = ?

A) 21 B) 10 C) 7 D) 3 E) 1

14. A x B = {(a, 1) (b, 1) (c, 1) (a, 2) (b, 2) (c, 2)}
C x D = {(m, x) (n, x) (n, y) (m, y)}
⇒ B x D = ?

A) {(a, x) (a, y) (b, x) (b, y)}
B) {(a, x) (b, x) (c, x)}
C) {(1, x) (1, y)}
D) {(1, x) (1, y) (2, x) (2, y)}
E) {(1, m) (1, n) (2, m) (2, n)}

15. A x B = {(m, 1), (m, 2), (n, 1), (n, 2)}
C x D = {(m, 2), (m, 3), (p, 2), (p, 3)}
⇒ A x C = ?

A) {(m, m), (m, p)}
B) {(n, m), (n, p)}
C) {(m, m), (m, p), (n, m), (n, p)}
D) {(m, m), (n, n), (m, p)(n, p)}
E) {(1, 2), (2, 1), (2, 3), (1, 3)}

16. A = {1, 2, 3, 4}
B = {a, b, c}
C = {b, c, d, e}
⇒ n[(A x B) ∩ (A x C)] = ?

A) 6 B) 8 C) 12 D) 16 E) 20

1. $A = \{a, b, c\}$
$B = \{d, e, f, g\}$
$C = \{a, c, d, e\}$
$\Rightarrow n[(A \times B) \cup (C \times B)] = ?$

A) 8 B) 16 C) 20 D) 36 E) 48

2. $A \times B = \{(2, 1), (2, 2)\}$
$n(C) = 4$
$\Rightarrow n[(A \times C) \cap (B \times C)] = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

3. $B \cap C = \{1, 2, 3, 4\}$
$n[(B \times A) \cap (C \times A)] = 20$
$\Rightarrow n(A) = ?$

A) 20 B) 15 C) 10 D) 5 E) 4

4. $A \times B = \{(1, 3) (1, a) (a, 3) (a, a) (3, a) (3, 3)\}$
$n(C) = 5$
$\Rightarrow n[(A \times C) \cap (B \times C)] = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

5. $\frac{n(A)}{n(A \times B)} \in Z$
$B \neq \emptyset$
$\Rightarrow n(B) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

6. $A \subset B$
$n[(A \times B) - (A \times A)] = 5$
$\Rightarrow n(B) = ?$

A) 7 B) 6 C) 5 D) 4 E) 3

7. $A = \{a, b, c, d, e\}$
$B = \{b, c, f\}$
$C = \{2, 3\}$
$\Rightarrow [(A \times C) \cap (B \times C)]^{-1} = ?$

A) {(2, a) (2, e) (3, a) (3, e)}
B) {(2, a) (2, e) (3, c) (3, d)}
C) {(a, a) (a, c) (b, c)}
D) {(2, b) (2, c) (3, b) (3, c)}
E) {(2, b) (2, c) (2, f) (3, b) (3, c) (3, f)}

8. $A = \{x \mid x \in Z, \quad |x - 1| < 3\}$
$n[(A \times B) \cup (A \times A)] = 30$
$\Rightarrow n(A \cup B) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

9. $A = \{x \mid x \in Z,\ |x-2| < 2\}$
$B = \{y \mid y \in Z,\ y^2 \le 4\}$
$\Rightarrow n(A \times B) = ?$

A) 20 B) 15 C) 10 D) 8 E) 6

10. $A = \{x \mid -2 \le x < 4,\ x \in N\}$
$B = \{y \mid 0 < y < 5,\ y \in N\}$
$\Rightarrow n(A \times B) = ?$

A) 0 B) 15 C) 16 D) 24 E) 30

11. $n(A \cap B) = 3$
$n[B \times (A \cup B)] = 72$
$n(A) = 4$
$\Rightarrow n(B) = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

12. $n(A \cap B) = 4$
$n[B \times (A \cup B)] = 54$
$n(A) = 7 \Rightarrow n(B) = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

13. $A = \{a \mid a \in N\ \ a^3 < 28\}$
$\Rightarrow n(A \times A \times A) = ?$

A) 125 B) 64 C) 27 D) 8 E) 1

14. $A = \{x \mid x^3 - x = 0,\ x \in R\}$
$B = \{x \mid x^2 = 4,\ x \in R\}$
$\Rightarrow n(A \times B) = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

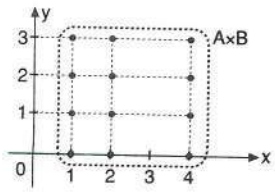
15. $A \subset B \subset C$
$n[(B \times A) \cap (B \times C)] = 9$
$n[(A \times B) \cup (A \times C)] = 21$
$\Rightarrow \min[n(A \times B \times C)] = ?$

A) 3 B) 21 C) 43 D) 63 E) 81

16. $A = \{x \mid\ |x| < 2\ \ x \in Z\}$
$n[(A \times B) \times (A \times A)] = 135$
$\Rightarrow n(B) = ?$

A) 3 B) 4 C) 5 D) 12 E) 15

1.

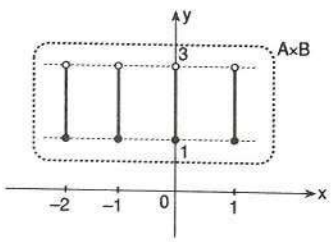


⇒ B \ A = ?

A) Ø B) {3} C) {0}

D) {0, 3} E) {0, 1, 2, 3}

2.

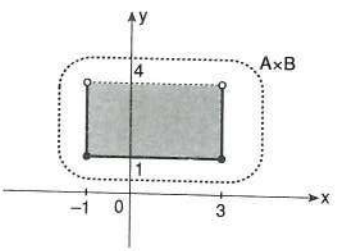


⇒ A \ B = ?

A) [– 2, 0) B) (– 2, 0) C) (– 2, 0]

D) {– 2, – 1} E) {– 2, – 1, 0}

3.



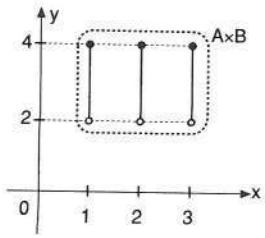
⇒ A x B = ?

A) [–1, 3] x [1, 3] B) [–1, 3] x [1, 4]

C) [–1, 3] x [1, 4) D) [–1, 3] x (1, 4)

E) (–1, 3) x (1, 4)

4.



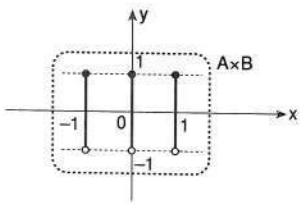
⇒ A x B = ?

A) [1, 3] x [2, 4] B) {1, 2, 3} x [2, 4)

C) {1, 2, 3} x (2, 4] D) [1, 3] x {2, 3, 4}

E) (1, 3) x {3, 4}

5.



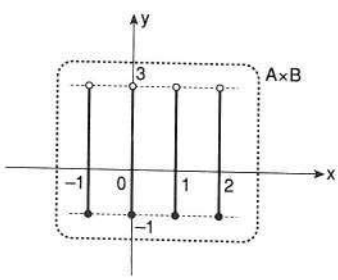
⇒ A x B = ?

A) [–1, 1] x [–1, 1] B) (–1, 1) x [–1, 1]

C) {–1, 0, 1} x (–1, 1] D) [–1, 1] x {–1, 0, 1}

E) {–1, 0, 1} x [–1, 1]

6.



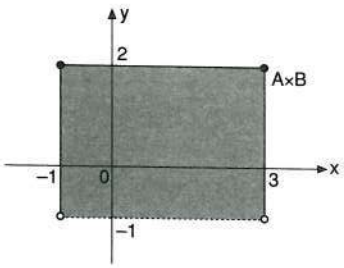
⇒ A x B = ?

A) [–1, 2] x [–1, 3] B) {–1, 0, 1, 2} x [–1, 3]

C) (–1, 2) x [–1, 3) D) {–1, 0, 1, 2} x [–1, 3)

E) {–1, 0, 1, 2} x {–1, 3}

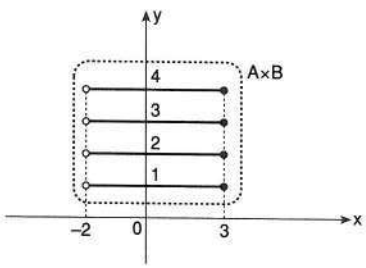
7.



⇒ A x B = ?

A) (–1, 3) x (–1, 2)
B) (–1, 3] x [–1, 2)
C) [–1, 3) x (–1, 2]
D) [–1, 3] x (–1, 2]
E) (–1, 2] x [–1, 3]

8.

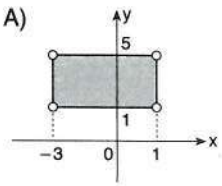


⇒ A x B = ?

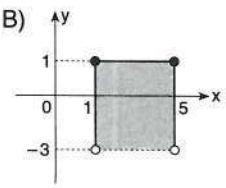
A) {– 2, –1, 0, 1, 2, 3} x [1, 4]
B) {– 2, 3} x [1, 4]
C) (– 2, 3] x {1, 2, 3, 4}
D) [– 2, 3) x {1, 2, 3, 4}
E) (– 2, 3] x (1, 4)

9. A = {x | |x + 1| ≤ 2, x ∈ R}
B = {x | 1 < x < 5, x ∈ R}
⇒ A x B = ?

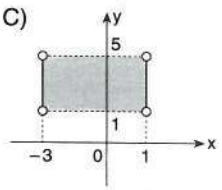
A)



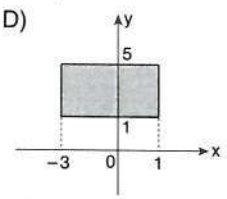
B)



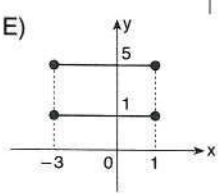
C)



D)



E)



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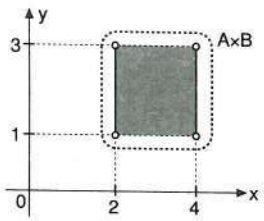
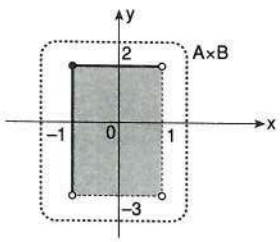


⇒ A x B = ?

A) (2, 4) x (1, 3)
B) {2, 4} x (1, 3)
C) (2, 4) x [1, 3]
D) (2, 4] x [1, 3)
E) [2, 4] x (1, 3)

11.

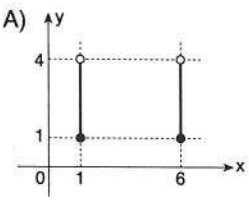


⇒ A x B = ?

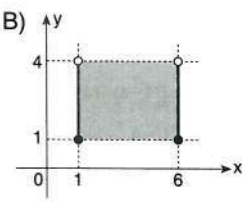
A) {– 1, 0, 1} x [– 3, 2]
B) {– 1, 0, 1} x {– 3, – 2, – 1, 0, 1, 2}
C) [– 1, 1) x [– 3, 2)
D) [– 1, 1) x (– 3, 2]
E) (– 1, 1) x (– 3, 2)

12. β = {(x, y) | 1 < x < 4, 1 ≤ y ≤ 6} ⇒ β = ?

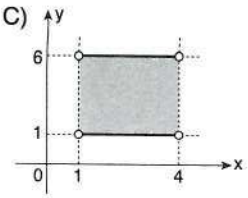
A)



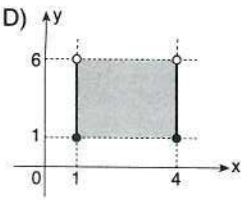
B)



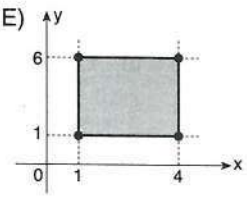
C)



D)



E)



1. $\beta = \{(x, y) \mid x \cdot y = 3 \quad x, y \in Z\}$

$\Rightarrow \beta = ?$

A) $\{(1, 3)\}$

B) $\{(3, 1), (1, 3)\}$

C) $\{(-1, 3)\}$

D) $\{(-1, 3), (3, -1)\}$

E) $\{(1, 3), (3, 1), (-1, -3), (-3, -1)\}$

2. $\beta = \{(x, y) \mid x \cdot y = 9, \quad x, y \in Z^+\}$

$\Rightarrow \beta = ?$

A) $\{(9, 9)\}$ B) $\{(9, 9), (9, -3)\}$

C) $\{(1, 9), (9, 1)\}$ D) $\{(1, 9), (9, 1), (3, 3)\}$

E) $\{(3, 3)\}$

3. $\beta = \{(x, y) \mid x \cdot y = 4, \quad x, y \in Z^+\}$

$\Rightarrow \beta = ?$

A) $\{(1, 4), (4, 1)\}$

B) $\{(-4, -1), (-1, -4), (1, 4), (4, 1)\}$

C) $\{(1, 4), (4, 1), (2, 2)\}$

D) $\{(1, 4), (4, 1), (-1, -4), (-4, -1), (2, 2)\}$

A) $\{(2, 2)\}$

4. $\beta = \{(x, y) \mid x + y = 10 \quad x, y \in N\}$

$\Rightarrow n(\beta) = ?$

A) 4 B) 5 C) 6 D) 10 E) 11

5. $A = \{1, 2, 3, 4, 6, 36\}$

$\beta = \{(x, y) : y = \sqrt{x} \quad x, y \in A\}$

$\Rightarrow \beta = ?$

A) $\{(1, 1) (4, 2) (36, 6)\}$

B) $\{(1, 1) (1, 4) (1, 0)\}$

C) $\{(1, 1) (2, 2) (6, 6)\}$

D) $\{(1, 1) (2, 4) (6, 36)\}$

E) $\{(2, 4) (6, 36)\}$

6. $\beta = \{(x, y) \mid \sqrt{x} + \sqrt{y} = 5, \quad x, y \in Z\}$

$\Rightarrow n(\beta) = ?$

A) 3 B) 4 C) 6 D) 8 E) 16

7. $\beta = \{(x, y) \mid 2x + y = 8, \quad x, y \in N\}$

$\Rightarrow n(\beta) = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

8. $\beta_1 = \{(x, y) \mid y = 2x - a\}$

$\beta_2 = \{(x, y) \mid y = x + 2\}$

$\beta_1 \cap \beta_2 = \{(3, 5)\}$

$\Rightarrow a = ?$

A) -3 B) -2 C) 1 D) 2 E) 3

9. $\beta = \{(x, y) \in N \times N \mid 3x + 5y = 240\}$
$\Rightarrow n(\beta) = ?$

A) 17 B) 16 C) 15 D) 14 E) 13

10. $\beta = \{(x, y) \mid y = 3x+a \quad x, y \in R\}$
$(1, 7) \in \beta \Rightarrow a = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

11. $\beta = \{(x, y) \mid y + 2a = 3x, \ x, y \in R\}$
$(2, 8) \in \beta \Rightarrow a = ?$

A) –2 B) –1 C) 0 D) 1 E) 2

12. $\beta = \{(x, y) \mid 5x + a = y, \ x, y \in R\}$
$(2, 12) \in \beta$
$\Rightarrow a = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

13. $\beta = \{(x, y) \in Z \times Z \mid |x| + |y| = 2\}$
$\Rightarrow n(\beta) = ?$

A) 2 B) 4 C) 6 D) 8 E) 12

14. $A = \{1, 2, 3, 4\}$
$\beta: A \rightarrow A$
$\beta: \{(x, y) \mid x \leq y \quad x, y \in A\}$
$\Rightarrow n(\beta) = ?$

A) 16 B) 10 C) 8 D) 6 E) 4

15. $A = \{1, 2, 3\}, \ B = \{0, 1, 2\}$
$\beta : A \rightarrow B$
$\beta = \{(x, y) \mid x > y, \ x \in A, \ y \in B\}$
$\Rightarrow n(\beta) = ?$

A) 6 B) 5 C) 4 D) 2 E) 1

16. $A = \{2, 3, 4, 5\}$
$B = \{2, 3, 4, 5\}$
$\beta : A \rightarrow B$
$\beta = \{(x, y) \mid x + y \leq 6\}$
$\Rightarrow n(\beta) = ?$

A) 8 B) 6 C) 4 D) 2 E) 1

1. $\beta = \{(1, 2), (1, 3), (2, 2)\}$
$\Rightarrow \beta^{-1} = ?$

A) $\{(2, 2)\}$
B) $\{(2, 1), (3, 1)\}$
C) $\{(1, 2), (1, 3), (2, 2)\}$
D) $\{(1, 1), (2, 2), (3, 3)\}$
E) $\{(2, 1), (3, 1), (2, 2)\}$

2. $\beta = \{(x, y) \in Z \times Z \mid 5x - 2y = n\}$
$(1, 3) \in \beta^{-1}$
$\Rightarrow n = ?$

A) -1 B) 1 C) 3 D) 13 E) 14

3. $\beta = \{(x, y) \in Z \times Z \mid 2x+3y = n\}$
$(2, 4) \in \beta^{-1} \Rightarrow n = ?$

A) 14 B) 13 C) 12 D) 11 E) 10

4. $A = \{1, 2, 3\}$, $\beta : A \to A$
$\beta = \{(x, y) \mid x < y,\ x, y \in A\}$
$\Rightarrow \beta^{-1} = ?$

A) $\{(3, 1), (3, 2)\}$
B) $\{(3, 3), (3, 2), (3, 1)\}$
C) $\{(3, 1), (3, 2), (2, 1)\}$
D) $\{(1, 3), (2, 3), (1, 2)\}$
E) $\{(1, 1), (2, 2), (3, 3)\}$

5. $\beta = \{(x, y) \mid 2x + y = 9,\ x, y \in Z^+\}$
$\Rightarrow \beta^{-1} = ?$

A) $\{(1, 4) (3, 3) (5, 2)\}$
B) $\{(1, 4) (5, 2) (7, 2)\}$
C) $\{(4, 1) (3, 3) (5, 2) (1, 7)\}$
D) $\{(1, 4) (3, 3) (5, 2) (7, 1)\}$
E) $\{(4, 1) (5, 2) (7, 1)\}$

6. $\beta = \{(x, y) \in Z \times Z \mid 2x+3y = 24\}$
$\Rightarrow \beta^{-1} = ?$

A) $\beta^{-1} = \{(y, x) \in Z \times Z \mid 3x+2y = 24\}$
B) $\beta^{-1} = \{(x, y) \in Z \times Z \mid 2x+3y = 24\}$
C) $\beta^{-1} = \{(y, x) \in Z \times Z \mid 6x+y = 24\}$
D) $\beta^{-1} = \{(x, y) \in Z \times Z \mid 3x+2y = 24\}$
E) $\beta^{-1} = \{(y, x) \in Z \times Z \mid x+6y = 24\}$

7. $\beta = \{(x, y) \in Z \times Z : 2|x| + |y| = 4\}$
$\Rightarrow n(\beta) = ?$

A) 4 B) 6 C) 8 D) 10 E) 12

8. $\beta = \{(a, c), (c, d), (b, b), (b, a), (c, a), (d, a), (d, c)\}$
$\Rightarrow n(\beta \cap \beta^{-1}) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $\beta = \{(1, 2), (2, 2), (3, 1), (2, 1), (2, 3), (3, 3), (3, 4), (4, 3)\}$
$\Rightarrow n(\beta \cap \beta^{-1}) = ?$

A) 7 B) 6 C) 5 D) 4 E) 3

10. $\beta = \{(x, y) \mid y = 2x - 4\}$
$\Rightarrow \beta \cap \beta^{-1} = ?$

A) $\{(2, 2)\}$ B) $\{(4, 4)\}$ C) $\{(0, 4)\}$
D) $\{(-4, 4)\}$ E) $\{(-4, 0)\}$

11. $\beta = \{(x, y) \in R^2 \mid 2x + 9y = 44\}$
$\Rightarrow \beta \cap \beta^{-1} = ?$

A) $\{(2, 9)\}$ B) $\{(9, 2)\}$ C) $\{(4, 4)\}$
D) $\{(4, 6)\}$ E) $\{(4, 1)\}$

12. $\beta = \{(x, y) \in R^2 \mid 3x + 7y = 30\}$
$\Rightarrow \beta \cap \beta^{-1} = ?$

A) $\{(3, 7)\}$ B) $\{(7, 3)\}$ C) $\{(-3, -7)\}$
D) $\{(3, 3)\}$ E) $\{(6, 1)\}$

13. $\beta = \{(x, y) \in R^2 \mid 3x + 4y = 21\}$
$\Rightarrow \beta \cap \beta^{-1} = ?$

A) $\{(3, 4)\}$ B) $\{(4, 3)\}$ C) $\{(3, 3)\}$
D) $\{(4, 4)\}$ E) $\{(3, 1)\}$

14. $\beta_1 = \{(x, y) : y - x = 4\}$
$\beta_2 = \{(x, y) : 2y = 3x - 9\}$
$\Rightarrow \beta_1 \cap \beta_2^{-1} = ?$

A) $\{(-1, 1)\}$ B) $\{(0, 1)\}$ C) $\{(3, 1)\}$
D) $\{(-3, 1)\}$ E) $\{(13, -17)\}$

15. $A = \{x : |x| < 4, \ x \in Z\}$
$B = \{(x, y) \in A \times A : x^2 + 1 = y\}$
$\Rightarrow n(\beta) = ?$

A) 1 B) 2 C) 3 D) 5 E) 6

16. $\beta = \{(x, y) \mid x^2 + y^2 = 625, \ x, y \in N\}$
$\Rightarrow n(\beta) = ?$

A) 2 B) 4 C) 6 D) 8 E) 16

1. $\beta(a, b) = 2a + 3b - ab$

$\beta(1, x) = \beta(x, 1)$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $\beta(x, y) = \frac{1}{x} + \frac{1}{y}$

$\beta\left(\frac{1}{2}, \frac{1}{7}\right) = \beta\left(\frac{1}{a}, \frac{2}{a}\right)$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 6 E) 9

3. $\beta(x, y) = |x| + 2y - 2$

$\beta(-2, 3) = \beta(5, a)$

$\Rightarrow a = ?$

A) 1 B) $\frac{3}{2}$ C) $\frac{5}{2}$ D) 4 E) 5

4. $\beta\left(\frac{1}{x}, y\right) = x + \frac{1}{y}$

$\beta\left(\frac{1}{3}, \frac{1}{2}\right) = \beta\left(\frac{3}{a}, 3\right)$

$\Rightarrow a = ?$

A) 20 B) 18 C) 15 D) 14 E) 6

5. $\beta(a, b) = a^2 - 2a + b,$

$\beta(2, x) = \beta(x, -4)$

$\Rightarrow \{x_1, x_2\} = ?$

A) $\{1, -1\}$ B) $\{1, 4\}$ C) $\{-1, 4\}$ D) $\{4, -4\}$ E) $\{0, 4\}$

6. $\beta(a, b) = \begin{cases} 2a + b & a \geq b \\ a^2 + b & a < b \end{cases}$

$\beta(4, 2) = \beta(1, x)$

$\Rightarrow x = ?$

A) -1 B) 1 C) 2 D) 6 E) 9

7. $\beta(a, b) = \begin{cases} 2a - b & , a \leq b \\ a + b & , a > b \end{cases}$

$\beta(2, 3) = \beta(3, x)$

$x < 5$

$\Rightarrow x = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

8. $\beta = \{(x, y) \in Z^+ \times Z^+ \mid x \cdot y = 12\}$

$\Rightarrow n(\beta) = ?$

A) 2 B) 3 C) 4 D) 6 E) 12

9. $\beta = \{(x, y) \in Z \times Z \mid x \cdot y = 8\}$

$\Rightarrow n(\beta) = ?$

A) 2 B) 3 C) 4 D) 6 E) 8

10. $\beta = \{(x, y) \in N \times N \mid x \cdot y = 108\}$

$\Rightarrow n(\beta) = ?$

A) 24 B) 20 C) 18 D) 16 E) 12

11. $\beta = \{(x, y) \in Z \times Z \mid x \cdot y = 720\}$

$\Rightarrow n(\beta) = ?$

A) 18 B) 30 C) 45 D) 50 E) 60

12. $\beta = \left\{(x, y) \in Z^+ \times Z^+ \middle| \frac{120}{x} = y\right\}$

$\Rightarrow n(\beta) = ?$

A) 9 B) 10 C) 12 D) 15 E) 16

13. $A = \{1, -1, 2\}$

$B = \{0, 1, 2\}$

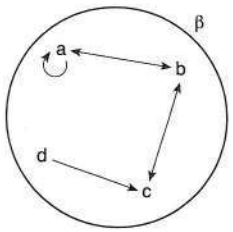
$\beta: A \to B$

$\beta = \{(x, y) \mid x^y = 1 \quad x \in A \quad y \in B\}$

$\Rightarrow n(\beta) = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

14.



$\Rightarrow \beta = ?$

A) {(a, b), (b, a), (b, c), (c, d), (d, c)}

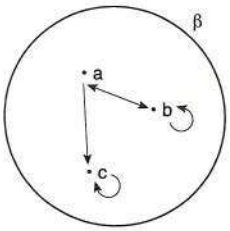
B) {(a, b), (b, a), (a, a), (c, d), (d, c)}

C) {(a, a), (a, b), (b, a), (d, c), (b, c), (c, b)}

D) {(a, b), (b, c), (d, c)}

E) {(a, b), (b, a), (b, c), (c, d), (d, c)}

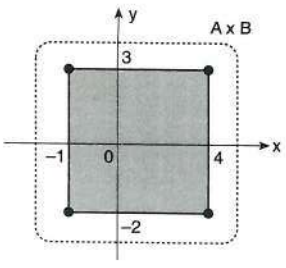
15.



$\Rightarrow n(\beta) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16.



$\Rightarrow A \cap B = ?$

A) [−2, 4] B) [−1, 4] C) {−1, 4}

D) [−1, 3] E) (−1, 3)

1. $f : R \to R$, $f(x) = 2x + 3$

$\Rightarrow f(2) = ?$

A) 2 B) 3 C) 4 D) 5 E) 7

2. $f : R \to R$

$f(x) = \frac{x-6}{3}$

$\Rightarrow f(12) = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

3. $f : R \to R$, $f(x) = x^2 - 4x$

$\Rightarrow f(3) = ?$

A) -6 B) -4 C) -3 D) 0 E) 3

4. $f : R \to R$, $f(x) = \frac{3x-1}{2}$

$\Rightarrow f(3) - f(1) = ?$

A) 3 B) 5 C) 6 D) 7 E) 8

5. $f : R \setminus \{2\} \to R \setminus \{1\}$

$f(x) = \frac{x+6}{x-2}$

$\Rightarrow f(6) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

6. $f : R \times R \to R$

$f(x, y) = x^2 - 2xy + y^2$

$\Rightarrow f(75, 70) = ?$

A) 1 B) 5 C) 20 D) 25 E) 125

7. $f: R \times R \to R$

$f(x, y) = y^2 - x(2y - x)$

$\Rightarrow f(2011, 2010) = ?$

A) 0 B) 1 C) 4 D) 2010 E) 2011

8. $f : R \to R$, $f(x) = x^3 - 3x^2 + 3x - 1$

$\Rightarrow f(11) = ?$

A) 11 B) 100 C) 121 D) 1000 E) 1210

9. $f: R \to R$, $f(x) = \begin{cases} x^2 - 1 & , x > 2 \\ x + 1 & , x = 2 \\ x & , x < 2 \end{cases}$

$\Rightarrow f(2) + f(4) + f(-1) = ?$

A) 3 B) 4 C) 5 D) 15 E) 17

10. $f: R \to R$, $f(x) = \begin{cases} x - 3 & , x > 1 \\ 3 & , x = 1 \\ x + 2 & , x < 1 \end{cases}$

$\Rightarrow f(3) + f(4) + f(0) = ?$

A) 3 B) 4 C) 6 D) 8 E) 10

11. $f: R \to R$, $f(x) = x^2 - ax + 5$

$f(3) = 5$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

12. $f: R \setminus (-1, 1) \to R$

$f(x) = 3^{x-1} + \sqrt{x^2 - 1}$

$\Rightarrow f(2) + f(1) = ?$

A) $4 + \sqrt{3}$ B) $\sqrt{3}$ C) $\sqrt{3} + 2$ D) $9 + \sqrt{3}$ E) $3 + \sqrt{3}$

13. $f: R \to R$, $f(x - 2) = 2x + 1$

$\Rightarrow f(3) = ?$

A) 7 B) 9 C) 11 D) 13 E) 15

14. $f: R \setminus \{4\} \to R$

$f(x + 4) = \dfrac{x - 1}{6x}$

$\Rightarrow f(5) = ?$

A) -1 B) 0 C) $\dfrac{2}{15}$ D) 1 E) 5

15. $f: (2, +\infty) \to R$

$2^{f(x)} = x - 2$

$\Rightarrow f(18) + f(6) = ?$

A) 2 B) 4 C) 6 D) 12 E) 18

16. $f: R \setminus \{1\} \to R \setminus \{2\}$

$f\left(\dfrac{x + 3}{x - 1}\right) = \dfrac{2x - 1}{x + 5}$

$\Rightarrow f(2) = ?$

A) $\dfrac{9}{10}$ B) $\dfrac{9}{5}$ C) 2 D) $\dfrac{11}{3}$ E) 4

1. $f : R \to R$

$f(x) = 3x + 7$

$\Rightarrow f(x - 3) = ?$

A) $3x + 7$ B) $x + 4$ C) $3x + 4$

D) $3x - 2$ E) $x + 7$

2. $f : R \to R$

$f(x) = 2x + 3$

$\Rightarrow f(x - 1) = ?$

A) $2x - 1$ B) $2x + 1$ C) $x - 3$

D) $x + 1$ E) $2x - 3$

3. $f : R \to R$

$f(x) = 4x + 2$

$\Rightarrow f(3x) = ?$

A) $3x + 2$ B) $12x + 2$ C) $12x + 6$

D) $4x + 6$ E) $3x + 6$

4. $f : R \to R$

$f(x) = x^2 - 6x + 7$

$\Rightarrow f(x + 1) = ?$

A) $x^2 - 6x$ B) $x^2 - 4x + 2$ C) $x^2 - 7x$

D) $x^2 - 6x + 8$ E) $x^2 - 4x$

5. $f : R \to R$

$f(x) = 7^{x-2}$

$\frac{f(3a-2)}{f(2a+1)} = 1$

$\Rightarrow a = ?$

A) -3 B) -2 C) -1 D) $\frac{1}{3}$ E) 3

6. $f : R \to R$

$f(x) = 2x - 4$

$\Rightarrow f(2f(x) + 3) = ?$

A) $4x - 5$ B) $2x + 1$ C) $4x + 1$

D) $8x - 10$ E) $8x - 14$

7. $f : R \to R$

$f(x) = x^2 - 1$

$\Rightarrow f(2 - x) - f(x - 2) = ?$

A) 2 B) 0 C) $2x - 4$

D) $4x^2$ E) $3x - 2$

8. $f : R \to R$

f sabit fonksiyon *(f constant function)*

$f(x) = (a - 1)x^2 + (b - 2)x + a \cdot b$

$\Rightarrow f(4) = ?$

A) 0 B) 1 C) 2 D) 4 E) 6

9. $f : R \to R$

f sabit fonksiyon *(f constant function)*

$f(x) = (a + 2)x^2 + (b - 3)x + a \cdot b + 2$

$\Rightarrow f(3002) = ?$

A) -4 B) 0 C) 1 D) 3002 E) 3004

10. $f : R \to R$, $f(x) = \dfrac{ax + 4}{2x - 4}$

f sabit fonksiyon *(f constant function)*

$\Rightarrow f(2002) = ?$

A) -2 B) -1 C) 4 D) 8 E) 2002

11. $f : R \to R$

f birim fonksiyon *(f identity function)*

$f(x) = (a - 2)x^2 + (b - 4)x + c + 1$

$\Rightarrow f(a+b+c) = ?$

A) 6 B) 5 C) 4 D) 2 E) 1

12. $f : R \to R$

$f(x^2 + 3x + 4) = 4x^2 + 12x + 3$

$\Rightarrow f(5) = ?$

A) 1 B) 3 C) 4 D) 5 E) 7

13. $f : R \to R$

$f(x^2 + 5x + 3) = x^2 + 5x + 7$

$\Rightarrow f(5) = ?$

A) 5 B) 7 C) 9 D) 11 E) 13

14. $f : R \setminus \{0\} \to R$

$f\left(\dfrac{x^2 - 4x}{x^3 - 5}\right) = \dfrac{x^3 - 5}{x^2 - 4x} + 2$

$\Rightarrow f\left(\dfrac{1}{x}\right) = ?$

A) x B) $x + 1$ C) $x + 2$ D) 2 E) 4

15. $f : R \to R$

$f(x^3 - x) = x^6 - 2x^4 + x^2$

$\Rightarrow f(2) = ?$

A) 1 B) 2 C) 4 D) 6 E) 8

16. $f : R \to R$

$f\left(\dfrac{3^{4x} + 1}{3^{2x}}\right) = 3^{4x} + 3^{-4x} + 5$

$\Rightarrow f(x) = ?$

A) $x^2 + 3$ B) x^2 C) $x^2 + 5$ D) $x^2 + 2$ E) $x + 5$

1. $f : R \to R$

$f(x) = x - 3$

$\Rightarrow f^{-1}(x) = ?$

A) $x + 3$ B) $3x$ C) $3x + 3$

D) $x - 3$ E) $3x - 3$

2. $f : R \to R$, $f(x) = 2x - 1$

$\Rightarrow f^{-1}(x) = ?$

A) $x + 2$ B) $2x - 1$ C) $\frac{x+1}{2}$

D) $x + \frac{1}{2}$ E) $\frac{x}{2} + 1$

3. $f : R \to R$

$f(x) = \frac{3x-4}{5}$

$\Rightarrow f^{-1}(x) = ?$

A) $5x + 4$ B) $5x - 4$ C) $\frac{3x+4}{5}$

D) $\frac{5x+4}{3}$ E) $\frac{3x+5}{4}$

4. $f : R \to R$

$f(x) = \frac{7-x}{2}$

$\Rightarrow f^{-1}(x) = ?$

A) $7 - 2x$ B) $\frac{7-x}{2}$ C) $2x - 7$

D) $\frac{x-7}{2}$ E) $2x$

5. $f : R \to R$

$f(x) = 2x + 1$

$\Rightarrow f^{-1}(3) = ?$

A) 7 B) 6 C) 5 D) 3 E) 1

6. $f : R \to R$

$f(x - 2) = \frac{x-3}{2}$

$\Rightarrow f^{-1}(2) = ?$

A) 7 B) 5 C) 3 D) 1 E) $\frac{1}{2}$

7. $f : R \setminus \{4\} \to R \setminus \{2\}$

$f(x) = \frac{2x-3}{x-4}$

$\Rightarrow f^{-1}(x) = ?$

A) $\frac{2x-3}{x+4}$ B) $\frac{x-3}{x-2}$ C) $\frac{4x-3}{x}$

D) $\frac{4x+3}{x-2}$ E) $\frac{4x-3}{x-2}$

8. $f : R \setminus \{3\} \to R \setminus \{-2\}$

$f(x) = \frac{4-2x}{x-3}$

$\Rightarrow f^{-1}(x) = ?$

A) $\frac{3x+4}{x+2}$ B) $\frac{3x+4}{x-2}$ C) $\frac{3-2x}{x-4}$

D) $\frac{3-2x}{x+4}$ E) $\frac{2x-3}{x-4}$

9. $f: R \setminus \{a\} \to R \setminus \{b\}$

$f(x) = \dfrac{6x-11}{7-4x}$

$\Rightarrow \dfrac{a}{b} = ?$

A) $-\dfrac{11}{7}$ B) $-\dfrac{7}{6}$ C) $\dfrac{3}{2}$ D) 3 E) 9

10. $f: R \to R$

$f(x+2) = 3x-2$

$\Rightarrow f(x) = ?$

A) $x-2$ B) $3x-8$ C) $3x+4$

D) $x-8$ E) $x+4$

11. $f: R \setminus \{-1\} \to R \setminus \{2\}$

$f(x-3) = \dfrac{2x+1}{x-2}$

$\Rightarrow f(x) = ?$

A) $\dfrac{2x-7}{x-1}$ B) $\dfrac{2x+7}{x+1}$ C) $\dfrac{x+3}{x+1}$

D) $\dfrac{2x+7}{x-1}$ E) $\dfrac{x-3}{x+1}$

12. $f: R \to R$

$f\left(\dfrac{x}{2}\right) = x^2-3x+1$

$\Rightarrow f(x) = ?$

A) $2x^2-6x$ B) x^2-3x C) $4x^2-6x+1$

D) x^2-6x+1 E) $4x^2-6x$

13. $f: R \setminus \left\{-\dfrac{1}{2}\right\} \to R \setminus \{2\}$

$f\left(\dfrac{x-1}{2}\right) = \dfrac{2x+3}{x}$

$\Rightarrow f(x) = ?$

A) $\dfrac{4x}{2x+1}$ B) $\dfrac{4x+5}{x+1}$ C) x

D) $\dfrac{4x+5}{2x+1}$ E) $\dfrac{4x-5}{x-1}$

14. $f: R \setminus \left\{\dfrac{1}{2}\right\} \to R$

$f\left(\dfrac{x+2}{2}\right) = \dfrac{x-5}{x+1} \Rightarrow f(x) = ?$

A) $\dfrac{x+1}{x-5}$ B) $\dfrac{x-3}{2x+1}$ C) $\dfrac{2x-7}{2x-1}$

D) $\dfrac{2x-7}{x+1}$ E) $\dfrac{x-7}{x+1}$

15. $f: R \setminus \{3\} \to R \setminus \{2\}$

$f\left(\dfrac{3x+1}{x-2}\right) = x$

$\Rightarrow f^{-1}(x) = ?$

A) $\dfrac{2x-1}{x+2}$ B) $\dfrac{2x+1}{x-3}$ C) $\dfrac{3x+1}{x+2}$

D) $\dfrac{3x+1}{x-2}$ E) x

16. $f: R \to R$, $f(x-3) = 5x+2$

$\Rightarrow f(x+1) = ?$

A) $x+22$ B) $5x-18$ C) $x-18$

D) $5x+7$ E) $5x+22$

1. $f: R \to R$

$f(3x-1) = 2x+1$

$\Rightarrow f^{-1}(9) = ?$

A) 2 B) 4 C) 6 D) 10 E) 11

2. $f: R \to R$

$f(2x+1) = 2x-2$

$\Rightarrow f^{-1}(4) = ?$

A) 3 B) 5 C) 6 D) 7 E) 11

3. $f: R \setminus \{3\} \to R$

$f\left(\frac{3x}{x+1}\right) = ax^2 - x + 2$

$f^{-1}(0) = 6$

$\Rightarrow a = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

4. $f: R \to R$

$f\left(\frac{2x-a}{3}\right) = x - 2$

$f^{-1}(3) = 2$

$\Rightarrow a = ?$

A) 2 B) 3 C) 4 D) 6 E) 7

5. $f: [-2, \infty) \to [0, \infty)$

$f(x^2-2) = x + 4$

$f^{-1}(6) = a$

$\Rightarrow a = ?$

A) $2\sqrt{2}+4$ B) $4+\sqrt{2}$ C) 3 D) 2 E) 1

6. $f: R^+ \to (1, +\infty)$

$f(x) = x^4 + 1$

$\Rightarrow f^{-1}(82) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $f: R \to R$

$f(x) = x^3 - 3x^2 + 3x - 1$

$\Rightarrow f^{-1}(8) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

8. $f: R \to R$

$f(x-2) = 3x - 6$

$\Rightarrow f^{-1}(x) = ?$

A) $3x$ B) $2x$ C) $\frac{x}{2}$ D) $\frac{x}{3}$ E) $\frac{x}{4}$

9. $f: R \setminus \left\{\frac{3}{2}\right\} \to R \setminus \{1\}$

$f\left(\frac{3x-2}{2x+2}\right) = x + 2$

$\Rightarrow f^{-1}(x) = ?$

A) $\frac{3x-8}{2x-2}$ B) $\frac{3x}{2x+4}$ C) $\frac{9x-4}{2x}$

D) $\frac{3x}{2x+2}$ E) $\frac{3x-8}{2x}$

10. $f(x) = \begin{cases} 2x-2, & x < 2 \\ 3x-1, & x \geq 2 \end{cases}$

$\Rightarrow f^{-1}(5) + f^{-1}(0) = ?$

A) -1 B) 0 C) 2 D) 3 E) 4

11. $f(x) = \frac{-6x+4}{x+a}$

$f(x) = f^{-1}(x)$

$\Rightarrow a = ?$

A) 6 B) 4 C) 2 D) -4 E) -6

12. $f: [3, +\infty) \to [-4, +\infty)$

$f(x) = x^2 - 6x + 5$

$\Rightarrow f^{-1}(21) = ?$

A) 4 B) 6 C) 8 D) 10 E) 21

13. $f: (2, +\infty) \to R^+$

$f(x) = x^2 - 4x + 4$

$\Rightarrow f^{-1}(x) = ?$

A) $x + 2$ B) $(x-2)^2$ C) $\sqrt{x} + 2$

D) $\sqrt{x}$ E) $\sqrt{x} - 2$

14. $f: [1, +\infty) \to [6, +\infty)$

$f(x) = x^2 - 2x + 7$

$\Rightarrow f^{-1}(x) = ?$

A) $\sqrt{x-6}$ B) $\sqrt{x-6} - 1$ C) $\sqrt{x-6} + 1$

D) $\sqrt{x+6} + 1$ E) $\sqrt{x+6} - 1$

15. $f: (-\infty, 3] \to [-8, +\infty)$

$f(x) = x^2 - 6x + 1$

$\Rightarrow f^{-1}(x) = ?$

A) $\sqrt{x-8} - 3$ B) $\sqrt{x-8} + 3$ C) $\sqrt{x+8} - 3$

D) $3 - \sqrt{x+8}$ E) $\sqrt{x+8} + 3$

16. $f: (3, \infty) \to (3, \infty)$

$f(x) = x^2 - 6x + 12$

$\Rightarrow f^{-1}(x^2 + 3) = ?$

A) x B) x^2 C) $3x$ D) $x + 3$ E) $x^2 + 3$

1. $f : R \to R$

$f(x) = x + 1$

$\Rightarrow (fof)(2) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

2. $f(x) = 3x - 1$

$g(x) = x^2 + 5$

$\Rightarrow (gof)(2) = ?$

A) 30 B) 26 C) 9 D) 5 E) 4

3. $f(x) = 3^{x-1}$

$\Rightarrow \frac{(fof)(2)}{f(3)} = ?$

A) $\frac{1}{3}$ B) 1 C) 2 D) 3 E) 9

4. $f(x) = x^2 - 2x + 1$

$g(x) = \sqrt{x+9}$

$\Rightarrow (gof)(5) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $f(x) = 2x - 1$

$g(x) = 3x + 4$

$\Rightarrow (fog)(x) = ?$

A) $6x - 1$ B) $2x + 4$ C) $6x + 8$ D) $6x + 7$ E) $2x + 7$

6. $f(x) = 3x + 1$

$g(x) = x - 5$

$\Rightarrow (gof)(x) = ?$

A) $3x - 5$ B) $3x - 4$ C) $x + 1$ D) $3x - 6$ E) $3x$

7. $f(x) = 2x - 1$

$g(x) = 3x + 2$

$(fog)(a) = (f + g)(a)$

$\Rightarrow a = ?$

A) -4 B) -2 C) 1 D) 2 E) 3

8. $f(2x - 1) = x^2$

$g(x + 1) = x - 4$

$\Rightarrow (gof)(5) = ?$

A) 0 B) 2 C) 3 D) 4 E) 6

9. $f : R \setminus \{3\} \to R \setminus \{3\}$

$f(x) = \dfrac{3x+1}{x-3}$

$g(x) = \dfrac{x+1}{x-1}$

$(f^{-1}og)(3) = a$

$\Rightarrow a = ?$

A) -7 B) -5 C) 1 D) 3 E) 5

10. $f : R \to R$

$f(x+7) = 3x - 6$

$g(2x+1) = x^2 - 1$

$\Rightarrow (f^{-1}og)(5) = ?$

A) 8 B) 10 C) 13 D) 17 E) 60

11. $f : R \to R$

$g : R \to R$

$g(x) = x + 3$

$f(x) = 3x + 1$

$\Rightarrow (g^{-1}of)^{-1}(4) = ?$

A) 0 B) 1 C) 2 D) 4 E) 7

12. $f : R \to R$

$g : R^+ \to (-2, +\infty)$

$f(x) = 2x - 1$

$g(x) = x^2 - 2$

$\Rightarrow (fog^{-1})^{-1}(5) = ?$

A) 5 B) 7 C) 9 D) 23 E) 25

13. $f : R \to R$

$g : R \to R$

$f(x+1) = 3x - 3$

$g(x-1) = 3x - 2$

$\Rightarrow (gof^{-1})^{-1}(x) = ?$

A) $2x + 1$ B) $2x - 4$ C) $x - 7$

D) $6x + 8$ E) $6x + 5$

14. $f : R \to R$

$g : R \to R$

$f(x) = 4x - 7$

$g(x) = 2x - 1$

$\Rightarrow (gof^{-1})^{-1}(x) = ?$

A) $\dfrac{x-5}{7}$ B) $2x - 5$ C) $3x - 7$

D) $\dfrac{2x-7}{2}$ E) $\dfrac{x-7}{2}$

15. $A = \{2, 3, 5\}$

$f: A \to A$

$f = \{(2, 5), (3, 2), (5, 3)\}$

$\Rightarrow f(3) + f^{-1}(5) + (fof^{-1})(2) = ?$

A) 15 B) 12 C) 10 D) 8 E) 6

16. $f^{-1}(x) = \dfrac{x-1}{2}$

$g(x) = \begin{cases} x+1, & x > 1 \\ x-3, & x \le 1 \end{cases}$

$\Rightarrow (fog)(2) + (gof)(-1) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

1. $f: R \to R$

$g: R \to R$

$g^{-1}(2) = f(4) = 3$

$\Rightarrow (gof)(4) = ?$

A) 2 B) 3 C) 4 D) 5 E) 7

2. $f: R \to R$

$g: R \to R$

$f(3x + 8) = 4x - 7$

$g\left(\frac{x+2}{2}\right) = \frac{x-2}{4}$

$\Rightarrow f^{-1}og(4) = ?$

A) 10 B) 11 C) 12 D) 13 E) 14

3. $f: R \to R$

$g: [1, +\infty) \to [3, +\infty)$

$f(x) = x - 1$

$g(x) = x^2 - x + 3$

$\Rightarrow (fog^{-1})^{-1}(x) = ?$

A) $x^2 - x + 2$ B) $x^2 + 3x + 4$ C) $x^2 + x + 3$

D) $x^2 - x + 4$ E) $x^2 - x - 2$

4. $f: R \to R$

$g: R \to R$

$f(x) = 3x - 2$

$(fog)(x) = 5x + 2$

$\Rightarrow g(x) = ?$

A) $5x + 4$ B) $\frac{5x}{3}$ C) $\frac{5x+4}{3}$

D) $\frac{5x-4}{3}$ E) $5x - 4$

5. $f: R \to R$

$g: R \to R$

$f(x) = \frac{x-4}{5}$

$(fog)(x) = 2x + 4$

$\Rightarrow g(x) = ?$

A) $10x$ B) $10x - 16$ C) $10x + 24$

D) $5x + 10$ E) $\frac{10x+24}{5}$

6. $f: R \to R$

$g: R \to R$

$f(x) = \frac{4x-2}{3}$

$(fog)(x) = 3x - 2$

$\Rightarrow g^{-1}(x) = ?$

A) $\frac{9x-4}{4}$ B) $\frac{4x+4}{9}$ C) $4x + 4$

D) $9x - 4$ E) $\frac{4x-4}{9}$

7. $f: [3, +\infty) \to [-4, +\infty)$

$g: R \to R$

$f(x) = x^2 - 5x + 2$

$(gof)(x) = 2x^2 - 10x + 7$

$\Rightarrow g(4) = ?$

A) 1 B) 4 C) 7 D) 11 E) 13

8. $f: R \to R$

$g: R \to R$

$g(x) = 2x - 3$

$(f^{-1}og)(x) = 3x + 3$

$\Rightarrow f(x) = ?$

A) $\frac{2x-3}{3}$ B) $3x - 3$ C) $\frac{2x-15}{3}$

D) $2x - 15$ E) $x - 15$

9. $f: R \to R$

$g: R \to R$

$f(x-3) = g^{-1}(2x+5)$

$\Rightarrow (gof)(1) = ?$

A) 5 B) 6 C) 8 D) 10 E) 13

10. $f: R \to R$

$g: R \to R$

$f(x) = x - 7$

$(g^{-1}of)(x) = 5x - 2$

$\Rightarrow g(8) = ?$

A) –7 B) –5 C) 2 D) 4 E) 5

11. $f: R \setminus \left\{-\frac{3}{2}\right\} \to R \setminus \left\{\frac{1}{2}\right\}$

$g: R \to R$

$g(x) = x - 1$

$(fog)(x) = \frac{x-1}{2x+1}$

$\Rightarrow f^{-1}(x) = ?$

A) $\frac{x}{2x+3}$ B) $\frac{-3x}{2x-1}$ C) $\frac{2x-1}{3x}$

D) $\frac{2x-1}{x}$ E) $\frac{2x+3}{x}$

12. $f: R \to R$

$g: R \to R$

$f(x-3) = g^{-1}(x+5)$

$\Rightarrow (gof)^{-1}(7) = ?$

A) – 3 B) –1 C) 1 D) 5 E) 7

13. $f: R \to R$

$g: R \to R$

$f^{-1}(x-3) = g(2x+4)$

$\Rightarrow (fog)(10) = ?$

A) – 3 B) – 2 C) 0 D) 2 E) 4

14. $f: R \to R$

$g: R \setminus \{1\} \to R \setminus \{2\}$

$f(x) = 3x - 2$

$g(x) = \frac{2x+1}{x-1}$

$(fog^{-1})(2a+1) = -8$

$\Rightarrow a = ?$

A) 7 B) 5 C) 3 D) 1 E) 0

15. $f: R \to R$

$g: R \to R$

$f\left(\frac{2-x}{3}\right) = g\left(\frac{x+3}{2}\right)$

$\Rightarrow (f^{-1}og)^{-1}(2) = ?$

A) –4 B) $-\frac{1}{2}$ C) 0 D) 2 E) 4

16. $f: R \to R$

$f^{-1}(x) = x^3 - 60$

$\Rightarrow (fofofofof)(4) = ?$

A) 1 B) 4 C) 6 D) 60 E) 64

1. $f\begin{pmatrix} a & b & c & d & e \\ b & c & a & e & d \end{pmatrix}$

$\Rightarrow f(d) = ?$

A) a B) b C) c D) d E) e

2. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$

$\Rightarrow f(2) + f(1) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

3. $f\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 2 & 1 \end{pmatrix}$

$\Rightarrow f^{-1}(2) + f(1) = ?$

A) 2 B) 4 C) 5 D) 6 E) 8

4. $f\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 5 & 4 & 2 & 1 \end{pmatrix}$

$\Rightarrow f^{-1}(3) + f(2) = ?$

A) 3 B) 5 C) 6 D) 7 E) 8

5. $f\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 1 & 2 & 5 & 4 \end{pmatrix}$

$g\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 4 & 2 & 1 & 3 & 5 \end{pmatrix}$

$\Rightarrow (gof)(2) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

6. $f\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 5 & 2 & 1 & 4 \end{pmatrix}$

$g\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 1 & 4 & 2 & 5 \end{pmatrix}$

$\Rightarrow (fogof)(3) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $f\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 4 & 1 & 5 & 3 & 2 \end{pmatrix}$

$g\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 2 & 1 & 5 & 4 \end{pmatrix}$

$\Rightarrow (f^{-1}og)(5) = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

8. $f\begin{pmatrix} a & b & c & d \\ d & a & c & b \end{pmatrix}$

$(gof^{-1})\begin{pmatrix} a & b & c & d \\ c & b & a & d \end{pmatrix}$

$\Rightarrow g = ?$

A) $\begin{pmatrix} a & b & c & d \\ c & d & b & a \end{pmatrix}$ B) $\begin{pmatrix} a & b & c & d \\ d & c & a & b \end{pmatrix}$

C) $\begin{pmatrix} a & b & c & d \\ b & c & a & d \end{pmatrix}$ D) $\begin{pmatrix} a & b & c & d \\ c & d & b & a \end{pmatrix}$

E) $\begin{pmatrix} a & b & c & d \\ d & a & b & c \end{pmatrix}$

9. $xy - 3y - x + 3 = 0$

$\Rightarrow y = ?$

A) $\frac{x-1}{x+2}$ B) $\frac{x-2}{x-3}$ C) 1

D) $\frac{x+3}{x-3}$ E) -1

10. $f(x) = \frac{4-2f(x)}{2+x}$

$\Rightarrow f(4) = ?$

A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) 1 E) $\frac{3}{2}$

11. $f(x) = \frac{-f(x)+x+1}{x-2}$

$\Rightarrow f(3) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

12. $f: R\setminus\{-1\} \to R\setminus\{1\}$

$xy + 2 = x - y$

$y = f(x)$

$\Rightarrow f^{-1}(x) = ?$

A) $\frac{x-2}{x-1}$ B) $\frac{x+2}{1-x}$ C) $\frac{x-2}{x}$

D) $\frac{2}{1-x}$ E) $\frac{2-x}{x-1}$

13. $f(x) = 5^{x+3}$

$\Rightarrow f(x+1)$ in $f(x)$ cinsinden değeri aşağıdakilerden hangisidir?

What is the value of $f(x+1)$ in terms of $f(x)$?

A) $25f(x)$ B) $5f(x)$ C) $25f^2(x)$

D) $f^2(x)$ E) $5f^2(x)$

14. $f(x) = 3^{x+1}$

$\Rightarrow f(x+2)$ nin $f(x)$ cinsinden değeri aşağıdakilerden hangisidir?

What is the value of $f(x+2)$ in terms of $f(x)$?

A) $f(x) + 1$ B) $\frac{f(x)}{3}$ C) $3f(x) - 2$

D) $9f(x)$ E) $f(x) + 3$

15. $f(x) = \frac{x+1}{x}$

$\Rightarrow f(3x)$ in $f(x)$ cinsinden değeri aşağıdakilerden hangisidir?

What is the value of $f(3x)$ in terms of $f(x)$?

A) $\frac{f(x)+2}{3}$ B) $\frac{3f(x)+1}{3f(x)}$ C) $\frac{3f(x)+1}{3}$

D) $3f(x)$ E) $f(x) + 2$

16. $f(x) = 3^{x+1}$

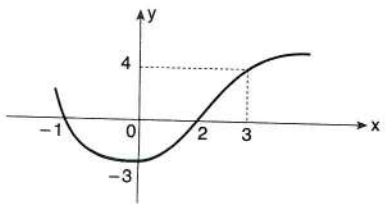
$\Rightarrow f\left(\frac{x+1}{2}\right)$ nin $f(x)$ cinsinden değeri aşağıdakilerden hangisidir?

What is the value of $f\left(\frac{x+1}{2}\right)$ in terms of $f(x)$?

A) $27f^2(x)$ B) $\sqrt{27f(x)}$ C) $3\sqrt{f(x)}$

D) $\sqrt{3f(x)}$ E) $9f^2(x)$

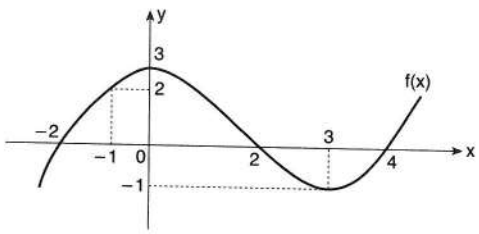
1.



$\Rightarrow f(2) + f(3) + f(0) = ?$

A) -3 B) -1 C) 0 D) 1 E) 4

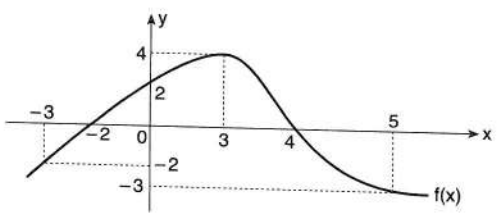
2.



$\Rightarrow \dfrac{f(-1) + f(0) + f(3)}{f(-2) + f(-1)} = ?$

A) 0 B) 1 C) 2 D) $\frac{5}{2}$ E) 3

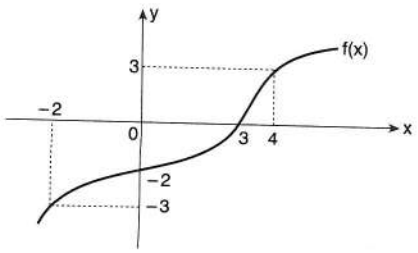
3.



$\Rightarrow (fof^{-1}of)(5) = ?$

A) -3 B) -2 C) 0 D) 2 E) 4

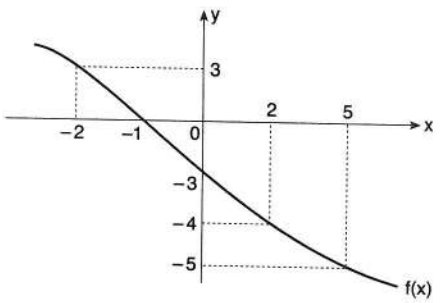
4.



$\Rightarrow \dfrac{f^{-1}(3) + f(4)}{f^{-1}(-3)} = ?$

A) -4 B) $-\frac{7}{2}$ C) 2 D) $\frac{7}{2}$ E) 4

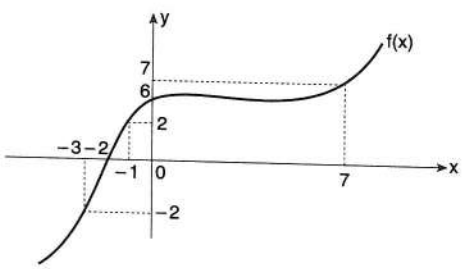
5.



$\Rightarrow f(-2) + f^{-1}(-3) + f^{-1}(-4) = ?$

A) 5 B) 4 C) -3 D) -4 E) -6

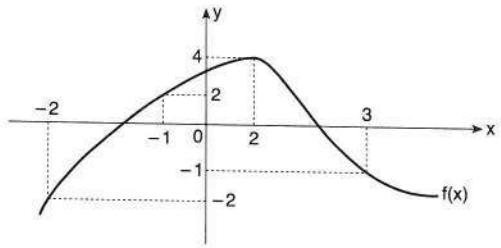
6.



$\Rightarrow [f^{-1}(6) - f(-2)] \cdot f^{-1}(2) = ?$

A) -4 B) -1 C) 0 D) 1 E) 7

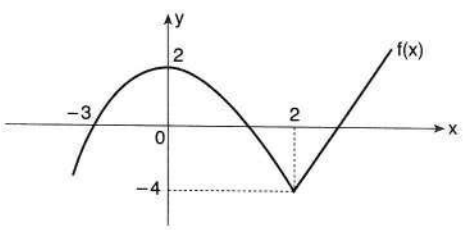
7.



⇒ (fofof)(3) = ?

A) – 2 B) –1 C) 0 D) 2 E) 4

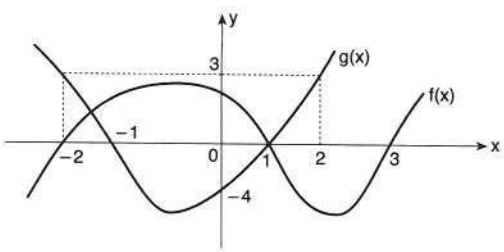
8.



⇒ (fofof)(– 3) = ?

A) – 4 B) – 3 C) 0 D) 1 E) 2

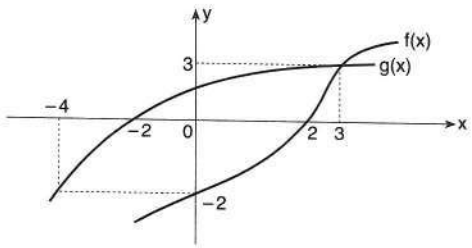
9.



⇒ (gofog)(– 2) = ?

A) 3 B) 2 C) 1 D) 0 E) –4

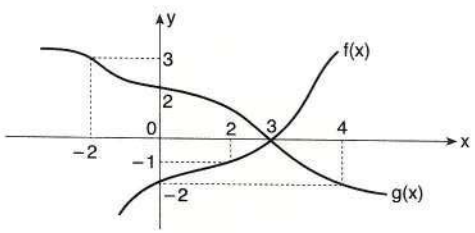
10.



⇒ (gof)(0) + (fog)(3) = ?

A) 4 B) 3 C) 1 D) –1 E) – 2

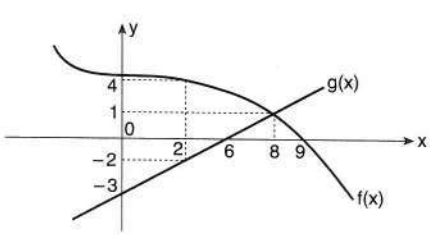
11.



⇒ $(fog^{-1})(2)$ = ?

A) –2 B) –1 C) 0 D) 2 E) 4

12.



⇒ $(f^{-1}og)(8) + (fog^{-1})(-2)$ = ?

A) 2 B) 4 C) 6 D) 8 E) 12

1. $f : R \to R$

$f(x) = ax + 3$

$f(-6) = 9$

$\Rightarrow a = ?$

A) -3 B) -2 C) -1 D) 1 E) 3

2. $f : R \to R$

$f(x) = ax + b$

$\left.\begin{matrix} f(1) = 6 \\ f(-2) = 3 \end{matrix}\right\} \Rightarrow f(3) = ?$

A) 1 B) 3 C) 4 D) 6 E) 8

3. $f : R \to R$

$f(x) = ax + b$

$f(2) = 5$

$f^{-1}(7) = 3$

$\Rightarrow f(4) = ?$

A) 3 B) 4 C) 7 D) 9 E) 10

4. $f : R \to R$

$f(x) = ax + b$

$f(x + 1) + f(x - 1) = 6x + 8$

$\Rightarrow f(2) = ?$

A) 4 B) 6 C) 8 D) 10 E) 14

5. $f : R \to R$

$f(x) = ax + b$

$f(x - 2) + f(x + 2) = 4x + 12$

$\Rightarrow f(-2) = ?$

A) -4 B) -2 C) 0 D) 2 E) 4

6. $f : R \to R$

$f(x) = ax + b$

$f(2x) + f(3x) = 10x + 10$

$\Rightarrow f(3) = ?$

A) 6 B) 8 C) 11 D) 25 E) 40

7. $f : R \to R$

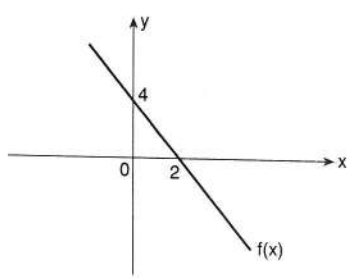
$f(x) = ax + b$

$f(x + 3) + f(x - 2) = 2x - 1$

$\Rightarrow f(5) - f(-5) = ?$

A) 0 B) 5 C) 10 D) 15 E) 20

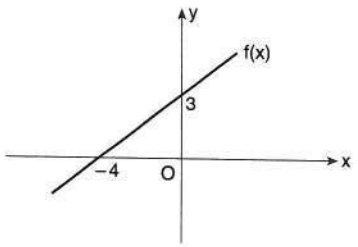
8.



$\Rightarrow f(4) = ?$

A) -8 B) -6 C) -4 D) -2 E) -1

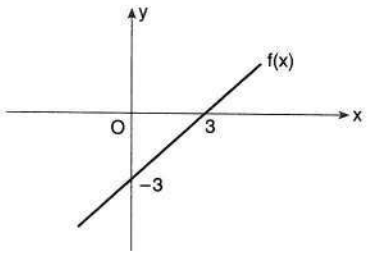
9.



$\Rightarrow f(8) = ?$

A) 4 B) 6 C) 7 D) 8 E) 9

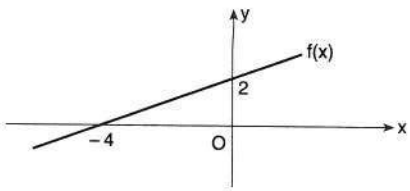
10.



$\Rightarrow y = f(x) = ?$

A) $x + 3$ B) $x - 3$ C) $3x$
D) $3x - 3$ E) $3x + 3$

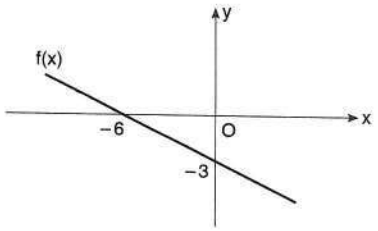
11.



$\Rightarrow y = f(x) = ?$

A) $2x + 4$ B) $\frac{x-4}{2}$ C) $x + 2$
D) $\frac{x+4}{2}$ E) $2x - 4$

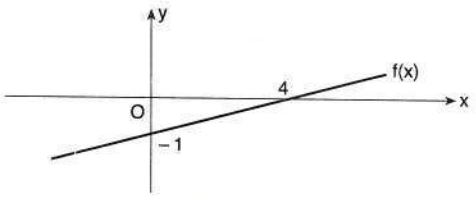
12.



$\Rightarrow y = f(x) = ?$

A) $-\left(\frac{x+6}{2}\right)$ B) $-x - 6$ C) $x + 6$
D) $\frac{x+6}{2}$ E) $3x + 6$

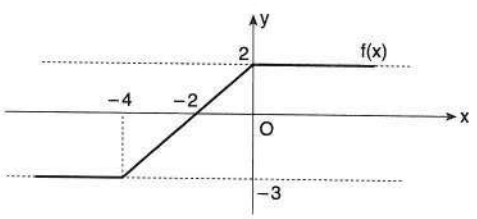
13.



$\Rightarrow f(1) = ?$

A) $-\frac{7}{8}$ B) $-\frac{3}{4}$ C) $-\frac{1}{2}$ D) $-\frac{1}{4}$ E) $-\frac{1}{9}$

14.



$\Rightarrow f(3) + f(-6) = ?$

A) −3 B) −1 C) 0 D) 1 E) 4

1. $f : Z \to Z$

$f(x) = f(x + 1) + 2$

$f(4) = 5$

$\Rightarrow f(7) = ?$

A) –1 B) 0 C) 1 D) 2 E) 3

2. $f : Z \to Z$

$f(x + 1) - f(x) = 3$

$f(15) = 16$

$\Rightarrow f(1) = ?$

A) –30 B) –26 C) –20 D) –16 E) –10

3. $f : Z \to Z$

$f(x) - f(x + 1) = x$

$f(2) = 9$

$\Rightarrow f(5) = ?$

A) –2 B) 0 C) 1 D) 3 E) 4

4. $f : Z \to Z$

$f(x + 2) = f(x) \cdot 2$

$f(1) = 3$

$\Rightarrow f(5) = ?$

A) 2 B) 3 C) 6 D) 12 E) 16

5. $f : Z \to Z$

$f(x) = x \cdot f(x + 3)$

$f(1) = 1$

$\Rightarrow f(7) = ?$

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{14}$ D) $\frac{1}{21}$ E) $\frac{1}{28}$

6. $f : Z^+ \to Z^+$

$f(x) = \frac{f(x+1)}{x}$

$f(1) = 5$

$\Rightarrow f(3) = ?$

A) 3 B) 5 C) 9 D) 10 E) 15

7. $f : Z \to Z$

$f(x) = 2x^2 + 3 - f(x + 2)$

$f(2) = 4$

$\Rightarrow f(-2) = ?$

A) 7 B) 9 C) 10 D) 11 E) 12

8. $f\left(\frac{x+4}{3}\right) + \frac{1}{x+2} \cdot f\left(\frac{3}{x+4}\right) = x + k$

$f(1) = 4$

$\Rightarrow k = ?$

A) 10 B) 9 C) 8 D) 7 E) 5

9. $f = \{(2, 3), (3, 2), (4, 1)\}$

$g = \{(-1, 3), (2, 4), (3, 5)\}$

$\Rightarrow (2f - g)(2) + (f \cdot g)(3) = ?$

A) 8 B) 10 C) 12 D) 15 E) 21

10. $f : R \to R$

$g : R \to R$

$f(x) = \begin{cases} 2x + 1 & , \ x > 3 \\ 1 - x & , \ x \leq 3 \end{cases}$

$g(x) = x - 4$

$\Rightarrow (f + 2g)(4) + (f \cdot g)(3) = ?$

A) −14 B) −1 C) −2 D) 4 E) 11

11. $g(3x - f(x)) = 3f(x) + 2$

$f(3) = -2$

$\Rightarrow g(11) = ?$

A) −6 B) −4 C) 2 D) 6 E) 11

12. $f\left(\frac{x^2 - 1}{x^2 + 1}\right) = x^6 + x^4 + 3$

$\Rightarrow f\left(\frac{2}{3}\right) = ?$

A) 3 B) 8 C) 33 D) 150 E) 153

13. $f : R^+ \to R$, $f(x^2 + 3) = \frac{x - 2}{x + 1}$

$\Rightarrow f(12) = ?$

A) $\frac{1}{4}$ B) $\frac{9}{13}$ C) $\frac{6}{11}$ D) $\frac{7}{10}$ E) 1

14. $f(x) = x - 3$

$(fog)(x - 1) = 2(gof(x + 2))$

$\Rightarrow g(2004) = ?$

A) −3 B) 0 C) 1 D) 2004 E) 4008

15. $(fog)(x) = \frac{3x + 1}{x + 1}$

$f(1) = 2$

$\Rightarrow g^{-1}(1) = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

16. $f : R \setminus \{3\} \to R \setminus \{2\}$

$g : R \setminus \{-6\} \to R \setminus \{3\}$

$f(x) = \frac{2x + 1}{x - 3}$

$g(x) = \frac{3x - m}{x + 6}$

$(g^{-1}of)^{-1}(1) = 2$

$\Rightarrow m = ?$

A) 8 B) 32 C) 35 D) 38 E) 40

1. $f(5x-2) = 2 \cdot f(3)x + 2$

$\Rightarrow f(8) = ?$

A) -8 B) -6 C) -2 D) 18 E) 50

2. $f(x) = \begin{cases} 3x + a, & x > 3 \\ 4x + 2, & x \leq 3 \end{cases}$

$(fof)(1) = 20$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3. $a, b \in R$

$f(ax + b) = -2x$

$\Rightarrow f(1) = ?$

A) $\frac{-2+2b}{a}$ B) $\frac{-b}{a}$ C) $\frac{-2a}{b}$

D) $2a - b$ E) $\frac{-a}{b}$

4. $f(2x-3) = \begin{cases} -2x + 3, & x < 1 \\ 3x - 1, & x \geq 1 \end{cases}$

$\Rightarrow f(-3) + f(1) = ?$

A) 10 B) 8 C) 6 D) 4 E) 2

5. $f(x) \cdot x - g(x) = x^2 - 5x + 1$

$f(2) = 5$

$\Rightarrow g^{-1}(15) = ?$

A) -5 B) 0 C) 2 D) 5 E) 15

6. $(fog)(x) = 3 \cdot g^2(x) + 3 \cdot g(x) - 5$

$\Rightarrow f(1) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $f(3^x + 2) = 9^x + 5$

$\Rightarrow f(x) = ?$

A) $x^2 - 4x + 9$ B) $x^2 - 4x + 4$

C) $x^2 - 4x + 1$ D) $x + 3$

E) $x^2 + 3$

8. $f(x) = \frac{ax+2}{x+a-4}$

$(fof)(x) = x$

$\Rightarrow a = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

9. $f(x) = \frac{5x-2}{x-5}$

$\Rightarrow (fof)(2011) = ?$

A) 0 B) 1 C) 2 D) 2011 E) 4022

10. $(x-2)\cdot f(x) + (x-4)\cdot fog(x) = x^2 - 4x + 2$

$\Rightarrow g^{-1}(4) = ?$

A) -2 B) 0 C) 2 D) 4 E) 8

11. $a \neq b$

$f\left(\frac{ax+b}{bx+a}\right) = x^{13} + x^{12} + x^{11} + x^{10} + \ldots + x^2 + x + 4$

$\Rightarrow f(-1) = ?$

A) -1 B) 0 C) 3 D) 4 E) 5

12. $f_x(y) = x^2 + y^3$

$\Rightarrow f_2(3) - f_3(2) = ?$

A) 28 B) 24 C) 18 D) 16 E) 14

13. $f(x \cdot y) = f(x) + f(y)$

$f(2) = 3$

$\Rightarrow f(8) = ?$

A) 2 B) 3 C) 6 D) 8 E) 9

14. $f(x \cdot y) = f(x) + f(y)$

$f(2) = 5$

$\Rightarrow f(16) = ?$

A) 40 B) 20 C) 16 D) 10 E) 8

15. $3xf(x) + 2 = x - f(x)$

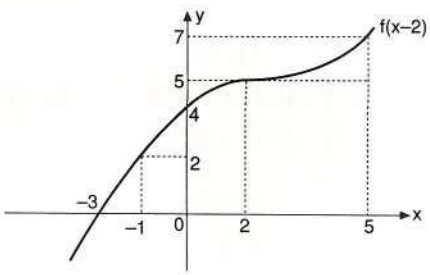
$g(x) = \frac{x}{x-2}$

$\Rightarrow g(x+2)$ nin $f(x)$ türünden değeri aşağıdakilerden hangisidir?

What is the value of $g(x+2)$ in terms of $f(x)$?

A) -2 B) 2 C) $\frac{5f(x)-4}{-2-f(x)}$ D) $\frac{2f(x)-1}{f(x)}$ E) $\frac{2f(x)-4}{f(x)}$

16.



$\Rightarrow \frac{f(3)+f(0)}{f^{-1}(7)+f^{-1}(2)+f(-2)} = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

KARTEZYEN ÇARPIM BAĞINTI VE FONKSİYON
Yanıt Anahtarı

CARTESIAN MULTIPLICATION, RELATION AND FUNCTION
Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	A	C	C	D	D	B	E	C	A	A	D	C	B

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	D	B	B	B	D	E	B	C	D	A	B	D	D	C

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	E	C	C	C	D	D	C	C	E	D	C				

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	C	E	A	C	B	C	A	B	B	D	D	B	A	B

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	A	C	D	D	C	E	B	B	C	D	C	D	C	C

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	B	D	C	E	A	D	E	E	E	E	C	C	E	D

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	B	C	A	B	D	B	D	E	A	C	A	C	B	C	A

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	B	B	B	E	E	B	C	A	B	A	E	C	C	C	A

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	C	D	A	E	B	E	A	B	B	B	C	D	C	D	E

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	B	C	D	C	C	D	A	D	A	C	C	C	D	D

TEST 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	B	E	D	B	B	D	A	B	C	B	C	B	E	C

TEST 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	E	C	C	C	B	D	C	E	B	B	B	C	E	B	B

TEST 13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	C	D	C	D	C	E	B	C	C	B	B	B	D	A	C

TEST 14

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	C	A	B	A	C	E	A	E	B	A	E				

TEST 15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	E	D	D	D	C	C	C	E	B	D	A	B	B		

TEST 16

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	B	D	B	D	E	B	C	E	B	E	A	A	E	D

TEST 17

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	A	B	C	A	A	E	D	C	C	E	E	B	C	C

İŞLEM
OPERATIONS

ÖZELLİK|Property 1

İşlem | Operation

A ve B boş olmayan iki küme olsun.

β: A x A → B kümesine tanımlanan her fonksiyona A üzerinde bir işlem denir.

Let A and B be two non-empty sets.

Every function defined from β: A x A → B is called an operation on A.

1. $a \square b = 2a + b + 1$

$\Rightarrow 3 \square 1 = ?$

8

2. $a \triangle b = a^2 - b$

$\Rightarrow 6 \triangle 3 = ?$

33

3. $a > 0$

$a^2 \bullet b = 2a + b + 1$

$\Rightarrow 4 \bullet 3 = ?$

8

4. $\frac{1}{a} \square \frac{1}{b} = a - 3b$

$\Rightarrow \frac{1}{3} \square \frac{1}{4} = ?$

−9

5. $\frac{4}{x} \triangle \frac{6}{y} = 2x + y$

$\Rightarrow 2 \triangle 3 = ?$

6

6. $a > 0$

$a^2 \square b^3 = 3a + b$

$\Rightarrow 9 \square 8 = ?$

11

7. $2^a \square 5^b = 3a + b - 3$

$\Rightarrow 4 \square 1 = ?$

3

8. $3^a \triangle \sqrt{b} = 4a - b^2 + 1$

$\Rightarrow 9 \triangle 2 = ?$

−7

9. $\frac{1}{a} \square \frac{1}{b} = a + b$

$\Rightarrow 2 \square 3 = ?$

$\frac{5}{6}$

10. $a \triangle b = a^2 - 2ab + b^2$

$\Rightarrow 88 \triangle 85 = ?$

9

11. $a \square b = a^b$

$\Rightarrow (2 \square 3) \square 2 = ?$

64

12. $a \triangle b = 2a + b^2$

$\Rightarrow (2 \triangle 1) \triangle 2 = ?$

14

13. $a \bullet b = \begin{cases} a+b & a>b \\ a \cdot b & a \le b \end{cases}$

$\Rightarrow (4 \bullet 2) \bullet 8 = ?$

48

14. $a \square b = \begin{cases} 2a-b & a \le b \\ a+b^2 & a>b \end{cases}$

$\Rightarrow (4 \square 5) \square 2 = ?$

7

15. $a \bullet b = \begin{cases} a^b & a>b \\ a+b & a \le b \end{cases}$

$\Rightarrow (3 \bullet 2) \bullet 10 = ?$

19

16. $a \triangle b = \max\{a+b, a \cdot b\}$

$\Rightarrow 4 \triangle 2 = ?$

8

17. $a \square b = \min\{a^b, a+2b\}$

$\Rightarrow 3 \square 1 = ?$

3

18. $a \blacksquare b = \min\{a \cdot b, 2a+b\}$

$\Rightarrow 3 \blacksquare 4 = ?$

10

19. $a \triangle b = \max\{a^2+1, 3b-6\}$

$\Rightarrow 4 \triangle (-1) = ?$

17

20. $a \circ b = \min\{a^3-2, b^2+4\}$

$\Rightarrow 2 \circ 2 = ?$

6

21. $x \circ y = x+y+1$

$x \square y = x \cdot y - 1$

$\Rightarrow (2 \square 3) \circ 4 = ?$

10

22. $a \triangle b = a+b-a \cdot b$

$a \square b = (a+1) \triangle (b+1)$

$\Rightarrow 1 \square 3 = ?$

-2

23. $a \circ b = \min\{a+3, b-2\}$

$a \bullet b = \max\{3a, 4b-1\}$

$\Rightarrow (2 \circ 1) \bullet 3 = ?$

11

24. $a \square b = \min\{a^2-1, b^2+1\}$

$a \circ b = \max\{a+1, b-1\}$

$\Rightarrow (3 \circ 2) \square 4 = ?$

15

25. $\frac{1}{a \star b} = \frac{2}{a} + \frac{b}{3}$

$\Rightarrow 1 \star 9 = ?$

$\frac{1}{5}$

26. $a \star b = a^b - b^a$

$\Rightarrow (1 \star 2) \star (3 \star 2) = ?$

-2

ÖZELLİK|Property 2

Değişme Özelliği | Commutative Property

★, A kümesi üzerinde tanımlı bir işlem olsun.

∀a, b ∈ A için

$a \star b = b \star a$ ise

★ işleminin A üzerinde değişme özelliği vardır denir.

Let ★ be an operation defined on set A.

If $\forall a, b \in A$

$a \star b = b \star a$ *then*

it is said that ★ operation has commutative property on set A.

1. $k \in R$

$a \star b = 3a - k \cdot b + a \cdot b + 7$

$a \star b = b \star a$

$\Rightarrow k = ?$

-3

2. $a \bullet b = a + b - ab - 2(a \bullet b)$

$\Rightarrow 1 \bullet 2 = ?$

$\frac{1}{3}$

3. $a \circ b = a + b - a \cdot b - 3(b \circ a)$

$\Rightarrow 6 \circ 2 = ?$

-1

4. $a \square b = 2a + 2b + ab - 2(b \square a)$

$\Rightarrow 1 \square 3 = ?$

$\frac{11}{3}$

5. $a \bullet b = 2a + b - 2(b \bullet a)$

$\Rightarrow 2 \bullet 4 = ?$

4

6. $a \square b = 3a - b - 3(b \square a)$

$\Rightarrow 2 \square 3 = ?$

$\frac{9}{4}$

ÖZELLİK|Property 3

Etkisiz Eleman | Identity Element

★, A kümesi üzerinde tanımlı bir işlem olsun.

∀a ∈ A için

$a \star e = e \star a = a$ ise

e'ye A kümesinin ★ işlemine göre etkisiz elemanı denir.

Let ★ be an operation defined on set A.

If $\forall a \in A$

$a \star e = e \star a = a$ *then*

e is called the identity element of set A with respect to ★ operation.

Aşağıda verilen işlemlerin etkisiz elemanını bulunuz.

Find the identity elements of the functions given below.

1. $a \circ b = a + b - 2$

2

2. $a \square b = a + b - 6$

6

3. $a \square b = a + b + 8$

-8

4. $x \square y = 2xy$

$\frac{1}{2}$

5. $x \circ y = 5xy$

$\frac{1}{5}$

6. $x \circ y = 2x + 2y - xy - 2$

1

7. $x \triangle y = 3x + 3y + 2xy + 3$

-1

ÖZELLİK|Property 4

Ters Eleman | Inverse Element

★, A kümesi üzerinde tanımlı bir işlem ve e de A kümesinin ★ işlemine göre etkisiz elemanı olsun.

$a \in A$ için

$a \star b = b \star a = e$ olacak şekilde bir $b \in A$ varsa b sayısına a'nın ★ işlemine göre tersi denir. a elemanının tersi a^{-1} ile gösterilir.

Let ★ be an operation defined on set A and e be the identity element of set A with respect to operation ★.

For $a \in A$

If there exists $b \in A$ *such that* $a \star b = b \star a = e$, *then b is called the inverse of a with respect to ★ operation. The inverse of a is denoted by* a^{-1}.

1. $a \square b = a + b - 6$

$\Rightarrow 4^{-1} = ?$

8

2. $a \triangle b = a + b - 4$

$\Rightarrow 2^{-1} = ?$

6

3. $a \square b = a + b - 12$

$\Rightarrow 4^{-1} = ?$

20

4. $x \bigcirc y = x \cdot y$

$\Rightarrow 3^{-1} = ?$

$\frac{1}{3}$

5. $x \square y = 4xy$

$\Rightarrow 2^{-1} = ?$

$\frac{1}{32}$

6. $x \square y = x + y + 4$

$\Rightarrow (-4)^{-1} = ?$

-4

7. $x \bigcirc y = 4x + 4y + 3xy + 4$

$\Rightarrow 2^{-1} = ?$

$-\frac{13}{10}$

ÖZELLİK|Property 5

Yutan Eleman | Null Element

★, A kümesi üzerinde tanımlı bir işlem olsun.

$\forall a \in A$ için

$a \star y = y \star a = y$

olacak şekilde bir $y \in A$ varsa y sayısına A kümesinin ★ işlemine göre yutan elemanı denir

Let ★ be an operation defined on set A.

For $\forall a \in A$

$a \star y = y \star a = y$

If there exists $y \in A$ *such that* $a \star y = y \star a = y$, *then y is called the null element of set A with respect to operation ★*

Aşağıda verilen işlemlerin yutan elemanını bulunuz.

Find the swallow elements of the functions given below.

1. $a \square b = a + b + 2ab$

$-\frac{1}{2}$

2. $a \square b = a + b + 4ab$

$-\frac{1}{4}$

3. $a \bigcirc b = 4a + 4b + 3ab + 4$

$-\frac{4}{3}$

4. $a \square b = 3a + 3b + 2ab + 3$

$-\frac{3}{2}$

5. $A = \{1, 2, 3, 4, 5\}$

$a \bigcirc b = \min\{a, b\}$

1

6. $A = \{1, 2, 3, 4, 5\}$

$a \square b = \max\{a, b\}$

5

ÖZELLİK | Property 6

△	a	b	c	d
a	c	d	a	b
b	d	a	b	c
c	a	b	c	d
d	b	c	d	a

b △ d = c

△	a	b	c	d
a	c	d	a	b
b	d	a	b	c
c	a	b	c	d
d	b	c	d	a

△ işleminin etkisiz elemanı c

The identity element of △ operation is c

△	a	b	c	d
a	c	d	a	b
b	d	a	b	c
c	a	b	c	d
d	b	c	d	a

etkisiz eleman c olduğundan *(since the identity element is c)*

$a^{-1} = a$

$b^{-1} = d$

$c^{-1} = c$

$d^{-1} = b$

Aşağıda verilen tabloya göre yandaki soruları cevaplayınız.

According to the table below answer the question on the side.

△	1	2	3	4	5
1	3	4	5	1	2
2	4	5	1	2	3
3	5	1	2	3	4
4	1	2	3	4	5
5	2	3	4	5	1

PUZA YAYINLARI

1. 2 △ 3 = ? — 1

2. 3 △ 5 = ? — 4

3. 4 △ 5 = ? — 5

4. △ işleminin etkisiz elemanı kaçtır? — 4

What is the identity element of △ operation?

5. 3^{-1} = ? — 5

6. 5^{-1} = ? — 3

7. 2^{-1} = ? — 1

8. 3 △ 4^{-1} = ? — 3

9. 2^{-1} △ 3^{-1} = ? — 2

10. 4^{-1} △ 5 = ? — 5

11. $(3 △ 4)^{-1}$ △ 5^{-1} = ? — 4

12. $(2^{-1} △ 3)^{-1}$ △ 2 = ? — 1

13. $(x △ 2)^{-1}$ △ 5 = 3

⇒ x = ? — 3

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1. $a \star b = \frac{a^b}{b^a}$

$\Rightarrow 4 \star 8 = ?$

16

2. $a \triangle b = 2a - 3b - 2(b \triangle a)$

$\Rightarrow 1 \triangle 3 = ?$

$\frac{13}{3}$

3. $a \square b = 5a + 5b + ab + 20$

$\forall a \in R$

$a \square e = a$

$\Rightarrow e = ?$

-4

4. $a \square b = 4a + 4b - 3ab - 4$

$\forall a \in R$

$a \square e = a$

$a \square a^{-1} = e$

$\Rightarrow 1^{-1} + 2^{-1} = ?$

$\frac{5}{2}$

5. $a \star b = 7a + 7b + ab + 42$

$\forall a \in R$

$a \star y = y$

$\Rightarrow y = ?$

-7

6. $2^{(x \square y)} = 3x + 5y - 3$

$\Rightarrow 5 \square 4 = ?$

5

7. $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$a \triangle b = \min\{a, b\}$

$\forall a \in A$ için

$a \triangle e = a$

$a \triangle y = y$

$\Rightarrow (e, y) = ?$

(9, 1)

8.

□	1	2	3	4	5
1	5	1	2	3	4
2	1	2	3	4	5
3	2	3	4	5	1
4	3	4	5	1	2
5	4	5	1	2	3

$(3 \square 4^{-1}) \square k = 1$

$\Rightarrow k = ?$

2

1. $a * b = 2a + 3b - ab$

$\Rightarrow 3 * 5 = ?$

A) 3 B) 6 C) 12 D) 15 E) 18

2. $a \triangle b = a - 2b + 6$

$\Rightarrow 2 \triangle 1 = ?$

A) 10 B) 8 C) 6 D) 5 E) 4

3. $x \star y = \left(\frac{1}{x} - \frac{1}{y}\right)^{-1} + 1$

$\Rightarrow 3 \star 2 = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

4. $a \triangle b = \frac{1}{a} + \frac{1}{b} + \frac{1}{ab}$

$\Rightarrow \frac{1}{2} \triangle \frac{1}{3} = ?$

A) 9 B) 10 C) 11 D) 12 E) 13

5. $a \triangle \frac{1}{b} = a + b - ab + 1$

$\Rightarrow 2 \triangle \frac{1}{4} = ?$

A) -1 B) 0 C) 1 D) 2 E) 4

6. $\frac{1}{a} * \frac{1}{b} = 2a + 2b + 3$

$\Rightarrow \frac{1}{5} * \frac{1}{4} = ?$

A) 15 B) 16 C) 18 D) 21 E) 24

7. $\frac{1}{a} \square \frac{1}{b} = 4a - 3b + 5$

$\Rightarrow 2 \square 3 = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

8. $a \triangle \frac{1}{b} = \frac{a+b}{b-a}$

$\Rightarrow \frac{1}{3} \triangle 2 = ?$

A) 2 B) 3 C) 5 D) 6 E) 10

9. $a, b \in Z^+$

$a^2 \triangle b^3 = 2a - b + a \cdot b$

$\Rightarrow 9 \triangle 8 = ?$

A) 6 B) 8 C) 10 D) 12 E) 20

10. $2^a * 3^b = a^2 - b^3$

$\Rightarrow 8 * 81 = ?$

A) -65 B) -55 C) -1 D) 1 E) 19

11. $\frac{2}{x} \star \frac{3}{y} = x + y$

$\Rightarrow 2 \star 6 = ?$

A) 4 B) 3 C) $\frac{5}{2}$ D) 2 E) $\frac{3}{2}$

12. $2^x \triangle 3^y = 2x - 3y + x \cdot y$

$\Rightarrow 8 \triangle 9 = ?$

A) 4 B) 5 C) 6 D) 7 E) 8

13. $\frac{x}{4} \square \frac{20}{y} = 3x - y + x \cdot y$

$\Rightarrow 1 \square 10 = ?$

A) 18 B) 14 C) 10 D) 8 E) 6

14. $\frac{a}{4} \star \frac{b}{6} = a + 4 - 3b$

$\Rightarrow \left(-\frac{1}{2}\right) \star \frac{1}{6} = ?$

A) -3 B) -1 C) 1 D) 2 E) 4

15. $\sqrt{a} \triangle \sqrt[3]{b} = a - b$

$\Rightarrow 4 \triangle (-3) = ?$

A) -11 B) 1 C) $2 + \sqrt[3]{3}$ D) 29 E) 43

16. $3^a \triangle \sqrt{b} = a^3 + 2^b - 1$

$\Rightarrow 9 \triangle 2 = ?$

A) 24 B) 23 C) 22 D) 21 E) 20

1. $a * b = \dfrac{a^{a+b}}{b^{a-b}}$

$\Rightarrow 8 * 2 = ?$

A) 2^5 B) 2^{15} C) 2^{20} D) 2^{24} E) 2^{30}

2. $a \triangle b = a^b + b^a$

$\Rightarrow (2 \triangle 1) \triangle 2 = ?$

A) 17 B) 15 C) 13 D) 11 E) 9

3. $x \square y = y^{x+1}$

$(1 \square 2) \square 3 = a$

$\Rightarrow a = ?$

A) 3 B) 3^2 C) 3^3 D) 3^4 E) 3^5

4. $x \square y = x^4 + x \cdot y$

$\Rightarrow 1 \square (2 \square 2) = ?$

A) 4 B) 8 C) 16 D) 20 E) 21

5. $a \bigstar b = ab + a$

$\Rightarrow \dfrac{1}{2} \bigstar \left(\dfrac{1}{3} \bigstar \dfrac{1}{4}\right) = ?$

A) $\dfrac{7}{12}$ B) $\dfrac{17}{12}$ C) $\dfrac{17}{24}$ D) $\dfrac{5}{16}$ E) $\dfrac{17}{32}$

6. $a \square b = \begin{cases} a+b, & a \geq b \\ a^2+b, & a < b \end{cases}$

$\Rightarrow (2 \square 3) \square 4 = ?$

A) 11 B) 9 C) 8 D) 7 E) 6

7. $a \square b = \begin{cases} 2a+b, & a > b \\ 3a-2b, & a \leq b \end{cases}$

$\Rightarrow (2 \square 1) \square (4 \square 6) = ?$

A) 8 B) 9 C) 10 D) 12 E) 18

8. $a \triangle b = \begin{cases} a^2-b^2, & a > b \\ a-b, & a \leq b \end{cases}$

$\Rightarrow (5 \triangle 5) \triangle (-2) = ?$

A) -25 B) -4 C) 0 D) 4 E) 21

9. $a \triangle b = \begin{cases} a+b & , a \geq b \\ a-b & , a < b \end{cases}$

$\Rightarrow (3 \triangle 2) \triangle (4 \triangle 4) = ?$

A) -4 B) -3 C) -2 D) -1 E) 0

10. $x \triangle y = \begin{cases} x-2y & , x \cdot y > 0 \\ x^2+y & , x \cdot y \leq 0 \end{cases}$

$\Rightarrow (2 \triangle (-3)) \triangle ((-2) \triangle (-1)) = ?$

A) -3 B) 1 C) 5 D) 14 E) 15

11. $a \triangle b = a^3 - 3a^2b + 3ab^2 - b^3$

$\Rightarrow 81 \triangle 79 = ?$

A) 1 B) 4 C) 8 D) 79 E) 81

12. $x * y = x^2 - 2xy + y^2$

$\Rightarrow (a+2) * (a-1) = ?$

A) 9 B) $(2a+1)^2$ C) (a^2+b^2) D) $(a+1)^2$ E) 1

13. $\frac{x}{2} \triangle 5y = 5x - 2y$

$\Rightarrow (6 \triangle 15) \triangle 75 = ?$

A) 200 B) 250 C) 310 D) 410 E) 510

14. $x \triangle y = \max\{x^y, x \cdot y\}$

$\Rightarrow 3 \triangle 2 = ?$

A) 3 B) 6 C) 8 D) 9 E) 12

15. $x * y = \min\{2x + y, 2y + x\}$

$\Rightarrow 5 * 4 = ?$

A) 20 B) 18 C) 14 D) 13 E) 4

16. $a \square b = \max\{a, b\}$

$\Rightarrow (2 \square 5) \square (7 \square 3) = ?$

A) 2 B) 3 C) 5 D) 7 E) 12

1. $a \square b = a + b + 3$

$a * b = a \cdot b - 1$

$\Rightarrow (2 \square 3) * 5 = ?$

A) 32 B) 35 C) 36 D) 39 E) 42

2. $a * b = a^b + a$

$a \square b = b^a + a$

$\Rightarrow (2 * 3) \square 1 = ?$

A) 11 B) 12 C) 16 D) 18 E) 20

3. $x * y = x + y$

$x \square y = x^y$

$\Rightarrow (1 * 3) \square (2 * (-3)) = ?$

A) $\frac{1}{16}$ B) $\frac{1}{4}$ C) 1 D) 4 E) 16

4. $a \triangle b = a^b$

$a * b = \sqrt[a]{b}$

$\Rightarrow 4 * (2 \triangle 8) = ?$

A) 2 B) 4 C) 8 D) 16 E) 32

5. $x * y = y^x$, $x \triangle y = x^y$

$\Rightarrow (1 * 2) \triangle (4 * 2) = ?$

A) 2^8 B) 2^{16} C) 2^{32} D) 2^{64} E) 2^{128}

6. $a \square b = a + b + 2$

$a \triangle b = a \cdot b - 1$

$\Rightarrow [2 \square (-1)]^{1 \triangle 5} = ?$

A) 9 B) 16 C) 25 D) 64 E) 81

7. $a \triangle b = \max\{a^2 + 1, b^3 - 2\}$

$a \square b = \min\{3a - 2, b^2 - 3\}$

$\Rightarrow (3 \triangle 2) \square 5 = ?$

A) 10 B) 15 C) 16 D) 22 E) 28

8. $x * y = \min\{x - y, x + y\}$

$x \triangle y = \max\{2y + x, 2x + 3\}$

$\Rightarrow (5 * 1) \triangle (2 * 3) = ?$

A) 11 B) 8 C) 7 D) 5 E) 4

9. $x \bigstar y = (m+2)x + (2m+1)y + x \cdot y$

$2 \bigstar 5 = 7$

$\Rightarrow m = ?$

A) -2 B) -1 C) 1 D) 2 E) 3

10. $a \triangle b = 2a - b$

$4 \triangle 5 = 3 \triangle k$

$\Rightarrow k = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

11. $x * y = x + 2y$

$(2 * 3) * k = 2 \Rightarrow k = ?$

A) -6 B) -3 C) -2 D) 2 E) 4

12. $\frac{1}{x \triangle y} = \frac{3xy}{x+y}$

$\Rightarrow 2 \triangle 4 = ?$

A) 4 B) 3 C) 2 D) $\frac{1}{3}$ E) $\frac{1}{4}$

13. $\frac{2}{a \square b} = \frac{3}{a} - \frac{1}{b}$

$\Rightarrow 3 \square (-1) = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

14. $\frac{1}{a \triangle b} = 3a + 2b - 4$

$\Rightarrow 2 \triangle 4 = ?$

A) 10 B) 6 C) $\frac{1}{4}$ D) $\frac{1}{8}$ E) $\frac{1}{10}$

15. $\frac{1}{a \triangle b} = \frac{3a}{b} + \frac{1}{b}$

$\Rightarrow 2 \triangle 3 = ?$

A) $\frac{7}{3}$ B) $\frac{5}{3}$ C) $\frac{2}{3}$ D) $\frac{3}{5}$ E) $\frac{3}{7}$

16. $2^{(a * b)} = 3a + 4b + 6$

$\Rightarrow 2 * 5 = ?$

A) 5 B) 12 C) 16 D) 20 E) 32

1. $a \square b = 3a - 2b + a^2$

$3 \square x = 10 \Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

2. $x * y = 3x - y^{-1}$

$2 * 1 = 3 * k \Rightarrow k = ?$

A) $\frac{1}{8}$ B) $\frac{2}{9}$ C) $\frac{1}{6}$ D) $\frac{1}{4}$ E) $\frac{2}{3}$

3. $a * b = a \cdot b + a + b$

$3 * x = (x * 2) + 5$

$\Rightarrow x = ?$

A) 6 B) 5 C) 4 D) -2 E) -3

4. $a \triangle b = \frac{a+b}{a \cdot b}$

$\frac{1}{2} \triangle \frac{1}{5} = \frac{1}{4} \triangle k \Rightarrow k = ?$

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) 1 D) 2 E) 3

5. $a * b = \frac{b-a}{a^2+1}$

$2 * 3 = 1 * n$

$\Rightarrow n = ?$

A) 1 B) 2 C) $\frac{7}{5}$ D) $\frac{9}{5}$ E) 3

6. $\left.\begin{array}{l} x \divideontimes y = x + y - 1 \\ x * y = x^2 - y \end{array}\right\}$ $a * 2 = 5 \divideontimes 3$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $x \square y = 2x^2 + 4y$

$x \triangle y = 3x - y$

$2 \square (2 \triangle a) = 28$

$\Rightarrow a = ?$

A) -1 B) 0 C) 1 D) 2 E) 3

8. $x * y = y \cdot (x * y) + x \cdot (x * y) + 4y$

$\Rightarrow 3 * 2 = ?$

A) -4 B) -2 C) 1 D) 2 E) 4

9. $a \triangle b = (a+1) \bigcirc (b-1)$

$a \bigcirc b = \dfrac{a^b - a}{b^a - b}$

$\Rightarrow 1 \triangle 4 = ?$

A) $\frac{3}{4}$ B) $\frac{5}{6}$ C) 1 D) $\frac{6}{5}$ E) $\frac{4}{3}$

10. $a * b = 3a - b$

$a \triangle b = a \cdot b + 2(a * b)$

$\Rightarrow 4 \triangle 3 = ?$

A) 24 B) 26 C) 28 D) 30 E) 32

11. $x \triangle y = x + y - 1$

$x \square y = x^2 - xy + 2(x \triangle y)$

$\Rightarrow 3 \square (-1) = ?$

A) 12 B) 14 C) 16 D) 18 E) 20

12. $a \star b = a - b + 2$

$x \square y = 3 \star (x \star y)$

$\Rightarrow 2 \square 3 = ?$

A) 1 B) 4 C) 6 D) 8 E) 12

13. $a * b = 2a - b - (a \triangle b)$

$a \triangle b = a + 2b + a \cdot b$

$\Rightarrow (2 \triangle 3) * 1 = ?$

A) –3 B) –1 C) 27 D) 30 E) 57

14. $x * y = 2x + 3y + 2(x \bigcirc y)$

$x \bigcirc y = x^2 - y - (x * y)$

$\Rightarrow 3 * 2 = ?$

A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{5}{2}$ D) $\frac{13}{2}$ E) $\frac{26}{3}$

15. $(x+1) * y = x \cdot y - y + 2$

$\Rightarrow x * (y+1) = ?$

A) $xy + x - y + 2$ B) $xy - x + y$

C) $xy - x - y - 1$ D) $xy - 1$

E) $xy + x - 2y$

16. $(x-1) * (y+1) = x + y - x \cdot y$

$\Rightarrow x * y = ?$

A) $xy - 1$ B) $xy - x + y$ C) $2xy - x + y$

D) $2y - xy + 1$ E) $2x - xy + 1$

1. $(a, b) * (c, d) = (a \cdot c, b + d)$

$\Rightarrow (2, 3) * (4, 6) = ?$

A) (9, 8) B) (8, 18) C) (8, 9) D) (6, 9) E) (6, 18)

2. $(a, b) * (c, d) = (a^2 \cdot c, 2b - d)$

$\Rightarrow (2, 1) * (3, 4) = ?$

A) (4, 2) B) (12, – 2) C) (4, – 2) D) (12, 2) E) (– 4, – 2)

3. $(a, b) * (c, d) = (a \cdot c - b \cdot d, a \cdot d + b \cdot c)$

$\Rightarrow (2, 3) * (4, 1) = ?$

A) (6, 4) B) (5, 10) C) (6, 14) D) (5, 14) E) (11, 10)

4. $(x, y) \triangle (k, m) = (x \cdot k, y - m)$

$(4, 2) \triangle (3, 5) = (2, 1) \triangle (x, y)$

$\Rightarrow x + y = ?$

A) 12 B) 10 C) 8 D) 6 E) 5

5. $(a, b) * (c, d) = (a^2 + c^2, b^2 - d^2)$

$\Rightarrow (2, 1) * (3, 2) = ?$

A) (13, 3) B) (5, – 3) C) (13, – 3) D) (5, 5) E) (– 13, – 3)

6. $x \triangle y = (3m - 1)x + (m + 7)y - 2$

$x \triangle y = y \triangle x$

$\Rightarrow m = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

7. $a * b = 2a + 2b - ab - (b * a)$

$\Rightarrow (- 2) * 3 = ?$

A) 8 B) 6 C) 5 D) 4 E) 2

8. $a * b = a + b + a \cdot b - 5(b * a)$

$\Rightarrow 6 * 12 = ?$

A) 5 B) 6 C) 7 D) 12 E) 15

9. $x \triangle y = 3x + y - 2(y \triangle x)$

$\Rightarrow 3 \triangle 2 = ?$

A) $\frac{7}{3}$ B) $\frac{11}{3}$ C) $\frac{13}{3}$ D) 5 E) $\frac{13}{2}$

10. $a \triangle b = 2a + 3b - 2(a \triangle b)$

$\Rightarrow 3 \triangle 1 = ?$

A) 1 B) 3 C) 6 D) 9 E) 12

11. $x \triangle y = x - xy - 2(y \triangle x)$

$\Rightarrow 2 \triangle 3 = ?$

A) -3 B) -1 C) $-\frac{2}{3}$ D) 1 E) 3

12. $(a \square b) + 3(b \square a) = a \cdot b$

$\Rightarrow 4 \square 2 = ?$

A) 2 B) 4 C) 6 D) 8 E) 10

13. $\left(\frac{9}{a} \odot \frac{4}{b}\right) = 2a + 3b - b(a \odot b)$

$\Rightarrow 3 \odot 2 = ?$

A) 9 B) 8 C) 6 D) 4 E) 3

14. $x \triangle y = y^x$

$x \square y = x - y$

$(a \square 1) \triangle a = 64$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 8

15. $k \in R^+$

$a * b = a^{b+1}$

$(2 * k) * k = 2^{25}$

$\Rightarrow k = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

16. $x \square y = \begin{cases} -5x + 3y & , x > y \\ xy - (x^2 \square y) & , x \le y \end{cases}$

$\Rightarrow 2 \square 3 = ?$

A) -3 B) 7 C) 13 D) 17 E) 21

1. $a * b = a + b - 3$

$\forall a \in R$

$a * e = a$

$\Rightarrow e = ?$

A) 6 B) 5 C) 4 D) 3 E) 2

2. $x \square y = x + y - 7$

$\forall x \in R$

$x \square e = x$

$\Rightarrow e = ?$

A) -7 B) 0 C) 1 D) 3 E) 7

3. $x \square y = 4x + 4y + 3xy + 4$

$\forall x \in R$

$x \square e = x$

$\Rightarrow e = ?$

A) 1 B) 0 C) -1 D) -2 E) -3

4. $x \square y = 3x + 3y - 2xy - 3$

$\forall x \in R$

$x \square e = x$

$\Rightarrow e = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

5. $a * b = 2a + 2b + ab + 2$

$\forall a \in R$

$a * e = a$

$\Rightarrow e = ?$

A) -2 B) -1 C) 0 D) 1 E) 2

6. $x \triangle y = -3xy - 3x - 3y - 4$

$\forall x \in R$

$x \triangle e = x$

$\Rightarrow e = ?$

A) $-\frac{4}{3}$ B) $-\frac{1}{3}$ C) 1 D) $\frac{4}{3}$ E) $\frac{3}{2}$

7. $x * y = \frac{x \cdot y}{4}$

$\forall x \in R$

$x * e = x$

$x * x^{-1} = e$

$\Rightarrow 2^{-1} = ?$

A) 8 B) 4 C) 2 D) $\frac{1}{4}$ E) $\frac{1}{8}$

8. $a \square b = a + b - 6$

$\forall a \in R$

$a \square e = a$

$a \square a^{-1} = e$

$\Rightarrow 4^{-1} = ?$

A) 2 B) 4 C) 5 D) 6 E) 8

9. $x * y = x + y - 2$

$\forall x \in R$

$x * e = x$

$x * x^{-1} = e$

$\Rightarrow 3^{-1} = ?$

A) -4 B) -2 C) -1 D) 1 E) 2

10. $a \triangle b = a + b + 3$

$\forall a \in R$

$a \triangle e = a$

$a \triangle a^{-1} = e$

$\Rightarrow 7^{-1} = ?$

A) -13 B) -7 C) -3 D) 2 E) 7

11. $a \square b = 3a + 3b - 2ab - 3$

$\forall a \in R$

$a \square e = a$

$a \square a^{-1} = e$

$\Rightarrow 1^{-1} = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

12. $x * y = 2x + 2y + xy + 2$

$\forall a \in R$

$a * e = a$

$a * a^{-1} = e$

$\Rightarrow 3^{-1} = ?$

A) -1 B) $-\frac{6}{5}$ C) $-\frac{8}{5}$ D) $-\frac{9}{5}$ E) -2

13. $m \square n = m + 2mn + n$

$\forall m \in R$

$m \square e = m$

$m \square m^{-1} = e$

$\Rightarrow (-2)^{-1} = ?$

A) $-\frac{1}{3}$ B) $-\frac{2}{3}$ C) 1 D) 2 E) $\frac{5}{2}$

14. $a \square b = a + b + ab$

$\forall a \in R$

$a \square y = y$

$\Rightarrow y = ?$

A) -3 B) -1 C) 0 D) 1 E) 2

15. $a \square b = 2a + 2b + ab + 2$

$\forall x \in R$

$x \square y = y$

$\Rightarrow y = ?$

A) -3 B) -2 C) -1 D) 1 E) 2

16. $a * b = 3a + 3b + 2ab + 3$

$\forall a \in R$

$a * y = y$

$\Rightarrow y = ?$

A) $-\frac{3}{2}$ B) $-\frac{2}{3}$ C) 0 D) $\frac{2}{3}$ E) $\frac{3}{2}$

1. $\forall x, y \in R$

$x \triangle y = y \triangle x$

$x \triangle y = (2a - 3)x + (a + 1)y + 3$

$\Rightarrow 3 \triangle 2 = ?$

A) 13 B) 15 C) 28 D) 30 E) 35

2. $x \triangle y = x^y - 1$

$a * b = a \cdot b + 1$

$m \triangle (2 * 1) = -9$

$\Rightarrow m = ?$

A) 14 B) 12 C) 1 D) -1 E) -2

3. $x * y = 4x + 4y + 2xy + 4 - (y * x)$

$\forall x \in R \quad x * e = x$

$\Rightarrow e = ?$

A) -1 B) $-\frac{1}{2}$ C) $-\frac{1}{3}$ D) $\frac{1}{3}$ E) 3

4. $a \square b = 4a + 4b + 3ab + k$

$k \in R$

$\forall a \in R$

$a \square e = a$

$\Rightarrow k = ?$

A) -4 B) -3 C) -1 D) 3 E) 4

5. $a \triangle b = 4ab$

$\forall a \in R$

$a \triangle e = a$

$a \triangle a^{-1} = e$

$\Rightarrow 2^{-1} = ?$

A) $\frac{1}{4}$ B) $\frac{1}{8}$ C) $\frac{1}{16}$ D) $\frac{1}{32}$ E) $\frac{1}{64}$

6. $a * b = a + b - 3ab$

$\forall a \in R$

$a * y = y$

$\Rightarrow y = ?$

A) $-\frac{1}{9}$ B) $-\frac{1}{3}$ C) 0 D) $\frac{1}{3}$ E) $\frac{1}{9}$

7. $3(x \triangle y) = x + y + 2(y \triangle x) + 4$

$\forall x \in R$

$x \triangle e = x$

$\Rightarrow e = ?$

A) -4 B) -2 C) 1 D) 2 E) 4

8. $x \square y = x + y - a$

$\forall x \in R$

$x \square e = x$

$x \square x^{-1} = e$

$6^{-1} = 4$

$\Rightarrow a = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $A = \{1, 2, 3, 4, 5, 6, 7\}$

$a * b = \min\{a, b\}$

$\forall a \in A$

$a * e = a$

$a * y = y$

$\Rightarrow (e, y) = ?$

A) (1, 7) B) (1, 1) C) (1, 4) D) (7, 7) E) (7, 1)

10. $A = \{3, 4, 5, 6, 7, 8, 9\}$

$a \triangle b = \max\{a, b\}$

$\forall a \in A$

$a \triangle e = a$

$a \triangle y = y$

$\Rightarrow (e, y) = ?$

A) (9, 3) B) (9, 6) C) (3, 9) D) (6, 9) E) (3, 6)

11. $x \square y = x + y + 3x \cdot y$

$\forall x \in R$

$x \square e = x$

$x \square x^{-1} = e$

$\Rightarrow a^{-1} = ?$

A) $\frac{a}{1+a}$ B) $\frac{-a}{1+3a}$ C) $\frac{1}{1+a}$ D) $\frac{3a}{1+a}$ E) $\frac{a+3}{2}$

12. $4^{x \triangle y} = (x \cdot y)^{y-x} - 2^{x \triangle y}$

$\Rightarrow 2 \triangle 3 = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

13. $x * y = x + y - 3m + 1$

$\forall x \in R \quad x * e = x \quad x * x^{-1} = e$

$(-2)^{-1} = 6$

$\Rightarrow m = ?$

A) $-\frac{1}{3}$ B) 0 C) 1 D) $\frac{2}{3}$ E) 2

14. $x * y = x + y + x \cdot y$

$x \triangle y = (x * y * 1)$

$\Rightarrow$ 1'in $\triangle$ işlemine göre tersi kaçtır?

What is the inverse of 1 according to $\triangle$ transaction?

A) -1 B) $\frac{3}{5}$ C) $-\frac{3}{5}$ D) $-\frac{7}{8}$ E) $\frac{7}{8}$

15. $x * y = \begin{cases} x - y & , x > y \\ x + y + (x^2 * y) & , x \le y \end{cases}$

$\Rightarrow (-3) * 2 = ?$

A) -1 B) 5 C) 6 D) 7 E) 8

16. $x \square y = \begin{cases} x^2 - y + (x^2 \square y^3) & , x < y \\ x + y & , x = y \\ x + 2 - \left(\frac{x}{4} \square (-y)\right) & , x > y \end{cases}$

$\Rightarrow (-2) \square (-1) = ?$

A) 2 B) 4 C) 5 D) 6 E) 9

1.

△	a	b	c	d	e
a	d	e	a	b	c
b	e	a	b	c	d
c	a	b	c	d	e
d	b	c	d	e	a
e	c	d	e	a	b

$(a \triangle b) \triangle (d \triangle e) = ?$

A) a B) b C) c D) d E) e

2.

★	1	2	3	4	5
1	5	1	2	3	4
2	1	2	3	4	5
3	2	3	4	5	1
4	3	4	5	1	2
5	4	5	1	2	3

$A = \{1, 2, 3, 4, 5\}$

$\forall x \in A$

$x \star e = x$

$\Rightarrow e = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

3.

★	A	L	T	I	N
A	T	I	N	A	L
L	I	N	A	L	T
T	N	A	L	T	I
I	A	L	T	I	N
N	L	T	I	N	A

$K = \{A, L, T, I, N\}$

$\forall x \in K$

$x \star e = x$

$x \star x^{-1} = e$

$\Rightarrow T^{-1} = ?$

A) A B) L C) T D) I E) N

4.

△	a	b	c	d	e
a	d	a	b	c	e
b	a	b	c	d	e
c	b	c	d	a	e
d	c	d	a	b	e
e	e	e	e	e	e

$A = \{a, b, c, d, e\}$

$\forall x \in A$

$x \triangle y = y$

$\Rightarrow y = ?$

A) a B) b C) c D) d E) e

5.

△	1	2	3	4	5
1	2	3	4	5	1
2	3	4	5	1	2
3	4	5	1	2	3
4	5	1	2	3	4
5	1	2	3	4	5

$A = \{1, 2, 3, 4, 5\}$

$\forall x \in A$

$x \triangle e = x$

$x \triangle x^{-1} = e$

$\Rightarrow (2^{-1} \triangle 4) \triangle 1 = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

6.

★	1	2	3	4	5
1	5	1	2	3	4
2	1	2	3	4	5
3	2	3	4	5	1
4	3	4	5	1	2
5	4	5	1	2	3

$A = \{1, 2, 3, 4, 5\}$

$\forall x \in A$

$x \star e = x$

$x \star x^{-1} = e$

$(2 \star k)^{-1} \star 5 = 3$

$\Rightarrow k = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7.

✱	a	b	c	d	f
a	c	d	f	a	b
b	d	f	a	b	c
c	f	a	b	c	d
d	a	b	c	d	f
f	b	c	d	f	a

$A = \{a, b, c, d, f\}$

$\forall x \in A$

$x \ast e = x$

$x \ast x^{-1} = e$

$x^2 = x \ast x$

$\Rightarrow (a^2 \ast f) \ast (c^{-1}) = ?$

A) a B) b C) c D) d E) f

8.

□	1	2	3	4	5
1		4	5	m	
2	4				
3	n				4
4	1	2			
5			p		

$A = \{1, 2, 3, 4, 5\}$

$\forall a, b \in A$

$a \square b = b \square a$

$\Rightarrow m + n + p = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

9.

□	1	2	3	4	5
1	5	1	2	3	4
2	1	2	3	4	5
3	2	3	4	5	1
4	3	4	5	1	2
5	4	5	1	2	3

$A = \{1, 2, 3, 4, 5\}$

$\forall x \in A$

$x \square e = x$

$x \square x^{-1} = e$

$(5^{-1} \square 3) \square k = 3$

$\Rightarrow k = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

10.

△	a	b	c	d	f
a	c	d	f	a	b
b	d	f	a	b	c
c	f	a	b	c	d
d	a	b	c	d	f
f	b	c	d	f	a

$A = \{a, b, c, d, f\}$

$\forall x \in A$

$x \triangle e = x$

$x \triangle x^{-1} = e$

$(d^{-1} \triangle a) \triangle (c \triangle k) = b \triangle b^{-1}$

$\Rightarrow k = ?$

A) a B) b C) c D) d E) f

11.

△	1	2	3	4	5
1	2	3	4	5	1
2	3	4	5	1	2
3	4	5	1	2	3
4	5	1	2	3	4
5	1	2	3	4	5

$A = \{1, 2, 3, 4, 5\}$

$\forall x \in A$

$x \triangle e = x$

$x \triangle x^{-1} = e$

$x * y = (x^{-1} \triangle y^{-1}) \triangle 5$

$\Rightarrow 3 * 4 = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

12.

✱	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	3	1	6	4	5
3	3	1	2	5	6	4
4	4	5	6	1	2	3
5	5	6	4	3	1	2
6	6	4	5	2	3	1

$a \ast b \neq b \ast a$

$4 \ast 2 = 5$

$2 \ast 4 = 6$

$(3 \ast k) \ast 6 = 2$

$\Rightarrow k = ?$

A) 6 B) 4 C) 3 D) 2 E) 1

İŞLEM OPERATIONS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	A	C	A	D	B	C	C	B	E	C	A	B	E	B

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	E	E	C	A	C	B	B	B	C	A	E	D	D	D

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	B	B	B	E	D	A	B	C	B	E	E	E	E	A

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	D	C	A	C	C	C	B	C	D	B	B	A	E	E	E

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	D	B	C	B	D	E	A	B	C	A	D	D	B	D

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	E	C	A	B	A	A	E	D	A	E	D	B	B	B	A

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	E	A	E	D	D	A	E	E	C	B	E	C	D	C	E

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	E	E	C	D	E	C	E	C	C	B				

MODÜLER ARİTMETİK
MODULAR ARITHMETIC

ÖZELLİK | Property 1

Kalanlı Bölme İşlemi

Division Operation with Remainder

$$\begin{array}{c|c} A & B \\ \hline - & C \\ \hline K & \end{array}$$

A = Bölünen Sayı *(Dividend)*

B = Bölen Sayı *(Divisor)*

C = Bölüm *(Quotient)*

K = Kalan *(Remainder)*

$A = B \cdot C + K$

$0 \le K < B$

K sıfır ise B sayısı, A sayısını tam böler denir.

If K is zero, B is divisible by A.

1. $\begin{array}{c|c} A & 8 \\ \hline - & 4 \\ \hline 3 & \end{array}$ $\Rightarrow A = ?$

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2. $\begin{array}{c|c} A & x \\ \hline - & 4 \\ \hline 5 & \end{array}$ $\Rightarrow \min(A) = ?$

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3. $\begin{array}{c|c} A & x \\ \hline - & 2 \\ \hline 4 & \end{array}$ $\Rightarrow \min(A) = ?$

14

4. $\begin{array}{c|c} A & 10 \\ \hline - & B \\ \hline B^2 & \end{array}$ $\Rightarrow \max(A) = ?$

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5. $\begin{array}{c|c} A & B \\ \hline - & 2 \\ \hline 5 & \end{array}$ $\begin{array}{c|c} B & C \\ \hline - & 3 \\ \hline 2 & \end{array}$ $\Rightarrow A = ?$

6C + 9

6. $\begin{array}{c|c} A & B \\ \hline - & 3 \\ \hline 4 & \end{array}$ $\begin{array}{c|c} B & C \\ \hline - & 4 \\ \hline 2 & \end{array}$ $\Rightarrow A = ?$

12C + 10

7. $\begin{array}{c|c} A & B \\ \hline - & 3 \\ \hline 4 & \end{array}$ $\begin{array}{c|c} B & C \\ \hline - & 4 \\ \hline 3 & \end{array}$ $\begin{array}{c|c} A & 12 \\ \hline - & \\ \hline x & \end{array}$

$\Rightarrow x = ?$

1

8. $\begin{array}{c|c} A & B \\ \hline - & 2 \\ \hline 5 & \end{array}$ $\begin{array}{c|c} B & C \\ \hline - & 4 \\ \hline 2 & \end{array}$ $\begin{array}{c|c} A & 8 \\ \hline - & \\ \hline x & \end{array}$

$\Rightarrow x = ?$

1

9. $\begin{array}{r|l} A & 7 \\ - & \\ \hline 3 & B \end{array}$ $\begin{array}{r|l} A+4 & B+1 \\ - & \\ \hline C & L \end{array}$

$\Rightarrow L = ?$

7

10. $\begin{array}{r|l} A & B \\ - & \\ \hline 5 & 2 \end{array}$ $\begin{array}{r|l} B & C \\ - & \\ \hline 2 & 4 \end{array}$ $\begin{array}{r|l} A & 8 \\ - & \\ \hline x & \end{array}$

$\Rightarrow \frac{A+C+B-20}{5B} = ?$

5

11. $\begin{array}{r|l} 6!+7!+8! & 6! \\ - & \\ \hline x & y \end{array}$ $\Rightarrow x + y = ?$

44

12. $\begin{array}{r|l} 1!+2!+3!+\ldots+100! & 6 \\ - & \\ \hline K & y \end{array}$ $\Rightarrow K = ?$

3

13. $\begin{array}{r|l} abab & ab \\ - & \\ \hline x & y \end{array}$ $\Rightarrow x + y = ?$

101

14. $\begin{array}{r|l} KLKLKL & KL \\ - & \\ \hline 0 & x \end{array}$ $\Rightarrow x = ?$

10101

15. $\begin{array}{r|l} aaaaa & aa \\ - & \\ \hline 3 & x \end{array}$ $\Rightarrow x + a = ?$

1013

16. $\begin{array}{r|l} xxxxx & xxx \\ - & \\ \hline b & a \end{array}$ $\Rightarrow a = ?$

100

ÖZELLİK | Property 2

Bölünebilme Kuralları | Divisibility Rules

- **2 ile Bölünebilme** | Divisibility by 2

  Birler basamağındaki rakamı çift olan doğal sayılar 2 ile bölünür.

  Numbers with an even numeral on the units digit are divisible by 2.

- **3 ile Bölünebilme** | Divisibility by 3

  Rakamları toplamı 3 ile bölünebilen sayılar, 3 ile bölünebilir. Bir sayının rakamları toplamının 3 ile bölümünden kalan sayı, o sayının 3 ile bölümünden kalan sayıya eşittir.

  Numbers whose digits add up to a number divisible by 3 are divisible by 3. The remainder obtained when the sum of a number's digits is divided by 3 is equal to the remainder obtained when the number itself is divided by 3.

- **4 ile Bölünebilme** | Divisibility by 4

  Bir sayının son iki rakamından oluşan sayı 4 ile bölünebilirse o sayı da 4 ile bölünebilir. Bir sayının son iki rakamından oluşan sayının 4 ile bölümünden kalan sayı, o sayının 4 ile bölümünden kalan sayıya eşittir.

  If the number consisting of the last two digits of a number is divisible by 4, then the number itself is divisible by 4. The remainder obtained when the number consisting of last two digits of a number is divided by 4 is equal to the remainder obtained when the number itself is divided by 4.

- **5 ile Bölünebilme** | Divisibility by 5

  Bir sayının birler basamağındaki rakam 0 veya 5 ise o sayı 5 ile bölünür. Verilen bir sayının birler basamağındaki rakam 5 ile bölümünden kalan sayı, o sayının 5 ile bölümünden kalan sayıya eşittir.

  If the numeral on the units digit of a number is divisible by 5, then the number itself is divisible by 5. The remainder obtained when the units digit of a given number is divided by 5 is equal to the remainder obtained when the number itself is divided by 5.

- **6 ile Bölünebilme** | Divisibility by 6

  Bir sayı hem 2 hem de 3 ile bölünebilirse o sayı 6 ile bölünür.

  If a number is divisible by both 2 and 3 then it is divisible by 6.

- **8 ile Bölünebilme** | Divisibility by 8

  Bir sayının son üç rakamından oluşan sayı 8 ile bölünebilirse o sayı da 8 ile bölünebilir. Bir sayının son üç rakamından oluşan sayının 8 ile bölümünden kalan sayı, o sayının 8 ile bölümünden kalan sayıya eşittir.

  If the number consisting of the last three digits of a number is divisible by 8, then the number itself is divisible by 8. The remainder obtained when the number consisting of last three digits of a number is divided by 8 is equal to the remainder obtained when the number itself is divided by 8.

- **9 ile Bölünebilme** | Divisibility by 9

  Rakamları toplamı 9 ile bölünebilen sayılar 9 ile bölünebilir. Bir sayının rakamları toplamının 9 ile bölümünden kalan sayı, o sayının 9 ile bölümünden kalan sayıya eşittir.

  Numbers whose digits add up to a number that is divisible by 9 are divisible by 9. The remainder obtained when the sum of a number's digits is divided by 9 is equal to the remainder obtained when the number itself is divided by 9.

- **10 ile Bölünebilme** | Divisibility by 10

  Bir sayının birler basamağındaki rakamı 0 ise o sayı 10 ile bölünür. Bir sayının birler basamağındaki rakam, o sayının 10 ile bölümünden elde edilen kalandır.

  If the numeral on the units digit of a number is 0, then the number itself is divisible by 10. The numeral on the units digit of a number is the remainder obtained when the number itself is divided by 10.

- **11 ile Bölünebilme** | Divisibility by 11

  Bir sayının rakamlarına birler basamağından başlanarak sırasıyla + ve – işaretleri verilerek rakamlar toplanır. Elde edilen sayı 11'in katı ise bu sayı 11'e bölünür. Elde edilen sayının 11 ile bölümünden kalan sayı, o sayının 11'e bölümünden kalan sayıya eşittir.

  Starting with the units digit, the digits of a number are given + and – signs in sequence, and they're added. If the obtained number is a multiple of 11, then the original number is divisible by 11. The remainder obtained from dividing the number obtained by adding the digits to 11 is equal to the remainder obtained when the number itself is divided by 11.

- **Not** | Note

  a ve b aralarında asal iki sayı olmak üzere, bir sayı hem a'ya hem de b'ye bölünürse bu sayı a · b'ye de bölünür.

  Let a and b be relatively prime. If a number is divisible by both a and b then it is also divisible by a . b.

1. 23654 | 2 ⇒ K = ?

– K

0

2. 100253 | 2 ⇒ K = ?

– K

1

3. $52791 \mid 3$ $\Rightarrow K = ?$

$= K$

0

4. $2793 + 61225 \mid 3$ $\Rightarrow K = ?$

$= K$

1

5. $24653 \cdot 190114 \mid 3$ $\Rightarrow K = ?$

$= K$

2

6. $415643 \mid 3$ $\Rightarrow x = ?$

$= x$

2

7. $43215 \mid 4$ $\Rightarrow x = ?$

$= x$

3

8. $99927 \mid 4$ $\Rightarrow K = ?$

$= K$

3

9. $400039 \mid 5$ $\Rightarrow K = ?$

$= K$

4

10. $421500 \mid 6$ $\Rightarrow K = ?$

$= K$

0

11. $12702 \mid 8$ $\Rightarrow K = ?$

$= K$

6

12. $4444444 \mid 8$ $\Rightarrow K = ?$

$= K$

4

13. $315687 \cdot 1011200 \mid 9$ $\Rightarrow K = ?$

$= K$

6

14. $253107 \mid 10$ $\Rightarrow K = ?$

$= K$

7

15. $6870014 \mid 11$ $\Rightarrow K = ?$

$= K$

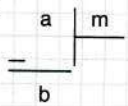
8

16. $24243242 \mid 15$ $\Rightarrow K = ?$

$= K$

2

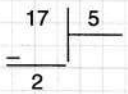
ÖZELLİK | Property 3



a sayısının m sayısına bölümünden kalan b ise m sayısı a – b sayısını tam böler. a ile b sayıları modül m'ye göre denktir denir ve a ≡ b (mod m) bağıntısı ile gösterilir.

If the remainder from dividing a to m is b, then m divides a – b without any remainders. It is said that numbers a and b are equivalent with respect to mod m and this is denoted by the relation a ≡ b (mod m).

Örnek | Example



17 ≡ 2 (mod 5)

1. $x \in Z/5$

$a \equiv 3 \pmod 5$

$a^2 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\boxed{\bar{4}}$

2. $a \equiv 2 \pmod 6$

$a^3 \equiv x \pmod 6$

$\Rightarrow x = ?$

$\boxed{\bar{2}}$

3. $a \equiv 3 \pmod 5$

$b \equiv 2 \pmod 5$

$a \cdot b \equiv x \pmod 5$

$\Rightarrow x = ?$

$\boxed{\bar{1}}$

4. $a \equiv 4 \pmod 6$

$b \equiv 3 \pmod 6$

$a^2 + b^2 \equiv x \pmod 6$

$\Rightarrow x = ?$

$\boxed{\bar{1}}$

5. $a \equiv 2 \pmod 5$

$b \equiv 3 \pmod 5$

$a^2 \cdot b \equiv x \pmod 5$

$\Rightarrow x = ?$

$\boxed{\bar{2}}$

6. $a \equiv 4 \pmod 7$

$b \equiv 2 \pmod 7$

$a^2 \cdot b \equiv x \pmod 7$

$\Rightarrow x = ?$

$\boxed{\bar{4}}$

7. $a \equiv 3 \pmod 5$

$b \equiv 2 \pmod 5$

$a^2 - b^2 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\boxed{\bar{0}}$

8. $x \in Z/5$

$4324 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\boxed{\bar{4}}$

9. $x \in Z/8$

$(-34426) \equiv x \pmod 8$

$\Rightarrow x = ?$

$\boxed{\bar{6}}$

10. $x \in Z/6$

$8! \equiv x \pmod 6$

$\Rightarrow x = ?$

$\boxed{\bar{0}}$

11. $x \in Z/7$

$2089 \equiv x \pmod 7$

$\Rightarrow x = ?$

$\bar{3}$

12. $x \in Z/5$

$10896 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{1}$

12. $x \in Z/3$

$249 \equiv x \pmod 3$

$\Rightarrow x = ?$

$\bar{0}$

14. $x \in Z/4$

$341 \equiv x \pmod 4$

$\Rightarrow x = ?$

$\bar{1}$

15. $x \in Z/5$

$10000 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{2}$

16. $x \in Z/9$

$216 \equiv x \pmod 9$

$\Rightarrow x = ?$

$\bar{0}$

17. $x \in Z/6$

$379 \equiv x \pmod 6$

$\Rightarrow x = ?$

$\bar{1}$

18. $x \in Z/5$

$1999 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{4}$

19. $x \in Z/11$

$122 \equiv x \pmod{11}$

$\Rightarrow x = ?$

$\bar{1}$

20. $x \in Z/2$

$163789 \equiv x \pmod 2$

$\Rightarrow x = ?$

$\bar{1}$

21. $x \in Z/6$

$(-304) \equiv x \pmod 6$

$\Rightarrow x = ?$

$\bar{2}$

22. $x \in Z/5$

$(-12) \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{3}$

23. $x \in Z/2$

$(-1453) \equiv x \pmod 2$

$\Rightarrow x = ?$

$\bar{1}$

24. $x \in Z/6$

$(-1) \equiv x \pmod 6$

$\Rightarrow x = ?$

$\bar{5}$

25. $x \in Z/4$

$-7 \equiv x \pmod 4$

$\Rightarrow x = ?$

$\bar{1}$

26. $x \in Z/7$

$-21 \equiv x \pmod 7$

$\Rightarrow x = ?$

$\bar{0}$

27. $x \in Z/3$

$-76 \equiv x \pmod 3$

$\Rightarrow x = ?$

$\bar{2}$

28. $x \in Z/9$

$-19 \equiv x \pmod 9$

$\Rightarrow x = ?$

$\bar{8}$

29. $x \in Z/10$

$-46 \equiv x \pmod{10}$

$\Rightarrow x = ?$

$\bar{4}$

30. $x \in Z/5$

$-15 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{0}$

ÖZELLİK | Property 4

- $Z/m = \{\overline{0}, \overline{1}, \overline{2}, ..., \overline{m-1}\}$

  $\overline{0} = \{x \in Z \mid 0 \equiv x \pmod m\}$

  $\overline{1} = \{x \in Z \mid 1 \equiv x \pmod m\}$

Örnek | Example

$Z/2 = \{\overline{0}, \overline{1}\}$

$\overline{0} = \{....., -4, -2, 0, 2, 4, 6, ...\}$

$\overline{2} = \{....., -3, -1, 1, 3, 5, 7, ...\}$

- $a \equiv b \pmod m$

  $c \equiv d \pmod m$

  $\Rightarrow a + c \equiv b + d \pmod m$

  $\Rightarrow a - c \equiv b - d \pmod m$

  $\Rightarrow a \cdot c \equiv b \cdot d \pmod m$

  $\Rightarrow a^n \equiv b^n \pmod m$

1. $x \in Z / 4$

$3421 \cdot 3243 \equiv x \pmod 4$

$\Rightarrow x = ?$

$\overline{3}$

2. $x \in Z / 9$

$(14321) + (342) \equiv x \pmod 9$

$\Rightarrow x = ?$

$\overline{2}$

3. $x \in Z / 5$

$(321)^4 \cdot (3222)^3 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\overline{3}$

4. $x \in Z / 9$

$(-244)^2 + (341) \equiv x \pmod 9$

$\Rightarrow x = ?$

$\overline{0}$

5. $x \in Z / 7$

$(1430) \cdot (724) \equiv x \pmod 7$

$\Rightarrow x = ?$

$\overline{6}$

6. $x \in Z^+$

$50322 \equiv x \pmod 3$

$\Rightarrow \min(x) = ?$

3

7. $x \in Z^-$

$896475 \equiv x \pmod 9$

$\Rightarrow \max(x) = ?$

-6

8. $x \in Z^+$

$(3)^{144} \equiv x \pmod 5$

$\Rightarrow \min(x) = ?$

1

9. $x \in Z / 7$

$2^{43} \equiv x \pmod 7$

$\Rightarrow x = ?$

$\overline{2}$

10. $x \in Z / 7$

$3^{33} \equiv x \pmod 7$

$\Rightarrow x = ?$

$\overline{6}$

11. $x \in Z/10$

$2^{100} \equiv x \pmod{10}$

$\Rightarrow x = ?$

$\boxed{\bar{2}}$

12. $x \in Z/6$

$4^{35} \equiv x \pmod{6}$

$\Rightarrow x = ?$

$\boxed{\bar{4}}$

13. $x \in Z^+$

$(5)^{133} \equiv x \pmod{9}$

$\Rightarrow \min(x) = ?$

$\boxed{5}$

14. $x \in Z^+$

$(12)^{142} \equiv x \pmod{10}$

$\Rightarrow \min(x) = ?$

$\boxed{4}$

15. $x \in Z/4$

$(143)^{100} \equiv x \pmod{4}$

$\Rightarrow x = ?$

$\boxed{\bar{1}}$

16. $x \in Z/9$

$(396)^{400} \equiv x \pmod{9}$

$\Rightarrow \min(x) = ?$

$\boxed{\bar{0}}$

17. $x \in Z^+$

$(24)^{38} \equiv x \pmod{5}$

$\Rightarrow \min(x) = ?$

$\boxed{1}$

18. $x \in Z^+$

$(-241)^{1002} \equiv x \pmod{6}$

$\Rightarrow \min(x) = ?$

$\boxed{1}$

19. $x \in Z/25$

$24^{99} \equiv x \pmod{25}$

$\Rightarrow x = ?$

$\boxed{\overline{24}}$

20. $x \in Z/23$

$(22)^{98} \equiv x \pmod{23}$

$\Rightarrow \min(x) = ?$

$\boxed{\bar{1}}$

21. $x \in Z/13$

$7^{12} \equiv x \pmod{13}$

$\Rightarrow x = ?$

$\boxed{\bar{1}}$

22. $x \in Z/11$

$7^{42} \equiv x \pmod{11}$

$\Rightarrow x = ?$

$\boxed{\bar{5}}$

ÖZELLİK | Property 5

■ **Z / m'de İşlemler** | Operations in Z/m

$Z/7 = \{\bar{0}, \bar{1}, \bar{2}, \bar{3}, \bar{4}, \bar{5}, \bar{6}\}$

$\bar{3} + \bar{4} = \bar{0}$

$\bar{3} \cdot \bar{4} = \bar{5}$

■ Z / m'de toplama işleminin etkisiz elemanı $\bar{0}$

The identity element of additive operation in Z/m is $\bar{0}$.

Z / 5 toplama işlemine göre

According to Z / 5 addition operation

$\bar{0}$ ın tersi $\bar{0}$ *(Inverse of* $\bar{0}$ *is* $\bar{0}$*)*

$\bar{1}$ in tersi $\bar{4}$ *(Inverse of* $\bar{1}$ *is* $\bar{4}$*)*

$\bar{2}$ nin tersi $\bar{3}$ *(Inverse of* $\bar{2}$ *is* $\bar{3}$*)*

$\bar{3}$ ün tersi $\bar{2}$ *(Inverse of* $\bar{3}$ *is* $\bar{2}$*)*

$\bar{4}$ ün tersi $\bar{1}$ dir. *(Inverse of* $\bar{4}$ *is* $\bar{1}$*)*

■ Z / m'de çarpma işleminin etkisiz elemanı $\bar{1}$ dir.

The identity element of multiplicative operation in Z / m is $\bar{1}$.

Z / 5 çarpma işlemine göre

According to Z / 5 multiplication operation

$\bar{1}$ in tersi $\bar{1}$ *(Inverse of* $\bar{1}$ *is* $\bar{1}$*)*

$\bar{2}$ nin tersi $\bar{3}$ *(Inverse of* $\bar{2}$ *is* $\bar{3}$*)*

$\bar{3}$ ün tersi $\bar{2}$ *(Inverse of* $\bar{3}$ *is* $\bar{2}$*)*

$\bar{4}$ ün tersi $\bar{4}$ tür. *(Inverse of* $\bar{4}$ *is* $\bar{4}$*)*

1. $x \in Z/5$

$x = \frac{1}{3}$

$\Rightarrow x = ?$

$\bar{2}$

2. $x \in Z/5$

$x = \left(\frac{2}{3}\right)^{-1}$

$\Rightarrow x = ?$

$\bar{4}$

3. $x \in Z/11$

$x = \left(\frac{3}{2}\right)^{-1}$

$\Rightarrow x = ?$

$\bar{8}$

PUZA YAYINLARI

4. $x \in Z/9$

$x = \frac{16}{5}$

$\Rightarrow x = ?$

$\bar{5}$

5. $x \in Z/7$

$x = \left(\frac{1}{3}\right)^{-21}$

$\Rightarrow x = ?$

$\bar{6}$

PUZA YAYINLARI

6. $x \in Z/3$

$(2)^{-15} + 6^5 \equiv x \pmod 3$

$\Rightarrow x = ?$

$\bar{2}$

7. $x \in Z/5$

$(3)^{-11} + (2)^8 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{4}$

8. $x \in Z/5$

$x = \left(\frac{2}{3}\right)^{-60}$

$\Rightarrow x = ?$

$\bar{1}$

PUZA YAYINLARI

9. $x \in Z/5$

$\bar{2}x + \bar{1} = \bar{4}$

$\Rightarrow x = ?$

$\bar{4}$

10. $x \in Z/7$

$\bar{4}x + \bar{4} = \bar{2}$

$\Rightarrow x = ?$

$\boxed{\bar{3}}$

11. $x \in Z/9$

$\bar{4}x - \bar{4} = \bar{2}$

$\Rightarrow x = ?$

$\boxed{\bar{6}}$

12. $x \in Z/5$

$(\bar{2}x + \bar{1})(x + \bar{5}) = \bar{0}$

$\Rightarrow$ S.S. = ?

$\boxed{\{\bar{0}, \bar{2}\}}$

13. $x \in Z/7$

$(x - \bar{3})(\bar{2}x + \bar{1}) = \bar{0}$

$\Rightarrow$ S.S. = ?

$\boxed{\{\bar{3}\}}$

14. $x \in Z/5$

$x^2 - \bar{4}x + \bar{3} = 0$

$\Rightarrow$ S.S. = ?

$\boxed{\{\bar{1}, \bar{3}\}}$

15. $x \in Z/7$

$x^2 + \bar{5}x + \bar{4} = 0$

$\Rightarrow$ S.S. = ?

$\boxed{\{\bar{3}, \bar{6}\}}$

16. $x \in Z/5$

$x^2 - \bar{4}x - \bar{5} = 0$

$\Rightarrow$ S.S. = ?

$\boxed{\{\bar{4}, \bar{0}\}}$

17. $x \in Z/5$

$f(x) = \bar{3}x + \bar{2}$

$\Rightarrow f(\bar{2}) = ?$

$\boxed{\bar{3}}$

18. $x \in Z/5$

$f(x) = \bar{4}x + \bar{3}$

$f(\bar{3}) = ?$

$\boxed{\bar{0}}$

19. $x \in Z/5$

$f(x) = x + \bar{4}$

$\Rightarrow (fof)(\bar{2}) = ?$

$\boxed{\bar{0}}$

20. $x \in Z/7$

$f(x) = \bar{3}x + \bar{4}$

$\Rightarrow f^{-1}(\bar{3}) = ?$

$\boxed{\bar{2}}$

21. $x \in Z/5$

$f(x) = x + \bar{4}$

$\Rightarrow f^{-1}(2) = ?$

$\boxed{\bar{3}}$

22. $x \in Z/5$

$f(x) = \bar{2}x + \bar{4}$

$\Rightarrow f^{-1}(x) = ?$

$\boxed{\bar{3}x + \bar{3}}$

23. $x \in Z/7$

$f(x) = \bar{3}x + \bar{1}$

$\Rightarrow f^{-1}(x) = ?$

$\boxed{\bar{5}x + \bar{2}}$

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

1.

A | 2	A | 3	A | 6
– | 1	– | 2	– | x

$\Rightarrow x = ?$

5

2. $x \in Z / 5$

$(8994)^2 \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{1}$

3. $x \in Z^+$

$3947 \equiv x \pmod 4$

$\Rightarrow \min(x) = ?$

3

4. $x \in Z^-$

$7946 \equiv x \pmod{11}$

$\Rightarrow \max(x) = ?$

-7

5. $x \in Z / 5$

$3^{209} \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{3}$

6. $x \in Z / 7$

$3^{405} \equiv x \pmod 7$

$\Rightarrow x = ?$

$\bar{6}$

7. $x \in Z / 11$

$7^{43} \equiv x \pmod{11}$

$\Rightarrow x = ?$

$\bar{2}$

8. $x \in Z / 6$

$2^{73} \equiv x \pmod 6$

$\Rightarrow x = ?$

$\bar{2}$

ÖRNEK SORU TÜRLERİ EXEMPLARY QUESTION TYPES

9. $x \in Z / 9$

$6^{65} \equiv x \pmod 9$

$\Rightarrow x = ?$

$\bar{0}$

10. $x \in Z / 10$

$2^{100} \equiv x \pmod{10}$

$\Rightarrow x = ?$

$\bar{6}$

11. $x \in Z / 5$

$(9999)^{9999} \equiv x \pmod 5$

$\Rightarrow x = ?$

$\bar{4}$

12. $x \in Z / 6$

$0! + 1! + 2! + 3! + 4! + \ldots + 30! \equiv x \pmod 6$

$\Rightarrow x = ?$

$\bar{4}$

13. $x \in Z / 17$

$16^{40} \equiv x \pmod{17}$

$\Rightarrow x = ?$

$\bar{1}$

14. $n \in Z^+$

$n > 60$

$3^n \equiv 6 \pmod 7$

$\Rightarrow \min(n) = ?$

63

15. $A = \{m \in Z^+ \mid 75 \equiv 3 \pmod m \quad m > 1\}$

$\Rightarrow n(A) = ?$

11

16. $x \in Z / 13$

$1^{12} + 2^{12} + 3^{12} + \ldots + 11^{12} + 12^{12} \equiv x \pmod{13}$

$\Rightarrow x = ?$

12

PUZA YAYINLARI

1. $A \equiv 5 \pmod{11}$, $A \equiv 3 \pmod{3}$

$\Rightarrow A = ?$

A) 33 B) 35 C) 37 D) 38 E) 40

2. $A \equiv x \pmod{9}$, $A \equiv 5 \pmod{5}$

$\Rightarrow \max(A) = ?$

A) 53 B) 51 C) 48 D) 46 E) 45

3. $A \equiv 5 \pmod{x}$, $A \equiv 7 \pmod{5}$

$\Rightarrow \min(A) = ?$

A) 45 B) 46 C) 47 D) 48 E) 49

4. $A \equiv 4 \pmod{B}$, $A \equiv 3 \pmod{3}$, $B \equiv 2 \pmod{C}$, $B \equiv 2 \pmod{5}$

$\Rightarrow A = ?$

A) $15 \cdot C + 14$ B) $15 \cdot C + 10$ C) $15 \cdot C + 6$ D) $8 \cdot C + 4$ E) $6 \cdot C + 4$

5. $A \equiv 2 \pmod{B}$, $A \equiv 4 \pmod{4}$, $B \equiv 5 \pmod{C}$, $B \equiv 3 \pmod{3}$, $A \equiv x \pmod{12}$

$\Rightarrow x = ?$

A) 11 B) 10 C) 9 D) 8 E) 7

6. $A \equiv 4 \pmod{5}$, $A \equiv m \pmod{5}$, $A + 3 \equiv L \pmod{m + 1}$, $A + 3 \equiv L \pmod{5}$

$\Rightarrow L = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

7. $A \equiv 5 \pmod{B}$, $A \equiv 3 \pmod{3}$, $B \equiv 4 \pmod{C}$, $B \equiv 4 \pmod{2}$

$\Rightarrow \min(A) = ?$

A) 47 B) 43 C) 35 D) 27 E) 23

8. $A \equiv B^2 \pmod{25}$, $A \equiv B \pmod{B}$

$\Rightarrow \max(A) = ?$

A) 98 B) 103 C) 108 D) 116 E) 122

9.

$$\begin{array}{r|l} 12121 & 12 \\ \hline - & x \\ \hline y & \end{array}$$

$\Rightarrow x + y = ?$

A) 102 B) 112 C) 1101 D) 1011 E) 1012

10.

$$\begin{array}{r|l} aaaaa & aaa \\ \hline - & x \\ \hline y & \end{array}$$

$\Rightarrow x = ?$

A) 100 B) 101 C) 110 D) 111 E) 1000

11.

$$\begin{array}{r|l} 3896562 & 4 \\ \hline - & \\ \hline x & \end{array}$$

$\Rightarrow x = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

12.

$$\begin{array}{r|l} 978124 & 8 \\ \hline - & \\ \hline x & \end{array}$$

$\Rightarrow x = ?$

A) 6 B) 4 C) 2 D) 1 E) 0

13.

$$\begin{array}{r|l} 3547912 & 11 \\ \hline - & \\ \hline x & \end{array}$$

$\Rightarrow x = ?$

A) 5 B) 4 C) 3 D) 2 E) 1

14.

$$\begin{array}{r|l} 478965 & 9 \\ \hline - & \\ \hline x & \end{array}$$

$\Rightarrow x = ?$

A) 8 B) 7 C) 5 D) 3 E) 1

15.

$$\begin{array}{r|l} 374561 & 6 \\ \hline - & \\ \hline x & \end{array}$$

$\Rightarrow x = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

16.

$$\begin{array}{r|l} 2a345a1 & 11 \\ \hline - & \\ \hline 4 & \end{array}$$

$\Rightarrow a = ?$

A) 5 B) 6 C) 7 D) 8 E) 9

1. $x \in Z/5$

$5238 \cdot 4379 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

2. $x \in Z/4$

$35412 \cdot 53214 \equiv x \pmod 4$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

3. $x \in Z/9$

$1475 + 3148 \equiv x \pmod 9$

$\Rightarrow x = ?$

A) $\overline{2}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{5}$ E) $\overline{6}$

4. $x \in Z/5$

$347 \cdot 1452 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{2}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{5}$ E) $\overline{6}$

5. $x \in Z/9$

$57347 - 32179 \equiv x \pmod 9$

$\Rightarrow x = ?$

A) $\overline{2}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{5}$ E) $\overline{6}$

6. $x \in Z/5$

$-13243 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

7. $x \in Z/9$

$-3984 \equiv x \pmod 9$

$\Rightarrow x = ?$

A) $\overline{7}$ B) $\overline{6}$ C) $\overline{5}$ D) $\overline{4}$ E) $\overline{3}$

8. $x \in Z/11$

$756893 \equiv x \pmod{11}$

$\Rightarrow x = ?$

A) $\overline{6}$ B) $\overline{5}$ C) $\overline{4}$ D) $\overline{3}$ E) $\overline{2}$

9. $x \in Z/8$

$4025 + 3322 \equiv x \pmod 8$

$\Rightarrow x = ?$

A) $\overline{7}$ B) $\overline{5}$ C) $\overline{4}$ D) $\overline{3}$ E) $\overline{1}$

10. $x \in Z/13$

$5! \equiv x \pmod{13}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{5}$ E) $\overline{8}$

11. $x \in Z/11$

$456735 \equiv x \pmod{11}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{7}$

12. $x \in Z/13$

$4! \equiv x \pmod{13}$

$\Rightarrow x = ?$

A) $\overline{9}$ B) $\overline{10}$ C) $\overline{11}$ D) $\overline{12}$ E) $\overline{13}$

13. $x \in Z/11$

$-3456 \equiv x \pmod{11}$

$\Rightarrow x = ?$

A) $\overline{9}$ B) $\overline{8}$ C) $\overline{5}$ D) $\overline{2}$ E) $\overline{1}$

14. $x \in Z/7$

$x \equiv 3 \pmod 7$

$\Rightarrow x^3 = ?$

A) $\overline{2}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{5}$ E) $\overline{6}$

15. $x \in Z/5$

$(19873)^2 \cdot (3664)^3 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

16. $x \in Z/10$

$(321452)^2 \cdot (457)^3 \equiv x \pmod{10}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

1. $x \in Z^+$

$(374)^2 + (42145)^3 \equiv x \pmod 4$

$\Rightarrow \min(x) = ?$

A) 4 B) 3 C) 2 D) 1 E) 0

2. $x \in Z^+$

$(-1321)^2 + (-45)^3 \equiv x \pmod 4$

$\Rightarrow \min(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

3. $x \in Z/7$

$(7750)^4 + (49632)^4 \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{6}$ B) $\overline{5}$ C) $\overline{4}$ D) $\overline{3}$ E) $\overline{2}$

4. $x \in Z/7$

$(1422)^3 + (2144)^3 \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

5. $x \in Z/5$

$2^{82} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

6. $x \in Z/5$

$3^{3333} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

7. $x \in Z/7$

$4^{141} \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

8. $x \in Z^+$

$2^{451} \equiv x \pmod 3$

$\Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $x \in Z/6$

$3^{452} \equiv x \pmod 6$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{5}$

10. $x \in Z/5$

$(743)^{72} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

11. $x \in Z/7$

$(72)^{143} \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

12. $x \in Z/5$

$(443)^{400} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

13. $x \in Z/5$

$(3451)^{4521} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

14. $x \in Z^+$

$(27914)^{889} \equiv x \pmod 3$

$\Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

15. $x \in Z/10$

$(343)^{84} \equiv x \pmod{10}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{6}$ E) $\overline{8}$

16. $x \in Z/7$

$23^{1991} \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

1. $x \in Z / 13$

$(132)^5 \equiv x \pmod{13}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{6}$ E) $\overline{11}$

2. $x \in Z / 17$

$35^{652} \equiv x \pmod{17}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

3. $x \in Z / 6$

$3^{60} \cdot 7^{56} \equiv x \pmod{6}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

4. $x \in Z^-$

$(397)^{443} \equiv x \pmod{5}$

$\Rightarrow \max(x) = ?$

A) -1 B) -2 C) -3 D) -4 E) -5

5. $x \in Z / 6$

$(30135)^{421} \equiv x \pmod{6}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

6. $x \in Z^+$

$(321542)^{145} \equiv x \pmod{3}$

$\Rightarrow \min(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

7. $x \in Z^-$

$(345243)^{450} \equiv x \pmod{4}$

$\Rightarrow \max(x) = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

8. $x \in Z / 9$

$(-3451)^{108} \equiv x \pmod{9}$

$\Rightarrow x = ?$

A) $\overline{8}$ B) $\overline{7}$ C) $\overline{4}$ D) $\overline{2}$ E) $\overline{1}$

9. $x \in Z^-$

$(-247)^{501} \equiv x \pmod 5$

$\Rightarrow \max(x) = ?$

A) -5 B) -4 C) -3 D) -2 E) -1

10. $x \in Z^+$

$(4521)^{121} \equiv x \pmod 9$

$\Rightarrow \min(x) = ?$

A) 9 B) 7 C) 3 D) 2 E) 0

11. $x \in Z / 6$

$(12435)^{48} \equiv x \pmod 6$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

12. $x \in Z / 36$

$(78)^{101} \equiv x \pmod{36}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{30}$ E) $\overline{35}$

13. $x \in Z / 11$

$(12233)^{5411} \equiv x \pmod{11}$

$\Rightarrow x = ?$

A) $\overline{10}$ B) $\overline{8}$ C) $\overline{5}$ D) $\overline{2}$ E) $\overline{1}$

14. $x \in Z / 13$

$13^{800} \cdot 14^{701} \cdot 18^{452} \equiv x \pmod{13}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{3}$ D) $\overline{10}$ E) $\overline{11}$

15. $x \in Z / 81$

$(3)^{18} + (9)^{12} + (2)^4 \equiv x \pmod{81}$

$\Rightarrow x = ?$

A) $\overline{2}$ B) $\overline{3}$ C) $\overline{4}$ D) $\overline{16}$ E) $\overline{27}$

16. $x \in Z / 8$

$(102452)^{105} + (2145)^3 \equiv x \pmod 8$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{4}$ D) $\overline{5}$ E) $\overline{6}$

1. $x \in Z / 12$

$8! \equiv x(\text{mod}12)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{2}$ C) $\overline{4}$ D) $\overline{6}$ E) $\overline{8}$

2. $x \in Z / 6$

$(0!+1! + 2! + 3! + ... 40!) \equiv x(\text{mod}6)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

3. $x \in Z / 5$

$(1! + 3! + 5! + 7! + ... + 17!) \equiv x \ (\text{mod } 5)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

4. $x \in Z / 5$

$(0! + 1! + 2! + 3! + 4! + ... + 22!)^{70} \equiv x \ (\text{mod } 5)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

5. $x \in Z / 16$

$(8!)^{72} \equiv x \ (\text{mod } 16)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{3}$ D) $\overline{8}$ E) $\overline{15}$

6. $x \in Z / 5$

$6^0 + 6^1 + 6^2 + 6^3 + 6^4 \equiv x \ (\text{mod } 5)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

7. $x \in Z / 6$

$5^7 + 6^7 + 7^7 \equiv x \ (\text{mod } 6)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{5}$

8. $x \in Z / 7$

$6^{10} + 7^{10} + 8^{10} \equiv x(\text{mod}7)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{5}$

9. $x \in Z / 23$

$24^{777} \equiv x(\text{mod}23)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{13}$ D) $\overline{17}$ E) $\overline{22}$

10. $x \in Z / 72$

$6^{93} \equiv x(\text{mod}72)$

$\Rightarrow x = ?$

A) $\overline{36}$ B) $\overline{24}$ C) $\overline{9}$ D) $\overline{3}$ E) $\overline{0}$

11. $n \in N^+$

$x \in Z / 5$

$3^{4n+6} \equiv x(\text{mod}5)$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

12. $n \in N^+$

$x \in Z / 5$

$4^{2n+7} \equiv x \ (\text{mod}\ 5)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

13. $n \in N^+$

$x \in Z / 7$

$9^{15n-2} \equiv x \ (\text{mod}\ 7)$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{4}$ E) $\overline{5}$

14. $n \in Z^+$

$n < 100$

$5^n \equiv 3(\text{mod}7)$

$\Rightarrow \max(n) = ?$

A) 99 B) 98 C) 97 D) 96 E) 95

15. $n \in Z^+$

$n > 48$

$8^n \equiv 2 \ (\text{mod}\ 5)$

$\Rightarrow \min(n) = ?$

A) 50 B) 51 C) 52 D) 53 E) 54

16. $n \in Z^+$

$n < 74$

$13^n \equiv 7 \ (\text{mod}\ 9)$

$\Rightarrow \max(n) = ?$

A) 69 B) 70 C) 71 D) 72 E) 73

1. $Z/5$

$\Rightarrow \bar{2}x \cdot (\bar{4}x - \bar{3}) = ?$

A) $\bar{4}x + \bar{3}$ B) $\bar{3}x^2 + \bar{2}x$ C) $\bar{3}x^2 + \bar{3}x$

D) $\bar{3}x^2 + \bar{4}$ E) $\bar{3}x^2 + \bar{4}x$

2. $Z/7$

$\Rightarrow (\bar{2}x + \bar{4}) \cdot (\bar{4}x + \bar{3}) = ?$

A) $x^2 + x + \bar{5}$ B) $x^2 + \bar{2}x + \bar{3}$

C) $x^2 + x + \bar{1}$ D) $\bar{2}x^2 + \bar{3}x + \bar{1}$

E) $\bar{2}x^2 + x + \bar{5}$

3. $Z/5$

$\Rightarrow (\bar{3}x - \bar{4})^2 = ?$

A) $x^2 + x + \bar{4}$ B) $\bar{3}x^2 + \bar{4}$

C) $\bar{4}x^2 + \bar{1}$ D) $x^2 + \bar{2}x + \bar{4}$

E) $\bar{4}x^2 + x + \bar{1}$

4. $Z/6$

$\Rightarrow (\bar{2}x - \bar{3}) \cdot (\bar{5}x + \bar{4}) = ?$

A) $x^2 + x + \bar{1}$ B) $x^2 + \bar{5}x$

C) $\bar{4}x^2 + x$ D) $\bar{4}x^2 + \bar{5}x$

E) $\bar{4}x^2 + \bar{5}x + \bar{3}$

5. $x \in Z/5$

$\bar{2}x + \bar{3} = \bar{4}$

$\Rightarrow x = ?$

A) $\bar{0}$ B) $\bar{1}$ C) $\bar{2}$ D) $\bar{3}$ E) $\bar{4}$

6. $x \in Z/5$

$\bar{3}x + \bar{5} = \bar{2}$

$\Rightarrow x = ?$

A) $\bar{0}$ B) $\bar{1}$ C) $\bar{2}$ D) $\bar{3}$ E) $\bar{4}$

7. $x \in Z^+$

$3x \equiv x + 4 \pmod 4$

$\Rightarrow \min(x) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

8. $x \in Z^+$

$3x + 5 \equiv 3 \pmod 8$

$\Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 5

9. $x \in Z^+$

$3x + 5 \equiv 6 (mod 7)$

$\Rightarrow \min(x) = ?$

A) 2 B) 3 C) 4 D) 5 E) 6

10. $x \in Z^-$

$2x \equiv x - 5 \pmod 6$

$\Rightarrow \max(x) = ?$

A) –5 B) –4 C) –3 D) –2 E) –1

11. $x \in Z / 7$

$\bar{5}x + \bar{4} = \bar{2}x + \bar{6}$

$\Rightarrow x = ?$

A) $\bar{1}$ B) $\bar{2}$ C) $\bar{3}$ D) $\bar{4}$ E) $\bar{6}$

12. $x \in Z^-$

$5x + 7 \equiv 10 (mod 11)$

$\Rightarrow \max(x) = ?$

A) – 9 B) – 6 C) – 5 D) – 3 E) – 1

13. $x \in Z^+$

$3x + 5 \equiv 1 \pmod{11}$

$\Rightarrow \min(x) = ?$

A) 1 B) 2 C) 3 D) 4 E) 6

14. $x \in Z / 5$

$(\bar{2}x + \bar{3}) \cdot (\bar{4}x + \bar{2}) = 0$

$\Rightarrow$ S.S. = ?

A) $\{\bar{1}, \bar{2}\}$ B) $\{\bar{1}, \bar{3}\}$ C) $\{\bar{1}, \bar{4}\}$
D) $\{\bar{2}, \bar{3}\}$ E) $\{\bar{3}, \bar{4}\}$

15. $x \in Z / 7$

$(\bar{3}x + \bar{1}) \cdot (\bar{5}x + \bar{2}) = 0$

$\Rightarrow$ S.S = ?

A) $\{\bar{0}, \bar{3}\}$ B) $\{\bar{1}, \bar{2}\}$ C) $\{\bar{4}, \bar{5}\}$
D) $\{\bar{1}, \bar{6}\}$ E) $\{\bar{3}, \bar{5}\}$

16. $\beta = \{x \in Z / 5 \mid x^2 \equiv \bar{4}\}$

$\Rightarrow n(\beta) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

1. $Z/9$

$f(x) = \overline{2}x + \overline{6}$

$\Rightarrow f(\overline{2}) = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{7}$

2. $Z/9$

$f(x) = \overline{2}x + \overline{5}$

$\Rightarrow (fof)(\overline{2}) = ?$

A) $\overline{0}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{5}$ E) $\overline{7}$

3. $Z/9$

$f(x) = \overline{4}x + \overline{6}$

$\Rightarrow f^{-1}(x) = ?$

A) $x + \overline{3}$ B) $\overline{7}x + \overline{1}$ C) $\overline{3}x + \overline{2}$

D) $\overline{6}x + \overline{4}$ E) $\overline{7}x + \overline{3}$

4. $Z/5$

$f(x) = \overline{2}x + \overline{4}$

$\Rightarrow f^{-1}(x) = ?$

A) $\overline{2}x + \overline{3}$ B) $x + \overline{1}$ C) $\overline{3}x + \overline{3}$

D) $\overline{3}x + \overline{1}$ E) $\overline{3}x + \overline{2}$

5. $Z/7$

$f(x) = \overline{3}x + \overline{2}$

$\Rightarrow f^{-1}(x) = ?$

A) $\overline{2}x + \overline{5}$ B) $\overline{2}x + \overline{3}$ C) $\overline{5}x + \overline{3}$

D) $\overline{4}x + \overline{6}$ E) $\overline{5}x + \overline{4}$

6. $Z/7$

$f(x) = \overline{2}x + \overline{5}$

$\Rightarrow f^{-1}(\overline{3}) = ?$

A) $\overline{6}$ B) $\overline{5}$ C) $\overline{4}$ D) $\overline{2}$ E) $\overline{1}$

7. $Z/5$

$f(x) = \overline{3}x + \overline{2}$

$(fog)(x) = \overline{2}x + \overline{3}$

$\Rightarrow g(x) = ?$

A) $x + \overline{4}$ B) $\overline{2}x + \overline{3}$ C) $\overline{3}x + \overline{2}$

D) $\overline{4}x + \overline{2}$ E) $\overline{2}x + \overline{4}$

8. $Z/7$

$f(x) = \overline{2}x + \overline{3}$

$(fog)(x) = \overline{3}x + \overline{1}$

$\Rightarrow g^{-1}(\overline{4}) = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{4}$ E) $\overline{6}$

9. $x \in Z/5$

$a \equiv 3 \pmod 5$

$b \equiv 2 \pmod 5$

$a^2 + b^3 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

10. $x \in Z/5$

$a \equiv 3 \pmod 5$

$b \equiv 2 \pmod 5$

$a^2 - b^4 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{4}$ B) $\overline{3}$ C) $\overline{2}$ D) $\overline{1}$ E) $\overline{0}$

11. $x \in Z/5$

$a \equiv 2 \pmod 5$

$b \equiv 4 \pmod 5$

$a^3 + 3a^2b + 3ab^2 + b^3 \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

12. $x \in Z/6$

$x \equiv 4 \pmod 6$

$\Rightarrow x^{108} \equiv ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

13. $x \in Z/11$

$x = \frac{8}{7} \Rightarrow x = ?$

A) $\overline{9}$ B) $\overline{8}$ C) $\overline{7}$ D) $\overline{5}$ E) $\overline{2}$

14. $x \in Z/13$

$x = \left(\frac{7}{5}\right)^{-1}$

$\Rightarrow x = ?$

A) $\overline{5}$ B) $\overline{8}$ C) $\overline{10}$ D) $\overline{11}$ E) $\overline{12}$

15. $Z/5$

$\left(\frac{1}{4}\right)^{-65} \equiv x \pmod 5$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{2}$ D) $\overline{3}$ E) $\overline{4}$

16. $x \in Z/7$

$\left(\frac{2}{3}\right)^{-37} + 72^{37} \equiv x \pmod 7$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{3}$ D) $\overline{5}$ E) $\overline{6}$

1. $\beta: \{x \in Z/6 \mid x^2 = \overline{4}\}$

$\Rightarrow n(\beta) = ?$

A) 0 B) 1 C) 2 D) 3 E) 4

2. $x \in Z/10$

$2^{100} \equiv x \pmod{10}$

$\Rightarrow x = ?$

A) $\overline{8}$ B) $\overline{6}$ C) $\overline{4}$ D) $\overline{2}$ E) $\overline{0}$

3. $x \in Z/11$

$5^{92} \equiv x \pmod{11}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{7}$ E) $\overline{9}$

4. $x \in Z^+$

$100^{203} \equiv x \pmod{45}$

$\Rightarrow \min(x) = ?$

A) 0 B) 5 C) 10 D) 15 E) 25

5. $x \in Z/6$

$(313)^{51} \cdot (4256)^{4251} \equiv x \pmod{6}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

6. $(2009)^{2010} \equiv x \pmod{2010}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{9}$ D) $\overline{10}$ E) $\overline{2009}$

7. $x \in Z/5$

$(1253)^{42} + (5417)^{314} \equiv x \pmod{5}$

$\Rightarrow x = ?$

A) $\overline{1}$ B) $\overline{2}$ C) $\overline{3}$ D) $\overline{4}$ E) $\overline{5}$

8. $x \in Z/15$

$(33)^{402} + (92)^{75} \equiv x \pmod{15}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{2}$ C) $\overline{8}$ D) $\overline{9}$ E) $\overline{13}$

9. $\beta = \{x \in Z^+ \mid 43 \equiv x \pmod{10} \quad x < 200\}$

$\Rightarrow n(\beta) = ?$

A) 18 B) 19 C) 20 D) 21 E) 22

10. $\beta = \{x \in Z^+ \mid 123 \equiv 3 \pmod{x} \quad x > 1\}$

$\Rightarrow n(\beta) = ?$

A) 13 B) 14 C) 15 D) 16 E) 20

11. $\beta = \{x \in Z^+ \mid 307 \equiv 7 \pmod{x} \quad x > 1\}$

$\Rightarrow n(\beta) = ?$

A) 12 B) 17 C) 18 D) 24 E) 27

12.

A	3
–	
2	

A	5
–	
3	

A	15
–	
x	

$\Rightarrow x = ?$

A) 1 B) 5 C) 6 D) 7 E) 8

13.

A	12
–	
6	

A	18
–	
12	

A	36
–	
x	

$\Rightarrow x = ?$

A) 6 B) 12 C) 24 D) 30 E) 32

14. $x \in Z / m$

$x \equiv a \pmod{m}$

$x^2 \equiv b \pmod{m}$

$x^3 \equiv c \pmod{m}$

$x^4 \equiv d \pmod{m}$

$x^5 \equiv e \pmod{m}$

$x^6 \equiv a \pmod{m}$

$\Rightarrow x^{2012} = ?$

A) $\overline{a}$ B) $\overline{b}$ C) $\overline{c}$ D) $\overline{d}$ E) $\overline{e}$

15. $x \in Z / 13$

$1^{17} + 2^{17} + 3^{17} + \ldots + 11^{17} + 12^{17} \equiv x \pmod{13}$

$\Rightarrow x = ?$

A) $\overline{0}$ B) $\overline{1}$ C) $\overline{6}$ D) $\overline{11}$ E) $\overline{12}$

16. $a \in Z / 9$

$\underbrace{55555\ldots\ldots5}_{\text{43 basamaklı}} \equiv x \pmod{9}$

43 digits

$\underbrace{77777\ldots\ldots7}_{\text{30 basamaklı}} \equiv y \pmod{9}$

30 digits

$x^2 - y \equiv a \pmod{9}$

$\Rightarrow a = ?$

A) $\overline{5}$ B) $\overline{6}$ C) $\overline{7}$ D) $\overline{8}$ E) $\overline{0}$

MODÜLER ARİTMETİK
Yanıt Anahtarı

MODULAR ARITHMETIC
Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	C	B	B	B	A	D	D	A	C	B	A	D	E	C

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	A	E	C	C	C	E	B	D	C	D	C	A	E	D	B

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	E	D	B	E	B	A	B	D	B	A	D	B	B	A	D

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	B	D	B	D	C	C	E	D	A	C	A	E	A	D	A

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	C	B	A	A	A	C	B	E	A	E	C	E	B	C

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	A	E	D	D	E	C	B	D	A	C	B	E	A	B	C

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	E	C	E	A	D	B	C	B	B	E	A	C	E	A

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	B	C	C	B	B	C	B	C	C	B	E	D	B	A	C

PROBLEMLER
PROBLEMS

Sayı Problemleri (Number Problems)

ÖZELLİK|Property 1

Bir problemi çözebilmek için, problemde verilen bilinmeyenleri ifade eden değişkenler kullanılarak, bilinmeyenler arasında matematiksel bir bağıntı oluşturulur. Bu bağıntıya denklem denir.

In order to solve a problem, a mathematical relation among the unknows is formed by using the variables which represent the unknows given in the problem. This relation is called an equation.

8 sayısının *(of number 8)*

- 4 fazlası
  4 more than _____
- 14 eksiği
  4 less than _____
- 3 katı
  3 times _____
- 2 katının 3 eksiği
  3 less than 2 times _____
- 5 eksiğinin 5 katı
  5 times 5 less than _____
- Yarısının 4 fazlası
  4 more of half of _____
- 7 eksiğinin yarısı
  the half of 7 less than _____
- 2 eksiğinin $\frac{2}{3}$ ü
  2/3 of 2 less than _____
- 5 eksiğinin küpü
  the cube of 5 less than _____
- 2 fazlasının karesinin yarısı
  the half of square of 2 more than _____

11 sayısının *(of number 11)*

- 11 fazlası
  11 more than _____
- 5 eksiği
  5 less than _____
- 4 katı
  4 times _____
- $\frac{6}{11}$ i
  6/11 of _____
- 2 katının 6 eksiği
  6 less than 2 times _____
- 2 eksiğinin 3 katı
  3 times 2 less than _____
- 6 fazlasının $\frac{4}{5}$ i
  4/5 of 6 more than _____
- $\frac{2}{22}$ sinin 1 fazlası
  1 more than 2/22 of _____
- Karesi
  the square of _____
- 9 fazlasının küpü
  the cube of 9 more than _____

Sayı Problemleri (Number Problems)

Aşağıdaki ifadelerden denklem oluşturunuz.

Form an equation from the expressions below.

1. Bir sayının 3 eksiği

3 less than a number

$x - 3$

2. Bir sayının 6 fazlası

6 more than a number

$x + 6$

3. Bir sayının 4 katı

4 times a number

$4x$

4. Bir sayının 2 katının 4 eksiği

4 less than 2 times a number

$2x - 4$

5. Bir sayının 3 katının 5 fazlası

5 more than 3 times a number

$3x + 5$

6. Bir sayının 4 eksiğinin 3 katı

3 times 4 less than a number

$(x - 4) \cdot 3$

7. Bir sayının 6 fazlasının 2 katı

2 times 6 more than a number

$(x + 6) \cdot 2$

8. Bir sayının yarısı

Half of a number

$\frac{x}{2}$

9. Bir sayının $\frac{3}{5}$'i

3/5 of a number

$\frac{3x}{5}$

10. Bir sayının 6 fazlasının yarısı

Half of 6 more than a number

$\frac{x+6}{2}$

11. Bir sayının yarısının 6 fazlası

6 more than half of a number

$\frac{x}{2} + 6$

12. Bir sayının $\frac{2}{7}$'sinin 2 fazlası

2 more than 2/7 of a number

$\frac{2x}{7} + 2$

13. Bir sayının 3 katının 2 eksiğinin $\frac{1}{4}$'ü

1/4 of 2 less than 3 times a number

$\frac{3x-2}{4}$

14. Bir sayının 3 katının karesi

Square of 3 times a number

$(3x)^2$

15. Bir sayının 3 katının 4 eksiğinin karesi

Square of 4 less than 3 times a number

$(3x - 4)^2$

16. Bir sayının karesinin 2 katının 2 fazlası

2 more than 2 times the square of a number

$2x^2 + 2$

Sayı Problemleri (Number Problems)

ÖZELLİK|Property 2

Denklem oluştururken mümkün olduğunca az değişken kullanılır. İki değişken varsa biri diğeri türünden yazılır.

The least possible number of variables is used when creating equations. If there are two variables, one of them is written in terms of the other.

1. Herhangi iki sayıdan biri diğerinin 2 katının 3 fazlasına eşit ise

If one of any two numbers is equal to 3 more than twice the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	2x + 3

2. İki sayıdan biri diğerinin 3 katının yarısına eşit ise

If one of two numbers is equal to half of 3 times the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	$\frac{3x}{2}$

3. İki sayıdan biri diğerinin 2 katının 4 eksiğine eşit ise

If one of two numbers is equal to 4 less than twice the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	2x – 4

4. İki sayıdan biri diğerinin yarısının 1 fazlasına eşit ise

If one of two numbers is equal to 1 more than half of the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	$\frac{x}{2} + 1$

5. İki sayıdan biri diğerinin 4 fazlasının 2 katına eşit ise

If one of two numbers is equal to 2 times 4 more than the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	2 · (x + 4)

6. İki sayıdan biri diğerinin 3 eksiğinin 2 katına eşit ise

If one of two numbers is equal to 2 times 3 less than the first number.

1. sayı *1st number*	2. sayı *2nd number*
x	2 · (x – 3)

7. İki sayının toplamı 6 ise

If sum of two numbers is equal to 6.

1. sayı *1st number*	2. sayı *2nd number*
x	6 – x

8. İki sayının farkı 4 ise

If the difference of two numbers is 4.

1. sayı *1st number*	2. sayı *2nd number*
x	x + 4

9. İki sayının kareleri farkı 6 ise

If the difference of squares of two numbers is 6.

1. sayı *1st number*	2. sayı *2nd number*
x	$\sqrt{x^2 - 6}$

Sayı Problemleri (Number Problems)

ÖZELLİK|Property 3

Problemin denklemi oluşturulduktan sonra denklemin çözümü yapılarak çözüm elde edilir.

After the equation of the problem is formed, the equation is solved and the solution is obtained.

1. 2 katının 1 eksiği 9 olan sayı kaçtır?

If 1 less than 2 times a number is 9, what is the number?

5

2. 3 katının 2 eksiği 10 olan sayı kaçtır?

If 2 less than 3 times a number is 10, what is the number?

4

3. Bir sayının yarısının 4 eksiği 12 ise bu sayı kaçtır?

If 4 less than half of a number is 12, what is the number?

32

4. Bir sayının 3 fazlasının yarısı 4 ise bu sayı kaçtır?

If half of 3 more than a number is 4, what is the number?

5

5. Hangi sayının $\frac{2}{3}$'ünün 4 eksiği 10'dur?

4 less than 2/3 of which number is 10?

21

6. Hangi sayının 2 katının 3 eksiği, aynı sayının 1 fazlasına eşittir?

3 less than 2 times of which number is equal to 1 more than the same number?

4

7. Hangi sayının 4 fazlasının 3 katı, aynı sayının yarısına eşittir?

3 times 4 more than which number is equal half of the same number?

$-\frac{24}{5}$

8. Hangi sayının $\frac{1}{3}$'ünün 2 fazlasının 3 katı, aynı sayının 2 katına eşittir?

3 times 2 more than 1/3 of which number, is equal to 2 times the same number?

6

9. Hangi sayının $\frac{2}{3}$'ünün 2 fazlasının yarısı 5'tir?

2 more than 2/3 of which number is 5?

12

10. Hangi sayının yarısının 3 eksiği, aynı sayının 6 fazlasının $\frac{1}{3}$'üne eşittir?

3 less of as half of which a number is equal to 6 more than 1/3 of the same number?

30

11. Hangi sayının 4 eksiğinin karesi, aynı sayının 2 fazlasının karesine eşittir?

4 less than a square of which number is equal to the 2 more than a square of the same number?

1

Sayı Problemleri (Number Problems)

ÖZELLİK|Property 4

Bir problemde 1 bilinmeyen varsa 1 denklem, 2 bilinmeyen varsa 2 denklem yazılıp çözülmelidir.

Bir problemde 1 bilinmeyen varsa 1 denklem, 2 bilinmeyen varsa 2 denklem yazılıp çözülmelidir.

1. 7 katı ile 3 katının farkı 480 olan sayı kaçtır?

If the difference of 7 times a number and 3 times the same number is 480, the what is this number?

120

2. Bir sayının 4 eksiğinin $\frac{1}{4}$'ü, aynı sayının 4 eksiğine eşittir. Bu sayı kaçtır?

1/4 of 4 less than a number is equal to 4 less than the same number. What is this number?

4

3. Toplamları 42 olan iki sayıdan birinin 3 katı, diğerinin 4 katına eşittir. Buna göre bu sayılardan küçük olanı kaçtır?

The sum of the number is 42. 3 times one of the numbers is equal to 4 times the other number. According to this, what is the smaller number?

18

4. Toplamları 12, farkları 2 olan iki doğal sayının çarpımı kaçtır?

The sum of two natural numbers is 12 and the difference of them is 2. What is the product of these two natural numbers?

35

5. Ardışık 3 tek tamsayının toplamı 81'dir. Buna göre en büyük sayı kaçtır?

The sum of 3 odd consecutive integers in 81. Then, what is the biggest number?

29

6. Toplamları 46 olan üç sayıdan birincisi, ikinci sayının 3 katı, üçüncü sayının 5 katıdır. Buna göre bu sayıların en küçüğü kaçtır?

Form 3 numbers whose sum is 46, the first number is 3 times the second number and 5 times the third number. What is the smallest number?

6

7. 1 defterin fiyatı, 1 kalemin fiyatının 2 katından 5 lira eksiktir. Ayşegül 1 defter ve 1 kalem için toplamda 40 lira ödemiştir. Buna göre 1 kalemin fiyatı kaç liradır?

The price of one notebook is 5 less than 2 times one pencil's price. Ayşegül has paid 40 TL in total for one notebook and one pencil. According to this, how much does one pencil cost?

15

Sayı Problemleri (Number Problems)

8. Bir sınıftaki toplam öğrenci sayısı, kız öğrenci sayısının 6 katıdır. Sınıfta toplam 49 öğrenci olduğuna göre erkek öğrencilerin sayısı kaçtır?

In a class, the number of students is 6 times the number of female students. There are 49 students in the class. How many male students are there in the class?

42

9. Bir salonda 12 erkek ve 5 kadın vardır. Bu salona kaç evli çift gelirse erkek sayısı, kadın sayısının 2 katı olur?

There are 12 men 5 women in a half. How many married couples should attend the hall in order for the number of men to become 2 times the numbers of women?

2

10. Ayça ile Ceren'in paraları toplamı 170 liradır. Ayça'nın parası, Ceren'in parasının 4 katıdır. Buna göre Ceren'in kaç lirası vardır?

The sum of Ayça and Ceren's money is 170 TL. Ayça's money is 4 times Ceren's money. Then, how much money does Ceren have?

34

11. 56 kişilik bir sınıftan 5 erkek ve 2 kız öğrenci ayrılınca geriye kalan öğrencilerden erkek öğrencilerin sayısının 4 katı, kız öğrencilerin sayısının 3 katına eşit oluyor. Buna göre başlangıçta sınıfta kaç erkek öğrenci vardır?

When 5 male and 2 female students leave a class having 56 students, 4 times the number of male students becomes equal to 3 times the number of female students. According to this, how many male students were there in the class at the beginning?

26

12. Görkem bir romanı günde 60 sayfa okuyarak 42 günde bitiriyor. Eğer günde 84 sayfa okusaydı bu romanı kaç günde bitirirdi?

Görkem finishes a novel in 42 days by reading 60 pages each day. If he read 84 pages in a day, how many days would it take for him to finish the book?

30

13. Buket'in 230 lirası, Duygu'nun 170 lirası vardır. Buket ile Duygu eşit miktarda para harcadıktan sonra Buket'in kalan parası, Duygu'nun kalan parasının 2 katı oluyor. Buna göre Buket ve Duygu kaç lira harcamışlardır?

Buket has 230 TL and Duygu has 170 TL.After Buket are Duygu spend the same amount of money, the remainder of Buket's money becomes 2 times Duygu's money. Then, how much money have Buket and Duygu spent?

110

Kesir Problemleri (Fraction Problems)

ÖZELLİK|Property 5

Kesir probleminde denklem oluştururken x yerine

- ifadenin $\frac{1}{3}$ ünden bahsediyorsa 3x
- ifadenin $\frac{1}{7}$ sinden bahsediyorsa 7x
- ifadenin $\frac{1}{3}$ ve $\frac{1}{4}$ ünden bahsediyorsa 12x denilerek

daha kolay işlem yapılabilir.

In fraction problems, it is easier to carry out operations by calling the variable x and calling:

- *the variable 3x if it is referring to 1/3 of the expression*
- *the variable 7x if it is referring to 1/7 of the expression*
- *the variable 12x if it is referring to 1/3 and 1/4 of the expression*

1. 177 sayısının $\frac{1}{3}$'ü kaçtır?

What is 1/3 of 177?

59

2. $\frac{2}{7}$'si 50 olan sayı kaçtır?

2/7 of a number is 50. Then, what is this number?

175

3. 100 sayısının $\frac{3}{4}$'ünün $\frac{2}{5}$'i kaçtır?

What is 2/5 of 3/4 of the number 100?

30

4. $\frac{7}{8}$'inin yarısı 21 olan sayı kaçtır?

The half of 7/8 of a number is 21. Then, what is this number?

48

5. $\frac{17}{18}$'i 51 olan sayının $\frac{4}{9}$'u kaçtır?

17/18 of a number is 51. Then, what is 4/9 of this number?

24

6. Bir sayının $\frac{1}{4}$'ü ile $\frac{4}{7}$'sinin toplamı 46 olduğuna göre bu sayı kaçtır?

The sum of 1/4 of a number and 4/7 of the same number is 46. Then, what is this number?

56

7. Bir kesrin değeri $\frac{3}{5}$'tir. Bu kesrin payından 2 çıkarılır, paydasına 3 eklenirse kesrin değeri $\frac{1}{2}$ oluyor. Buna göre başlangıçtaki kesrin paydası kaçtır?

The value of a fraction is 3/5 when 2 is substracted from the numerator and 3 is added to the denominator, the value of the fraction becomes 1/2. Then, what was the denominator at the beginning?

35

8. Deniz parasının $\frac{3}{5}$'i ile tanesi 4 TL'lik kalemlerden 6 tane alıyor. Buna göre Deniz'in başlangıçta kaç TL'si vardı?

Deniz buys 6 pencils every one of which cost 4 TL with 3/5 of her money. Then, how much money did she have at the beginning?

40

9. Bir okuldaki öğrencilerin $\frac{4}{7}$'si kız, kalanları erkektir. Bu okulda 64 kız öğrenci olduğuna göre erkek öğrenci sayısı kaçtır?

In a school, 4/7 of the students is females and the rest is males. There are 64 female students in this school. Then, how mony male students are there?

48

Kesir Problemleri (Fraction Problems)

10. Efe 300 TL'sinin önce $\frac{2}{3}$'ünü, daha sonra kalan parasının $\frac{3}{4}$'ünü harcıyor. Buna göre Efe'nin son durumda kaç TL'si kalmıştır?

Efe spends 2/3 of 300 TL and then spends 3/4 of the remainder. Then, how much money does he have left?

25

11. Ayşe parasının $\frac{4}{9}$'u ile alışveriş yapmış ve kalan parasının $\frac{1}{4}$'ünü de kuaförde harcamıştır. Geriye 150 TL parası kaldığına göre, Ayşe'nin başlangıçtaki parası kaç TL'dir?

Ayşe has done shopping with 4/9 of her money and spent 1/4 of the remainder at the hairdresser. If she has 150 TL left, how much money did Ayşe have at the beginning?

360

12. Ali maaşının $\frac{2}{3}$'ünü markete, kalanının $\frac{3}{4}$'ünü ev kirasına, kalanın $\frac{1}{3}$'ünü faturalara ve kalanın $\frac{1}{4}$'ünü de oğluna harçlık veriyor. Geriye 300 TL kaldığına göre, ev kirasına kaç TL ödemiştir?

Mr. Ali spends 2/3 of his money at the market, 3/4 of the remainder as to his house's rent, 1/3 of the remainder to pay the bills, and he gives 1/4 of the remainder to his son as pocket money. If he has 300 TL left, how much did he pay for the rent?

1800

13. Bir havuzun $\frac{3}{7}$'si boştur. Havuzdan 40 litre su alınınca havuzun $\frac{1}{2}$'si boş kalıyor. Buna göre, havuzun tamamı kaç litre su ile dolar?

3/7 of a pool is empty. When 40 liters of water is taken from the pool its 2/4 remains empty. According to this how many liters of water would it take to completely fill the pool?

560

14. Bir kamyonun benzin deposunun $\frac{1}{5}$'i doludur. Depoya 55 litre daha benzin ilave edildiğinde deponun $\frac{3}{4}$'ü dolduğuna göre, bu kamyonun deposu kaç litre benzin alır?

1/5 of the fuel tank of a truck is full. If when 55 liters of fuel is added to the tank, 3/4 of the tank is filled, how many liters of fuel can the tank hold?

100

15. Mehmet elindeki cevizleri 5 arkadaşına paylaştırıyor. 1. arkadaşına tüm cevizlerin $\frac{1}{4}$'ünü, geriye kalan 4 arkadaşına da kalan cevizleri eşit şekilde paylaştırıyor. Buna göre, 1. arkadaş diğerlerinin her birinden kaç kat fazla ceviz almıştır?

Mehmet divides his walnuts among his 5 friends. He gives 1/4 of all walnuts to his first friend and then divides the remaining walnuts equally among his other 4 friends. According to this, how many times more the first friend receives from each of the others?

$\frac{4}{3}$

16. Atilla gideceği yolun $\frac{2}{5}$'ini arabayla, $\frac{1}{3}$'ünü koşarak alıyor. Sonra 300 m daha yürüyünce yolun $\frac{4}{5}$'ini almış oluyor. Buna göre, yolun tamamı kaç km'dir?

Atilla completes 2/5 of the distance he must travel by car, and runs 1/3 of it. Afterwards when he walks 300 m more he has completed 4/5 of the distance. According to this, what is the total distance he has to complete?

4,5

17. Kütüphanedeki kitapların $\frac{5}{8}$'i matematik kitabıdır. Kütüphaneye 22 matematik kitabı daha ilave edilince kitapların $\frac{7}{11}$'i matematik kitabı oluyor. Son durumda Kütüphanedeki kitap sayısı kaçtır?

5/8 of the books in the Library are mathematics books. When 22 more mathematics books are added to the library, 7/11 of the books become mathematics books. At the end how many books are there in the Library?

726

Yaş Problemleri (Age Problems)

ÖZELLİK|Property 6

Bugün x yaşında olan bir kişi

- t yıl sonra x + t
- t yıl önce x – t yaşındadır.

Someone who is x age old today

- *is x + t years old after t years*
- *was x – t years old t years ago*

1. Ahmet 40 yaşındayken Kemal 10 yaşındadır. Kaç yıl sonra Ahmet'in yaşı, Kemal'in yaşının 2 katı olur?

Kemal is 10 years old when Ahmet is 40 years old. How many years later will Ahmet's age be twice Kemal's age?

20

2. Ayşe 10 yaşındayken Suat'ın doğmasına 6 yıl vardı. Kaç yıl sonra Ayşe'nin yaşı, Suat'ın yaşının 3 katı olur?

When Ayşe was 10 years old, Suat had 6 years to be born. How many years later will Ayşe's age be three times Suat's age?

14

3. Murat 42, Can 36 yaşındadır. Kaç yıl sonra yaşları toplamı, yaşları farkının 14 katı olur?

Murat is 42 years old and Can is 36 years old. How many years later will the sum of their ages be 14 times the difference between their ages?

3

4. Ayşe ile Duygu'nun yaşları tamsayıdır. Ayşe ile Duygu'nun yaşları çarpımı 13 olduğuna göre, yaşları farkı kaçtır?

Ayşe and Duygu's ages are integers. If the multiplication of Ayşe and Duygu's ages is 13, what is the difference between their ages?

12

5. Serkan'ın yaşının, Atilla'nın yaşına oranı $\frac{2}{3}$'tür. 3 yıl sonra bu oran $\frac{5}{7}$ olduğuna göre, ikisinin bugünkü yaşları toplamı kaçtır?

The ratio of Serkan's age to Atilla's age is 2/3. If 3 years later this ratio becomes 5/7, what is the sum of their ages today?

30

ÖZELLİK|Property 7

- İki kişinin yaşları farkı hiçbir zaman değişmez.
- İki kişinin yaşları oranı, yaşları değiştikçe değişir.

- *The difference between two people's ages never change.*
- *The ratio of two people's ages change as their ages change.*

1. Sıla bugün 32 yaşındadır. Oya, Sıla'nın yaşına geldiğinde Sıla 40 yaşında olacağına göre, Oya kaç yaşındadır?

Sıla is 32 years old today. If Sıla will be 40 years old when Oya reaches Sıla's age, what is Oya's age today?

24

2. İki kardeşin yaşları farkı 4'tür. Büyük kardeş, küçük kardeşin yaşında iken büyük kardeşin yaşı, küçük kardeşin yaşının 3 katıydı. Buna göre kardeşlerin bugünkü yaşları toplamı kaçtır?

The age difference between two siblings is 4. When the older sibling was at the current age of the younger sibling, the age of the older sibling was three times the age of the younger sibling. According to this what is the sum of the siblings' current ages?

16

3. İki kardeşin yaşları toplamı 30'dur. Küçük kardeş, büyük kardeşin yaşına geldiğinde, büyük kardeş 24 yaşında olacağına göre, küçük kardeşin bugünkü yaşı kaçtır?

The sum of two siblings' ages is 30. If when the younger sibling reaches the age of the older sibling the older sibling will be 24 years old, how old is the younger sibling today?

12

4. Bir annenin yaşı, oğlunun yaşının 4 katıydı. Oğlu, annesinin yaşına geldiğinde yaşları toplamı 88 olduğuna göre, oğlunun bugünkü yaşı kaçtır?

The age of a mother was 4 times the age of her son. When the son reaches his mother's age the sum of their ages becomes 88, how old is the son today?

8

5. Kazım ile Hatice'nin yaşları toplamı 48'dir. Hatice, Kazım'ın yaşına geldiğinde yaşları toplamı 56 olduğuna göre, Hatice ile Kazım'ın yaşları farkı kaçtır?

The sum of Kazım and Hatice's ages is 48. If when Hatice reaches Kazım's age the sum of their ages becomes 56, what is the difference between their ages today?

4

Yaş Problemleri (Age Problems)

ÖZELLİK|Property 8

Bugün yaşları toplamı x olan n kişinin yaşları toplamı;

- t yıl sonra $x + t \cdot n$
- t yıl önce $x - t \cdot n$ dir.

If the sum of the ages of n people is x today;

- *t years later the sum of their ages will be* $x + t \cdot n$
- *t years ago the sum of their ages was* $x - t \cdot n$

1. Batır ile Itır'ın yaşları toplamı 18'dir. 4 yıl sonra Batır ile Itır'ın yaşları toplamı kaç olur?

The sum of Batır and Itır's ages is 18. What will be the sum of their ages in 4 years?

26

2. Bir babanın iki çocuğunun yaşları toplamı 20'dir. 2 yıl sonra babanın yaşı, iki çocuğunun yaşları toplamının 2 katı olacağına göre, babanın bugünkü yaşı kaçtır?

The sum of the ages of the two children of a father is 20. If in 2 years the father's age will be 2 times the sum of the children's ages, how old is the father today?

46

3. Baba ile iki yıl arayla doğmuş iki çocuğunun yaşları toplamı 34'tür. 2 yıl sonra çocukların yaşları toplamının, babanın yaşına oranı $\frac{1}{4}$ olduğuna göre, babanın bugünkü yaşı kaçtır?

The sum of the ages of a father and his two children which were born 2 years apart is 34. If in 2 years the ratio of the sum of the children's ages to the age of the father will be 1/4, how old is the father today?

30

4. 40 yaşında olan babanın 2 yıl sonra 2 çocuğunun yaşları toplamına oranı $\frac{7}{6}$ olduğuna göre, çocukların yaşları toplamı kaçtır?

If the ratio of a 40 year old father's age to the sum of the ages of his 2 children will be 7/6 in two years, what is the sum of his children's ages today?

32

5. 40 yaşında olan bir babanın iki çocuğunun yaşları toplamı 14'tür. Kaç yıl sonra babanın yaşının 3 fazlası, çocukların yaşları toplamının 2 katı olur?

The sum of the ages of the two children of a 40 year old father is 14. How many years later will 3 more than the father's age be equal to twice the sum of the children's ages?

5

ÖZELLİK|Property 9

Bugün x yaşında olan bir kişi;

- t yıl önce doğmuş olsaydı $x + t$
- t yıl sonra doğmuş olsaydı $x - t$ yaşında olurdu.

A person who is x years old today would be;

- $x + t$ *years old if he were born t years earlier.*
- $x - t$ *years old if he were born t years later.*

1. Baba 3 yıl önce, oğlu 4 yıl sonra doğmuş olsaydı yaşları farkı 28 olacaktı. Buna göre, bugünkü yaşları farkı kaçtır?

If the father had been born 3 years earlier and his child had been born 4 years later, the difference between their ages would be 28. According to this, what is the difference between their ages today?

21

2. Taner 3 yıl önce, kardeşi Ahmet 2 yıl sonra doğmuş olsaydı Taner'in yaşı, Ahmet'in yaşının 6 katı olacaktı. Taner ile Ahmet'in bugünkü yaşları toplamı 34 olduğuna göre, Taner'in yaşı kaçtır?

If Taner had been born 3 years earlier and his brother Ahmet had been born 2 years later Taner's age would be twice Ahmet's age. If the sum of Taner and Ahmet's current ages is 34, how old is Taner?

27

3. Annenin iki kızının yaşları toplamı 17'dir. Kızları 2 yıl önce doğmuş olsaydı annenin yaşı kızlarının yaşları toplamının iki katı olacaktı. Buna göre, annenin bugünkü yaşı kaçtır?

The sum of the ages of the two daughters of a mother is 17. If her daughters had been born 2 years earlier the mother's age would be twice the sum of the daughters' ages. According to this how old is the mother today?

42

4. Bir anne ile ikiz çocuklarının yaşları toplamı 44'tür. İkizlerden biri 3 yıl önce, diğeri 2 yıl sonra doğmuş olsaydı, çocukların yaşları toplamı, annenin yaşının yarısı olacaktı. Buna göre, annenin bugünkü yaşı kaçtır?

The sum of the twin children of a mother is 44. If one of the twins had been born 2 years earlier and the other 3 years later, the sum of their ages would be half the mother's age. According to this how old is the mother today?

30

5. İki kardeşin büyük olanı 4 yıl önce, küçük olanı 3 yıl sonra doğsaydı büyük kardeşin yaşı, küçük kardeşin yaşının iki katı olacaktı. İki kardeşin yaşları toplamı 29 olduğuna göre, küçük kardeşin yaşı kaçtır?

If the older of two siblings had been born 4 years earlier and the younger 3 years later, the age of the older sibling would be twice the age of the younger sibling. If the sum of the two sibling's ages is 29, how old is the younger sibling?

13

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 10

x = Yol *(Distance)*
V = Hız *(Velocity)*
t = Zaman *(Time)*

$x = V \cdot t$ $\quad V = \frac{x}{t}$ $\quad t = \frac{x}{V}$

1. Hızı 70 km/s olan bir araç 3 saatte kaç km yol alır?

How many kilometers does a car with the velocity of 70 km/h travel in 3 hours?

210

2. 605 km'lik bir yolu 5,5 saatte giden bir aracın hızı kaç km/s'dir?

How many kilometers is the velocity of a car covering 605 km/h of distance in 5.5 hours?

110

3. 240 km'lik bir yolu 3 saatte giden bir aracın hızı kaç km/s'dir?

How many km/h is the velocity of a vehicle which travels a distance of 240 km in 3 hours?

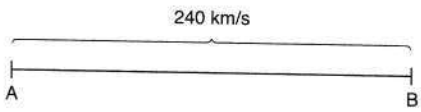
80

4. Sabit 120 km/s hızla hareket eden bir araç, 300 km'lik bir yolu kaç saatte alır?

How many hours would it take for a vehicle traveling with a constant velocity of 120 km/h to travel a distance of 300 km?

2,5

5.



A şehri ile B şehri arası 240 km'dir. Bir araç A'dan B'ye 60 km/s hızla gidip 80 km/s hızla geri dönmüştür. Bu araç toplam kaç saat hareket etmiştir?

The distance between city A and city B is 240 km. A vehicle has travelled from A to B with a velocity of 60 km/h and returned from B to A with a velocity of 80 km/h. How many hours has it travelled in total?

7

6. 60 km/s hızla hareket eden bir araç 8 saatte toplam kaç km yol alır?

How many km of distance would a vehicle traveling with a velocity of 60 km/h complete in 8 hours?

480

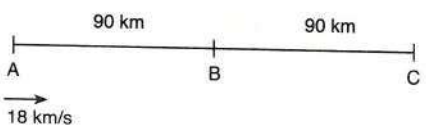
7.

Bir araç 200 km'lik bir yolu sabit hızla 8 saatte gidiyor. Buna göre, bu araç saatteki hızını 25 km artırırsa aynı yolu kaç saatte gider?

A vehicle with a stable velocity can travel a distance of 200 km in 8 hours. If it increases its velocity by 25 km, how many hours does it take for the vehicle to cover the same distance?

4

8.



Hızı 18 km/s olan bir araç A'dan B'ye yol alıyor. B'den C'ye giderken ise hızını yarıya düşürüyor. Bu araç A'dan C'ye kaç saatte gitmiştir?

A vehicle with the velocity of 18 km/h travels from A to B. It reduces its velocity to half, when travelling from B to C. How many hours did it take for this car to travel from A to C?

15

Hareket Problemleri (Movement Problems)

9. Hızı 120 km/s olan bir araç 20 dakikada kaç km yol alır?

How many kilometers can a vehicle with a velocity of 120 km/h cover in 20 minutes?

40

10. Bir aracın saatte 32 km hızla 5 saatte aldığı bir yolu, saatteki hızı 20 km olan bir başka araç kaç saatte alır?

A vehicle with the velocity of 32 km/h covers a distance in 5 hours. How mony hours would it take for another car with the velocity of 20 km/h to cover the same distance?

8

11. Bir araç 150 km'lik bir yolu sabit hızla 5 saatte gidiyor. Bu araç saatteki hızını 20 km artırırsa aynı yolu kaç saatte gider?

A vehicle with a stable velocity covers a distance of 150 km in 5 hours. If this vehicle increases its velocity by 20 km/h, how many hours will it take to cover the same distance?

3

12. Dakikada 4 km yol alan bir aracın saatteki hızı kaç km'dir?

How many kilometers per hour of a vehicle covering a distance of 4 km per minute?

240

13. 630 km'lik bir yolun bir kısmı bozuktur. Bir aracın normal hızı 90 km/s, bozuk yoldaki hızı 60 km/s'dir. Yolculuk toplam 8 saat sürdüğüne göre, bu yolun bozuk kısmı kaç km'dir?

A section of a 630 km road is rough. A vehicle's normal velocity is 90 km/h and its velocity on the rough section of the road is 60 km/h. If the total trip has taken 8 hours, how many km is the rough section of the road?

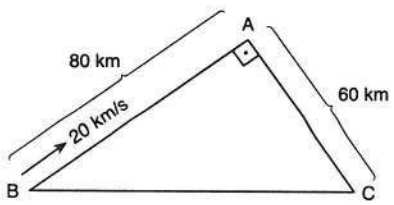
180

14. 800 km'lik bir yolu V km/s hızla giden bir araç hızını yarıya düşürerek geri dönüyor ve yolculuğunu 12 saatte tamamlıyor. Buna göre aracın ilk hızı kaç km/s'dir?

A vehicle which travels a distance of 800 km with a velocity of V km/h returns by reducing its velocity of half and completes its travel in 12 hours. According to this what is the initial velocity of this vehicle?

200

15.



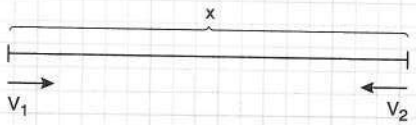
B noktasından hareket edip aynı noktaya dönen araç bu yolculuğu kaç saatte tamamlar?

How many hours would it take for a vehicle which starts travelling from the point B and returns to the same point again?

12

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 11



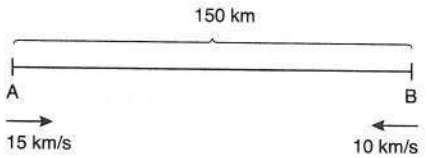
Aralarında x birim uzaklık bulunan iki araç birbirlerine doğru V_1 ve V_2 hızlarıyla aynı anda hareket etsinler. Bu iki aracın karşılaşma süresi t ile ifade edilirse;

$t = \frac{x}{V_1 + V_2}$ dir.

Let two vehicles which are x units apart from each other travel towards each other with a velocity of V_1 and V_2, respectively. If the time elapsed until they meet is represented by t;

then $t = \frac{x}{V_1 + V_2}$

1.



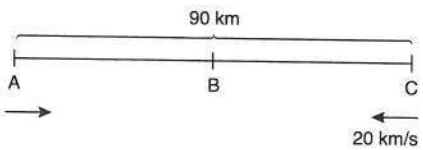
|AB| = 150 km

A ve B'den aynı anda birbirlerine doğru hareket eden bu iki araç kaç saat sonra karşılaşır?

These two vehicles take of from points A and B toward each other simultaneously. How many hours later to these two vehicles meet?

6

2.



|AC| = 90 km

A ve C'den aynı anda birbirlerine doğru hareket eden 2 araç B noktasında karşılaşıyorlar. Buna göre |AB| kaç km'dir?

Two vehicles take off from points A and B toward each other simultaneously and they meet at point B. Then how many kilometers is |AB|?

50

3. A ve B'den, hızları toplamı 60 km/s olan iki araç birbirine doğru aynı anda harekete başladıktan 2,5 saat sonra karşılaşıyorlar. Buna göre |AB| kaç km'dir?

Two vehicles the sum of whose velocities is 60 km/h take off from points A and B toward each other simultaneously. They meet after 2.5 hours. According to this, how many kilometers is |AB|?

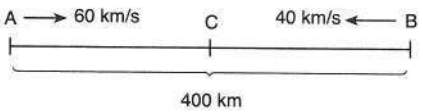
150

4. Aralarındaki mesafe 720 km olan iki araç birbirlerine doğru 70 km/s ve 50 km/s hızlarla hareket ediyor. Kaç saat sonra bu iki araç karşılaşır?

Two vehicles which are 720 km apart start to travel towards each other with a velocity of 70 km/h and 50 km/h, respectively. How many hours would it take for these two vehicles to meet?

6

5.

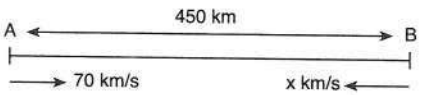


Aralarındaki mesafe 400 km olan A ve B noktalarından 60 km/s ve 40 km/s hızlarla harekete başlayan iki araç C noktasında karşılaşıyorlar. Buna göre A ile C noktaları arasındaki mesafe kaç km'dir?

Two vehicles which take off from point A and point B, which are 400 km apart, with velocities of 60 km/h and 40 km/h, respectively, meet at point C. According to this, what is the distance between point A and point C?

240

6.

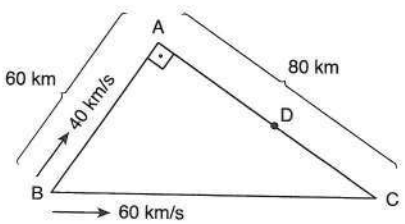


Aralarındaki mesafe 450 km olan iki araç birbirlerine doğru hareket ettiklerinde 3 saat sonra karşılaşıyorlar. A noktasından hareket eden aracın hızı 70 km/s ise B noktasından hareket eden aracın hızı kaç km/s dir?

Two vehicles which are 450 km apart meet 3 hours after they begin to travel towards each other. If the velocity of the vehicle which takes off from point A is 70 km/h, what is the velocity of the vehicle which takes off from point B?

80

7.



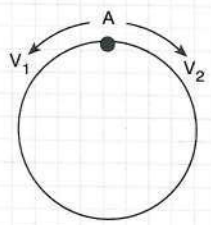
B noktasından aynı anda şekildeki gibi sırasıyla 40 km/s ve 60 km/s hızlarla hareket eden iki araç D noktasında karşılaşıyorlar. Buna göre |DC| kaç km'dir?

Two vehicles moving at 60 km/h and 40 km/h respectively which simultaneously take off from point B as shown in the figure meet at point D. According to this how many km is |DC|?

44

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 12



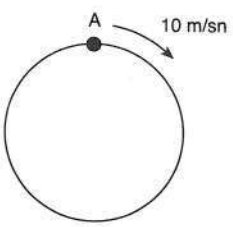
Çevresi x birim olan dairesel bir pistin üzerindeki bir noktadan zıt yönde, aynı anda hareket eden iki hareketlinin karşılaşma süresi t ile ifade edilirse;

$t = \frac{x}{V_1 + V_2}$ dir.

If the time that takes for two mobile objects which simultaneously start to travel in opposite directions, from the same point on a circular track with a circumference of x units is represented by t;

then $t = \frac{x}{V_1 + V_2}$

1.

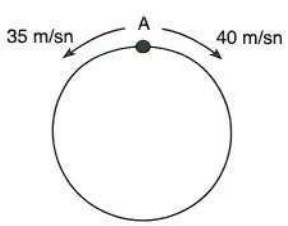


V_A = 10 m/sn olan bir araç dairesel bir pistte 40 sn'de 1 tur atmaktadır. Buna göre, pistin uzunluğu kaç m'dir?

A vehicle with a velocity of 10 m/s takes one tour for every 40 seconds on a circular track. According to this, how many meters is the circular track?

400

2.

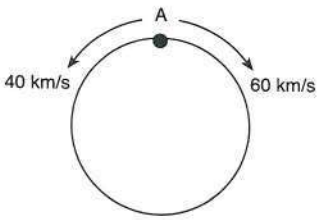


Pistin çevresi 225 m'dir. A noktasından; hızları saniyede 35 m ve 40 m olan iki araç aynı anda, zıt yönde harekete başlıyor. Buna göre, bu iki araç kaç saniye sonra ilk kez karşılaşır?

The circumference of the circular track is 225 meters. Two vehicles with velocities of 35 m/s and 40 m/s respectively take off from point A simultaneously in opposite directions. Then how many minutes does it take for them to meet for the first time?

3

3.

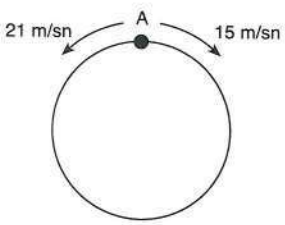


Dairesel bir pistte hızları sırasıyla 40 km/s ve 60 km/s olan iki araç aynı anda A noktasından zıt yönlerde harekete başladıktan 2 saat sonra karşılaştıklarına göre, pistin çevresi kaç km'dir?

If two vehicles, with velocities 40 km/h and 60 km/h respectively, which simultaneously start to travel in opposite directions from point A on a circular track meet 2 hours after they take off, how many km is the circumference of the track?

200

4.

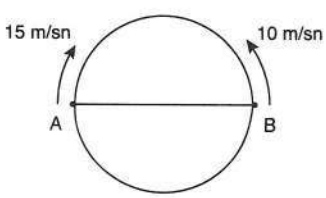


Hızları 21 m/sn ve 15 m/sn olan iki hareketli, çevresi 720 m olan dairesel bir pistte aynı anda, aynı noktadan ve zıt yönde harekete başlıyorlar. Bu iki hareketli ilk kez karşılaştıklarında hızlı olan hareketli kaç m yol almıştır?

Two vehicles with velocities of 21 m/s and 15 m/s take off simultaneously in opposite directions from point A. When these vehicles meet for the firs time, how many meters will the faster vehicle have travelled?

420

5.



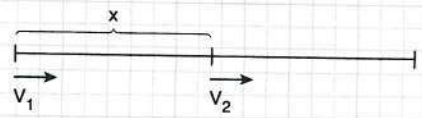
Dairesel bir pistin [AB] çapının iki ucundan 10 m/sn ve 15 m/sn hızları ile birbirine doğru hareket eden iki araba 10 sn sonra karşılaşıyorlar. Buna göre yavaş olan araba pistin tamamını kaç sn'de dolanır?

Two cars with velocities of 10 m/s and 15 m/s respectively take off from each end of [AB] partmeter, toward each other. They meet after 10 seconds. Then, how many seconds does it take for the shower car to complete the whole circular track?

50

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 13



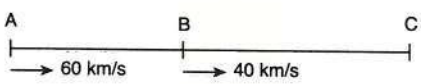
Aralarında x birim uzaklık bulunan iki araç aynı yönde, aynı anda V_1 ve V_2 hızlarıyla hareket etsinler. Bu iki aracın karşılaşma süresi t ile ifade edilirse;

$t = \frac{x}{V_1 - V_2}$ dir. $(V_1 > V_2)$

Let two vehicles which are x units apart be travelling towards the same direction with a velocity of V1 and V2, respectively. If the time that takes for these two vehicles to meet is expressed with t;

then $t = \frac{x}{V_1 - V_2}$ $(V_1 > V_2)$

1.

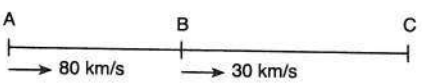


Şekildeki gibi aynı anda A noktasından 60 km/s hızla hareket eden araç B noktasından 40 km/s hızla hareket eden araca 2 saat sonra C noktasında yetişiyor. Buna göre, A ile B noktaları arasındaki mesafe kaç km'dir?

As shown in the figure, a vehicle which takes off from point A with a velocity of 60 km/h catches up with another vehicle which takes off from point B with a velocity of 40 km/s after 2 hours, at point C. According to this, how many km is the distance between points A and B?

40

2.

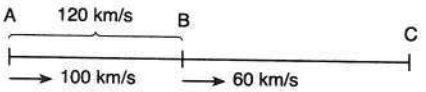


Şekildeki gibi aynı anda A noktasından 80 km/s hızla hareket eden araç B noktasından 30 km/s hızla hareket eden araca 3 saat sonra C noktasında yetişiyor. Buna göre B ile C noktaları arasındaki mesafe kaç km'dir?

As shown in the figure, a vehicle which takes off from point A with a velocity of 80 km/h catches up with another vehicle which takes off from point B with a velocity of 30 km/s after 3 hours, at point C. According to this, how many km is the distance between points B and C?

90

3.

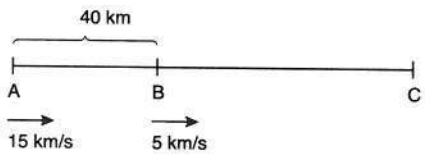


Şekildeki gibi aynı anda A noktasından 100 km/s hızla hareket eden araç B noktasından 60 km/s hızla hareket eden aracı C noktasında yakalıyor. A ile B noktaları arasındaki mesafe 120 km olduğuna göre, |BC| kaç km'dir?

As shown in the figure, a vehicle which takes off from point A with a velocity of 100 km/h catches up with another vehicle which takes off from point B with a velocity of 60 km/s at point C. If the distance between point A and point B is 120 km, how many km is |BC|?

180

4.

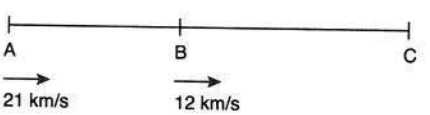


|AB| = 40 km'dir. A'dan ve B'den saatteki hızları sırasıyla 15 km/s ve 5 km/s olan iki araç aynı anda C'ye doğru harekete başlıyor. Buna göre, A'dan hareket eden araç, B'den hareket eden araca kaç saat sonra yetişir?

|AB| is 40 km. Two vehicles with velocity of 15 km/h and 5 km/h respectively start travelling from A and B toward C simultaneously. After how many hours will the vehicle travelling from A catch up with the vehicle travelling from B = ?

4

5.



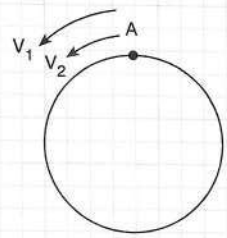
A ve B'den iki araç aynı anda C'ye doğru sırasıyla 21 km/s ve 12 km/s hızla hareket ediyor. İki araç aynı anda C'ye vardığına göre $\frac{|AC|}{|BC|}$ oranı kaçtır?

Two vehicles with velocities of 21 km/h and 12 km/h, respectively, start travelling from A and B toward C, simultaneously. If two vehicles reach point C at the same time. What is $\frac{|AC|}{|BC|} = ?$

$\frac{11}{4}$

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 14



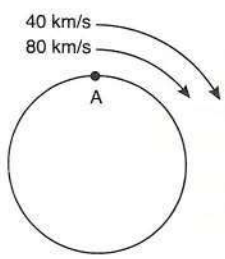
Çevresi x birim olan dairesel bir pistin üzerindeki bir noktadan aynı yönde, aynı anda hareket eden iki hareketlinin karşılaşma süresi t ile ifade edilirse;

$t = \frac{x}{V_1 - V_2}$ dir. $(V_1 > V_2)$

If the time that takes for two mobile objects which simultaneously start to travel in the same direction, from the same point on a circular track with a circumference of x units is represented by t;

then $t = \frac{x}{V_1 - V_2}$ $(V_1 > V_2)$

1.

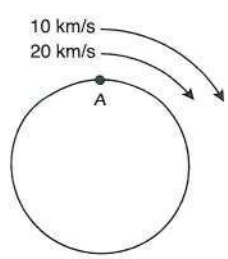


Dairesel pistte A noktasından aynı anda, aynı yönde iki araç 80 km/s ve 40 km/s hızla hareket başlıyor. Çevresi 120 km olan dairede bu iki araç ilk kez kaç saat sonra karşılaşırlar?

On a circular track, two vehicles with velocities of 40 km/h and 80 km/h, respectively, start travelling to same direction at the same time. After how many hours do these two vehicles meet for the first time on this circular track with the circumference of 120 km?

3

2.

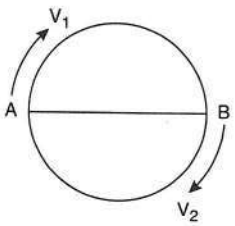


Dairesel pistte A noktasından aynı anda, aynı yönde 10 km/s ve 20 km/s hızla iki araç hareket ediyor. Bu iki araç ilk kez 10 saat sora karşılaştıklarına göre bu dairenin çevresi kaç km'dir?

Two vehicles with velocities of 10 km/h and 20 km/h, respectively, take off from point A simultaneously, to the same direction. If these two vehicles meet for the first time after 10 hours later, how many kilometers is the circumference of the circular track?

100

3.

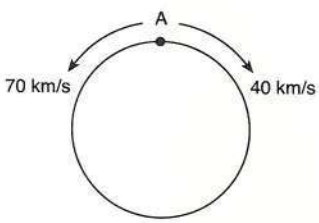


[AB] çaplı dairesel bir pistin çevresi 80 m'dir. Hızları V_1 = 7 m/sn, V_2 = 2 m/sn olan iki araç A ve B noktalarından aynı anda, saat yönünde harekete başlıyorlar. Buna göre, hızlı giden hareketli diğerine kaç saniye sonra yetişir?

The circumference of a circular track with a diameter of |AB| is 80 meters. Two vehicles with velocities of 7 m/sc and 2 m/sc (V_1 = 7 m/sc, V_2 = 2 m/sc) take off clockwise, simultaneously. According to this, after how many seconds does the faster vehicle catch up with the other one?

8

4.

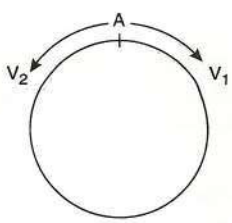


Dairesel pistte A noktasından aynı anda, zıt yönlerde iki araç sırasıyla 70 km/s ve 40 km/s hızlarla harekete başlıyorlar. 3 saat sonra karşılaştıklarına göre aynı yönde hareket etselerdi bu iki araç ilk kez kaç saat sonra karşılaşırdı?

Two vehicles take off simultaneously from the same point A in opposite directions, with a velocity of 70 km/h and 40 km/h respectively on a circular track. If the vehicles meet after 3 hours, how many hours would it take them to meet if they had travelled in the same direction?

11

5.



Hızları oranı $\frac{V_2}{V_1} = \frac{3}{2}$ olan iki araç, çevresi 75 km olan dairesel bir pistte A noktasından aynı anda harekete başladıktan 20 dk sonra karşılaşıyorlar. Buna göre $V_2 - V_1$ kaçtır?

The ratio of the velocities of two vehicles is $\frac{V_2}{V_1} = \frac{3}{2}$ *. After these vehicles take off from point A, simultaneously, on a circular track with the circumference of 75 km, they meet. According to this, what is* $V_2 - V_1$*?*

45

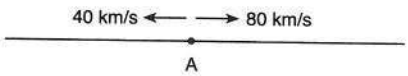
Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 15

Eşit sürede iki aracın hızları oranı, aldıkları yolların oranı ile aynıdır.

The ratio of the velocities of two vehicles is equivalent to the ratio of the distances they travel in equal times.

1.

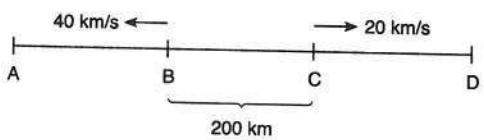


A noktasından aynı anda zıt yönde harekete başlayan iki araç arasındaki mesafe kaç saat sonra 360 km olur?

After how many hours would the distance between two vehicles which take off simultaneously from the same point A in opposite directions become 360 km?

3

2.



|BC| = 200 km

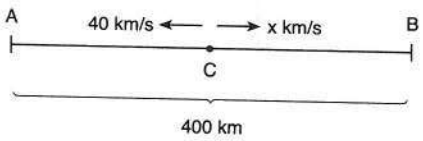
|AD| = 800 km

Aynı anda B ve C noktalarından zıt yönlerde 40 km/s ve 20 km/s hızlarla harekete başlayan araçlar sırasıyla A ve D noktalarına aynı anda ulaşıyorlar. Buna göre, |CD| kaç km'dir?

Two vehicles which take off simultaneously from point B and point C in opposite directions with a velocity of 40 km/h and 20 km/h, reach point A and point D, respectively, at the same time. According to this how many km is |CD|?

200

3.

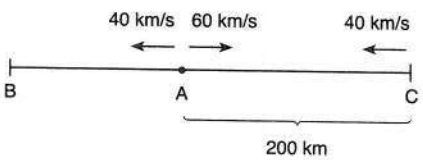


C noktasından aynı anda zıt yönde 40 km/s ve x km/s hızlarla harekete başlayan iki araç arasındaki mesafe 8 saat sonra 400 km oluyor. Buna göre, x kaçtır?

The distance between two vehicles which take off simultaneously from the same point C, in opposite directions, with a velocity of 40 km/h and x km/h, respectively, becomes 400 km after 8 hours. According to this what is x?

10

4.

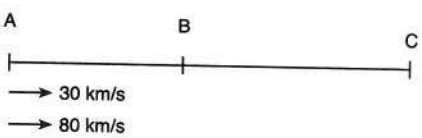


A ve C noktalarından birbirlerine doğru aynı anda harekete başlayan iki araç karşılaştıklarında A noktasından onlarla aynı anda 40 km/s hızla harekete başlayan başka bir araç B noktasına ulaşıyor. Buna göre, |AB| kaç km'dir?

When two vehicles which take off towards each other from points A and C meet, another vehicle which simultaneously takes off from point A with a velocity of 40 km/h reaches point B. According to this how many km is |AB|?

80

5.



A noktasından aynı anda sırasıyla 30 km/s ve 80 km/s hızlarla harekete başlayan araçlardan hızlı olan C noktasına gidip geri dönüyor ve B noktasında yavaş olan araç ile karşılaşıyor. Buna göre $\frac{|BC|}{|AB|}$ oranı kaçtır?

Two vehicles take off simultaneously from point A, with a velocity of 30 km/h and 80 km/h, respectively. The faster vehicle reaches point C and turns back to meet with the slower vehicle at point B. According to this what is the ratio of |BC|/|AB|?

$\frac{5}{6}$

Hareket Problemleri (Movement Problems)

ÖZELLİK|Property 16

■ **Ortalama Hız** | Average Velocity

$$V_{ortalama} = \frac{\text{Toplam yol}}{\text{Toplam zaman}} \qquad V_{average} = \frac{Total\ distance}{Total\ time}$$

■ Eşit sürede farklı hızlarla hareket eden aracın ortalama hızı, hızların aritmetik ortalamasıdır.

The average velocity of a vehicle traveling at different velocities for an equal amount of time is the arithmetical mean of the velocities.

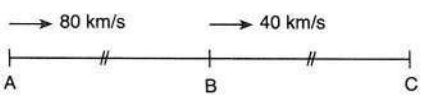
$$V_{ortalama} = \frac{V_1 + V_2}{2} \qquad V_{average} = \frac{V_1 + V_2}{2}$$

■ Eşit mesafede, farklı hızlarla hareket eden aracın ortalama hızı, hızların harmonik ortalamasıdır.

The average velocity of a vehicle travelling at different velocities for an equal distance is the harmonic mean of the velocities.

$$V_{ortalama} = \frac{2V_1 \cdot V_2}{V_1 + V_2} \qquad V_{average} = \frac{2V_1 \cdot V_2}{V_1 + V_2}$$

1.

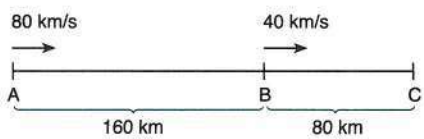


Bir araç gideceği yolun yarısını 80 km/s, geri kalan yolu 40 km/s hızla tamamlıyor. Buna göre, yol boyunca aracın ortalama hızı kaç km/s'dir?

A vehicle travels half of the distance it will travel with a velocity of 80 km/h, and the remaining distance with a velocity of 40 km/h. According to this, what is the average velocity of the vehicle for the whole trip?

$\frac{160}{3}$

2.



|AB| = 160 km

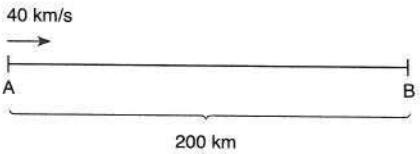
|BC| = 80 km

A noktasından 80 km/s hızla harekete başlayan araç B noktasında hızını yarıya düşürüyor. Bu araç C noktasına vardığında yol boyunca ortalama hızı kaç km/s olmuştur?

A vehicle which takes off from point A with a velocity of 80 km/h, reduces its velocity to half at point B. How many km/h is the average velocity of this vehicle for the total distance it has travelled when it reaches point C?

60

3.



|AB| = 200 km

A noktasından B noktasına 40 km/s hızla giden bir araç B noktasına ulaştığında 1 saat bekledikten sonra hızını yarıya düşürerek A noktasına geri dönüyor. Buna göre, aracın yol boyunca ortalama hızı kaç km/s'dir?

A vehicle which travels from point A to point B with a velocity of 40 km/s waits for 1 hour when it reaches point B and then returns to point C with half the velocity. According to this how many km/h is the average velocity of this vehicle for the total distance it has travelled?

25

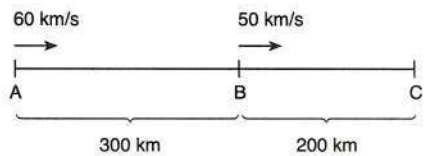
4.

A noktasından B noktasına 60 km/s hızla giden bir araç B noktasından A noktasına hızını 1/3 oranında düşürerek geri dönüyor. Bu aracın yol boyunca ortalama hızı kaç km/s'dir?

A vehicle which travels from point A to point B with a velocity of 60 km/s decreases its velocity by 1/3 when returning to point A from point B. According to this how many km/h is the average velocity of this vehicle for the total distance it has travelled?

48

5.



|AB| = 300 km

|BC| = 200 km

A noktasından 60 km/s hızla hareket eden araç B noktasında 1 saat mola verdikten sonra 50 km/s hızla yolu tamamlıyor. Bu aracın yolculuk boyunca ortalama hızı kaç km/s'dir?

A vehicle which takes off from point A with a velocity of 60 km/s waits for 1 hour at point B then completes its journey with a velocity of 50 km/h. According to this how many km/h is the average velocity of this vehicle during the total journey?

50

İşçi Problemleri (Work Output Problems)

ÖZELLİK|Property 17

- Bir işin tamamı t zamanda yapılırsa birim zamanda işin $\frac{1}{t}$'si yapılır.

  If a work is completed in t amount of time, then in unit time 1/t of the work can be done.

- A işçisi bir işi a zamanda yaparsa birim zamanda işin $\frac{1}{a}$'sını yapar.

  B işçisi bir işi b zamanda yaparsa birim zamanda işin $\frac{1}{b}$'sini yapar.

  İkisi birlikte birim zamanda işin $\frac{1}{a}+\frac{1}{b}$'sini yapar.

  İkisi birlikte bu işi t saatte yaparsa $\frac{1}{a}+\frac{1}{b}=\frac{1}{t}$ dir.

  If worker A completes a work in 'a' amount of time, then in unit time he can do 1/a of the work.

  If worker B completes a work in 'b' amount of time, then in unit time he can do 1/b of the work.

  Together, they can do 1/a + 1/b of the work in unit time.

  If together they complete the work in t hours, then 1/a + 1/b = 1/t

1. Bir işi A işçisi 3 günde, B işçisi 6 günde bitirdiğine göre, ikisi beraber kaç günde bitirir?

If worker A completes a work in 3 days and worker B completes in 6 days, how many days would it take to complete the work together?

2

2. Bir işi Suat 18 günde, Ümit 12 günde, Ahmet 9 günde yaptığına göre, bu işi üçü beraber kaç günde yapar?

If Suat completes a work in 18 days, Ümit completes in 12 days and Ahmet completes it in 9 days, how many days would it take to complete the same work if they worked together?

4

3. Bir işçi bir işin $\frac{1}{3}$'ünü 5 günde, diğer işçi $\frac{1}{5}$'ini 2 günde bitiriyor. Buna göre iki işçi işin tamamını kaç günde bitirir?

A worker completes 1/3 of a work in 5 days, and another worker completes 1/5 of the same work in 2 days. According to this how many days would it take for these two workers to complete the work?

6

4. Mehmet bir işin tamamını 12 günde, Ahmet 36 günde bitiriyor. Buna göre ikisi işin $\frac{1}{3}$'ünü kaç günde bitirir?

Mehmet completes a work in 12 days and Ahmet completes the same work in 36 days. According to this how many days would it take for them to complete 1/3 of the work?

3

5. Bir işi Berk 4 günde, Irmak ise 12 günde bitiriyor. İkisi birlikte bu işin tamamını kaç günde bitirirler?

Berk completes a work in 4 days and Irmak does it in 12 days. How many days does it take for them to complete the entire work together?

3

6. Merve ve Yasin bir işi 10 saatte bitiriyorlar. Merve işin tamamını 30 saatte bitirebildiğine göre, Yasin kaç saatte bitirebilir?

Merve and Yasin completes work in 10 hours. If Merve completes the entire work in 30 hours, than how many hours does it take for Yasin to complete the entire work?

15

İşçi Problemleri (Work Output Problems)

7. Mehmet bir işi x günde, Ayşe ise 3x günde bitirebilmektedir. İkisi birlikte aynı işi 6 günde bitirdiklerine göre, Ayşe tek başına bu işi kaç günde bitirir?

Mehmet completes work in "x" days and Ayşe completes it "3x" days. If they completes the same work in 6 days, how many days does it take for Ayşe to complete this work by herself?

8

8. Bir işi Beyza 12 günde, Ali 20 günde tamamlıyor. Buna göre ikisi birlikte işin $\frac{2}{3}$'ünü kaç günde tamamlarlar?

Beyza completes a work in 12 days and Ali completes it in 20 days. Then, how many days does it take for them to complete the 2/3 of the work together?

5

9. Yeliz bir işi a günde, Sümeyye aynı işi $\frac{a}{2}$ günde bitirebilmektedir. İkisi birlikte aynı işi 2 günde bitirdiklerine göre, a kaçtır?

Yeliz completes a work in "a" days and Sümeyye completes the same work in a/2 days if they can complete the same work in 2 days, what is "a"?

6

10. Ece ile Ezgi bir işi birlikte 30 günde bitiriyorlar. Birlikte işe başlayıp 20 gün çalıştıktan sonra Ezgi ayrılıyor. Ece 40 gün daha çalışıp işi bitiriyor. Bu işin tamamını Ece kaç günde bitirir?

Ece and Ezgi completes a work in 30 days. After they work for 20 days, Ezgi leaves and stops works Ece completes the work by working for 40 more days. How many days does it take for Ece to complete the entire work by herself?

40

11. Murat bir işi 16 günde, Selim ise 12 günde bitirmektedir. Murat çalışma hızını iki katına çıkarıp Selim yarıya düşürürse ikisi beraber işin tamamını kaç günde bitirir?

Murat completes a work in 16 days and Selim completes the same work in 12 days. If Murat doubles his working speed and Selim halves his working speed how many days would it take for them to complete the work?

6

12. 8 işçi bir işi 12 günde bitiriyor. Aynı kapasitedeki 6 işçi aynı işi kaç günde bitirir?

8 workers complete a work in 12 days. How many days would it take for 6 workers of the same capacity to complete the same work?

16

13. 2 usta günde 8 çift ayakkabı, 4 kalfa günde 8 çift ayakkabı yapıyor. Buna göre 4 usta, 6 kalfa günde kaç çift ayakkabı yapar?

2 masters produce 8 pairs of shoes per day, and 4 apprentices produce 8 pairs of shoes per day. According to this, how many pairs of shoes would 4 masters and 6 apprentices produce per day?

28

14. Bir işi 2 usta ile 3 çırak 6 günde, 2 usta ile 4 çırak 5 günde bitirdiğine göre, bu işin tamamını bir çırak tek başına kaç günde bitirir?

If 2 masters and 3 apprentices complete a work in 6 days and 2 masters and 4 apprentices complete the same work in 5 days, how many days would it take a single apprentice to complete this work?

30

15. Bir işi 2 kalfa 6 günde, 6 usta 1 günde bitirmektedir. 2 kalfa ile 4 usta aynı işin $\frac{5}{6}$'sını kaç günde bitirir?

2 apprentices complete a work in 6 days, and 6 masters complete the same work in 1 days. How many days would it take for 2 apprentices and 4 masters to complete 5/6 of this work?

1

16. Bir işi Ali 20 günde, Recep 30 günde bitirmektedir. İkisi beraber 2 gün çalışırsa işin ne kadarı biter?

Ali completes a work in 20 days, Recep completes the same work in 30 days. How much of the work can they complete if they work together for 2 days?

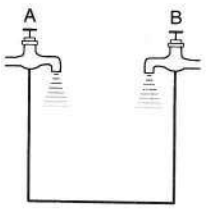
$\frac{1}{6}$

Havuz Problemleri (Pool Problems)

ÖZELLİK|Property 18

Havuz problemleri de işçi problemlerinde olduğu gibi düşünülerek çözülür.

Pool problems are solved with the same method of thinking as the worker problems.

1. 

A musluğu boş havuzu 4 saatte, B musluğu boş havuzu 3 saatte dolduruyor. Buna göre bu iki musluk boş havuzu kaç saatte doldurur?

Faucet A fills the empty pool in 4 hours and faucet B fills it in 3 hours. According to this how many hours would it take for these two faucets to fill the pool together?

$\frac{12}{7}$

2. A musluğu havuzun yarısını 6 saatte, B musluğu havuzun yarısını 3 saatte doldurduğuna göre, bu iki musluk boş havuzu kaç saatte doldurur?

If faucet A fills the half of the pool in 6 hours and faucet B fills half of it in 3 hours, how many hours would it take for these two faucets to fill the pool together?

4

3. Boş bir havuzu 1. musluk tek başına 6 saatte, 2. musluk tek başına 8 saatte, 3. musluk tek başına 12 saatte doldurmaktadır. Üç musluk aynı anda açıldığında boş havuz kaç saatte dolar?

The first faucet fills an empty pool in 6 hours, second faucet fills it in 8 hours and the third faucet fills it in 12 hours. When all three faucets are opened together, how many hours does it take to fill the pool?

$\frac{8}{3}$

4. Boş havuzu x ve y muslukları 3 saatte, y ve z muslukları 4 saatte, x ve z muslukları ise 6 saatte doldurmaktadır. Buna göre bu üç musluk boş havuzu kaç saatte doldurur?

Faucets x and y fill the empty pool in 3 hours, faucets y and z fill it in 4 hours and faucets x and z fill it in 6 hours. According to this how many hours does it take for all three faucets to fill the pool?

$\frac{8}{3}$

5. A musluğu havuzun $\frac{1}{3}$'ünü 2 saatte, B musluğu havuzun yarısını 2 saatte dolduruyor. Buna göre iki musluk havuzun tamamını kaç satte doldurur?

Faucet A fills 1/3 of the pool in 2 hours and faucet B fills half of the pool in 2 hours. According to this how many hours does it take for these two faucets to fill the pool?

$\frac{12}{5}$

Havuz Problemleri (Pool Problems)

ÖZELLİK|Property 19

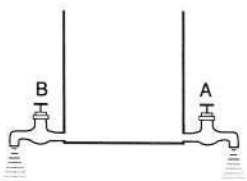
Boş bir havuzu 1. musluk a saatte, 2. musluk b saatte dolduruyor ve dipteki 3. musluk da c saatte boşaltıyorken havuzun tamamı t saatte dolarsa

$\frac{1}{t}=\frac{1}{a}+\frac{1}{b}-\frac{1}{c}$ dir.

When the first faucet fills an empty pool in "a" hours, the second faucet fills it in b hours and the third faucet at the bottom empties the pool in c hours, it takes t hours to fill the pool completely;

then $\frac{1}{t}=\frac{1}{a}+\frac{1}{b}-\frac{1}{c}$

1.

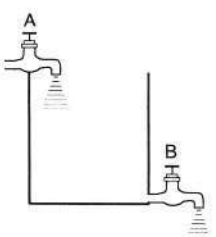


A musluğu dolu havuzu 6 saatte, B musluğu dolu havuzu 4 saatte boşaltıyor. İkisi beraber dolu havuzu kaç saatte boşaltır?

Faucet A empties the pool in 6 hours and faucet B empties it in 4 hours. How many hours does it take for both faucets to empty the pool together?

$\frac{12}{5}$

2.

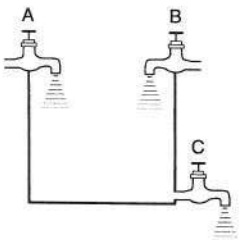


A musluğu boş havuzu 4 saatte dolduruyor. B musluğu dolu havuzu 6 saatte boşaltıyor. Buna göre, bu iki musluk aynı anda açıldığında boş havuz kaç saatte dolar?

Faucet A fills the empty pool in 4 hours. Faucet B empties the full pool in 6 hours. According to this, how many hours does it take to fill the pool if both faucets are opened at the same time?

12

3.

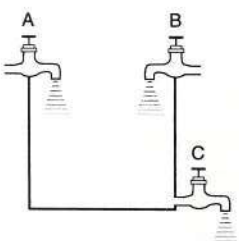


A musluğu boş havuzu 3 saatte, B musluğu 4 saatte dolduruyor. C musluğu ise dolu havuzu 6 saatte boşaltıyor. Bu üç musluk aynı anda açıldığında havuz kaç saatte dolar?

Faucet A fills empty pool in 3 hours and faucet B fills it in 4 hours. Faucet C empties a full pool in 6 hours. How many hours does it take to fill the pool if all three faucets are opened at the same time?

$\frac{12}{5}$

4.

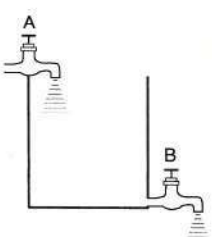


Özdeş A ve B muslukları boş havuzu birlikte 8 saatte doldururken, C musluğu dolu havuzu 16 saatte boşaltıyor. Üç musluk aynı anda açıldığında havuz kaç saatte dolar?

Identical faucets A and B fill an empty pool together in 8 hours. Faucet C empties a full pool in 16 hours. How many hours does it take to fill the pool if all three facuets are openned at the same time?

16

5.



A musluğu boş havuzu 6 saatte dolduruyor. B musluğu dolu havuzu 4 saatte boşaltıyor. Buna göre bu iki musluk aynı anda açıldığında dolu havuz kaç saatte boşalır?

Faucet A fills the empty pool in 6 hours. Faucet B empties the full pool in 4 hours. According to this, how many hours does it take to empty a full pool if both faucets are opened at the same time?

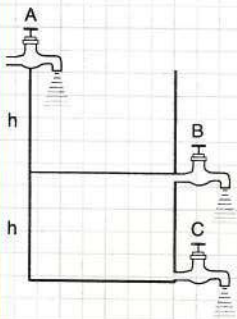
12

Havuz Problemleri (Pool Problems)

ÖZELLİK|Property 20

Havuzun orta kısmında, havuzu boşaltan musluk varsa, üst ve alt kısımlar ayrı havuzlar gibi değerlendirilerek işlem yapılır.

If there's a faucet located at the middle of the pool which empties the pool, the upper and lower sections of the pool are considered as separate pools and calculated accordingly.



A musluğu havuzun tamamını a saatte dolduruyor.
Faucet A fills the pool completely in a hours.

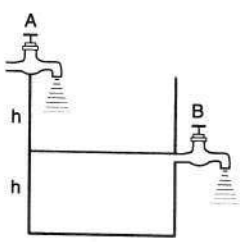
B musluğu havuzun üst kısmını b saatte boşaltıyor.
Faucet B empties upper section of the pool in b hours.

C musluğu havuzumun tamamını c saatte boşaltıyor.
Faucet C empties an entire pool in c hours.

Alt kısım için *For the lower section:*	Üst kısım için *For the upper section*
$\left(\frac{2}{a}-\frac{2}{c}\right)t_1 = 1$	$\left(\frac{2}{a}-\frac{2}{c}-\frac{1}{b}\right)t_2 = 1$

Üç musluk beraber açıkken havuz $t = t_1 + t_2$ saatte dolar.
When all three faucets are opened the pool fills in $t = t_1 + t_2$ hours.

1.

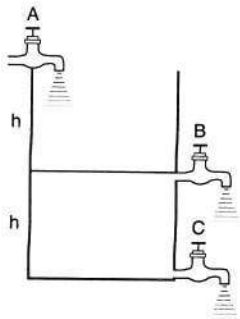


A musluğu boş havuzu 6 saatte doldurmakta, havuzun yarısında bulunan B musluğu ise havuzun yarısını 4 saatte boşaltmaktadır. İki musluk aynı anda açıldığında havuz kaç saatte dolar?

Faucet A fills the empty pool in 6 hours and faucet B which is located at the halfway empties half of the pool in 4 hours. How many hours does it take to fill the pool when both faucets are opened at the same time?

15

2.

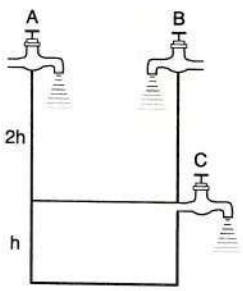


A musluğu boş havuzu 4 saatte doldurmaktadır. B musluğu havuzun yarısını 12 saatte boşaltmakta, C musluğu ise havuzun tamamını 12 saatte boşaltmaktadır. Buna göre üç musluk aynı anda açıldığında havuz kaç saatte dolar?

Faucet A fills the empty pool in 4 hours. Faucet B empties half of the pool in 12 hours and faucet C empties the entire pool in 12 hours. According to this how many hours does it take to fill the pool when all three faucets are opened at the same time?

7

3.

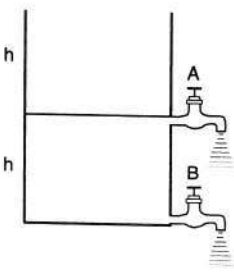


A musluğu boş havuzu 6 saatte, B musluğu 3 saatte doldurmaktadır. C musluğu ise kendi seviyesine kadarki bölümü 4 saatte boşaltmaktadır. Buna göre üç musluk aynı anda açıldığında havuz kaç saatte dolar?

Faucet A fills the empty pool in 6 hours and faucet B fills it in 3 hours. Faucet C empties the part of the pool down to its level in 4 hours. According to this how many hours does it take to fill the pool when all three faucets are opened at the same time?

$\frac{8}{3}$

4.



Özdeş 2 musluk birlikte dolu havuzu 18 saatte boşaltıyor. Buna göre havuzun dibindeki musluk dolu havuzu tek başına kaç saatte boşaltır?

Two identical faucets empty a full pool in 18 hours. According to this, how many hours does it take for the faucet at the bottom of the pool to empty a full pool by itself?

24

Havuz Problemleri (Pool Problems)

1. A musluğu boş havuzu 4 saatte, B musluğu boş havuzu 6 saatte doldurmaktadır. İki musluk açıldıktan 2 saat sonra A musluğu kapatılıyor ve B musluğu havuzun tamamını dolduruyor. Havuz bu şekilde kaç saatte dolar?

Faucet A fills the empty pool in 4 hours and faucet B fills it in 6 hours. 2 hours after both faucets are opened faucet A is closed and faucet B fills the entire pool. How many hours does it take to fill the pool in this way?

3

2. A musluğu boş havuzu 6 saatte, B musluğu boş havuzu 12 saatte dolduruyor. A musluğu 2 saat açık bırakıldıktan sonra kapatılıp B musluğu açılıyor. B musluğu kalan kısmı kaç saatte doldurur?

Faucet A fills the empty pool in 6 hours and faucet B fills it in 12 hours. Faucet A is left open for 2 hours and then closed and faucet B is opened. How many hours does it take for faucet B to fill the remainder of the pool?

8

3. A musluğu boş havuzu 4 saatte, B musluğu boş havuzu 8 saatte dolduruyor. Havuzun dibindeki C musluğu dolu havuzu 6 saatte boşaltıyor. Üç musluk açıldıktan 4 saat sonra C musluğu kapatılıyor. Buna göre boş havuz kaç saatte dolar?

Faucet A fills the empty pool in 4 hours and faucet B fills it in 8 hours. Faucet C located at the bottom of the pool empties a full pool in 6 hours. Faucet C is closed 4 hours after the three faucets are opened. According to this how many hours does it take to fill the pool?

$\frac{40}{9}$

4. Boş havuzu A musluğu 8 saatte, B musluğu 12 saatte dolduruyor. Dipteki C musluğu ise dolu havuzu 6 saatte boşaltıyor. Havuz boş iken üç musluk 8 saat açık tutuluyor ve B ile C muslukları kapatılıyor. Kalan kısmı A musluğu kaç saatte doldurur?

Faucet A fills the empty pool in 8 hours and faucet B fills it in 12 hours. Faucet C located at the bottom of the pool empties a full pool in 6 hours. When the pool is empty all three faucets are left open for 8 hours and then faucet B and faucet C are closed. According to this how many hours does it take for faucet A to fill the remainder of the pool?

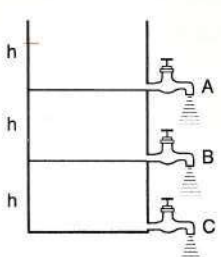
$\frac{16}{3}$

5. A musluğu boş havuzu 15 saatte doldurmaktadır. A musluğunun çalışma kapasitesi açıldıktan her bir saat sonra iki katına çıkarılırsa boş havuzu kaç saatte doldurur?

Faucet A fills the empty pool in 15 hours. If the working capacity of faucet A is doubled every hour, how many hours does it take to fill the pool?

4

6.



Özdeş 3 musluk birlikte dolu havuzu 22 saatte boşalttığına göre, havuzun dibindeki musluk dolu havuzu tek başına kaç saatte boşaltır?

If three identical faucets empty a full pool in 22 hours, how many hours does it take for the faucet at the bottom of the pool to empty a full pool by itself?

36

Yüzde Problemleri (Percentage Problems)

ÖZELLİK|Property 21

Bir x sayısının % a'sı

$$x \cdot \frac{a}{100} \text{ dür.}$$

Yüzde problemlerinde değişken olarak x yerine 100x kullanılması işlemi kolaylaştırır.

a % of a number x is:

$$x \cdot \frac{a}{100}$$

In percentage problems, using 100x as a variable instead of x will simplify the calculation.

1. 150 sayısının % 30'u kaçtır?

What is 30% of 150?

45

2. % 120'si 240 olan sayı kaçtır?

What is the number whose 120% is 240?

200

3. Hangi sayının % 30'u, o sayının $\frac{1}{3}$'ünün 5 eksiğine eşittir?

30% of which number is equal to 5 less than 1/3 of the same number?

150

4. Hangi sayının % 10'unun 3 eksiğinin % 25'i 3 tür?

25% of 3 less than 10% of which number is 3?

150

5. 240 sayısının % 50'sinin %10'u, hangi sayının % 20'sine eşittir?

10% of 50% of 240 is equal to 20% of which number?

60

6. a sayısı, b sayısının % 30'u; c sayısı da a sayısının % 50'si olduğuna göre, c sayısı, b sayısının % kaçıdır?

If number a is 30% of number b and number c is 50% of number a, then number c is what % of number b?

15

7. Bir su deposunun % 10'u doludur. Depoya 200 litre su konulunca deponun % 50'si boş kalıyor. Su deposunun tamamı kaç litredir?

10% of a water tank is full. When 200 liters of water is added to the tank its 50% remains empty. What is the capacity of the water depot?

500

8. Bir topluluğun % 60'ı erkektir. Erkeklerin % 50'si gözlüklü olduğuna göre, gözlüksüz erkekler, bu topluluğun % kaçıdır?

60% of a community is male. If 50% of the males wear glasses, the males that don't wear glasses make up what % of this community?

30

9. Bir atlet koşacağı yolun önce % 25'ini, daha sonra kalan yolun $\frac{1}{3}$'ünü koştuğunda yolun yüzde kaçını koşmuştur?

If an athlete first runs 25% of the total distance he will run, and then runs 1/3 of the remaining distance, what % of the total distance has he run?

50

10. 80 kişilik bir sınıfta kız öğrencilerin sayısı 50'dir. Sınıfın % 50'si matematikten geçtiğine göre, matematikten geçen kızların sayısı en az kaçtır?

The number of female students is 50 in a class of 80. If 50% of the class passed mathematics, at least how many female students have passed mathematics?

10

Faiz Problemleri (Interest Problems)

ÖZELLİK|Property 22

Basit Faiz | Simple Interest

A = Anapara | *A = Capital*

n = Yıllık faiz yüzdesi | *n = Yearly interest percentage*

t = Zaman | *t = Time*

Yıllık Faiz = $\frac{A \cdot n \cdot t}{100}$ | *Yearly interest* = $\frac{A \cdot n \cdot t}{100}$

Aylık Faiz = $\frac{A \cdot n \cdot t}{1200}$ | *Monthly interest* = $\frac{A \cdot n \cdot t}{1200}$

Günlük Faiz = $\frac{A \cdot n \cdot t}{36000}$ | *Daily interest* = $\frac{A \cdot n \cdot t}{36000}$

1. Bir bankaya yatırılan 120 TL, % 60 basit faizle 1 yıl sonra kaç TL faiz getirir?

How much interest does 120 TL deposited in a bank bring after a year, with a 60% simple interest rate?

72

2. Bir bankaya yıllık % 40 basit faizle yatırılan 5000 TL, 6 ay sonra kaç TL olur?

How much does 5000 TL deposited at a bank with 40% yearly simple interest become after 6 months?

6000

3. Yıllık % 60 basit faizle bankaya yatırılan bir miktar para kaç ay sonra kendisinin yarısı kadar faiz kazandırır?

How many months does it take for a certain amount of money deposited at the bank with 60% yearly interest to bring money equal to its half?

10

4. Bir bankaya yıllık % 50 basit faizle yatırılan bir miktar para 6 ay sonra 6250 TL olduğuna göre, faize verilen para kaç TL'dir?

If a certain amount of money deposited at a bank with 50% yearly simple interest becomes 6250 TL after 6 months, how much was the money deposited initially?

5000

5. Bir miktar para % k ve % (k – 4) basit faizle bankaya yatırıldığında bir yılda getirdiği faizlerin farkı 4000 TL'dir. Buna göre, faize yatırılan para kaç TL'dir?

When a certain amount of money is deposited in a bank with k% and (k-4)% yearly simple interest rates, the difference between the interests it brings in one year is 4000 TL. According to this, how much is the deposited money?

100 000

ÖZELLİK|Property 23

Bileşik Faiz | Compound Interest

Anaparanın kazandığı faizi anaparaya ekleyerek tekrar faizin hesaplanmasına bileşik faiz denir. F faiz olmak üzere;

Adding the interest earned by the capital to the capital and calculating interest again is called a compound interest. If F is the interest rate;

$$A + F = A\left(1 + \frac{n}{100}\right)^t$$

1. Yıllık % 20 bileşik faizle bankaya yatırılan 100 TL, 2 yıl sonra kaç TL olur?

How much does 100 TL deposited at a bank with 20% yearly compound interest rate become after 2 years?

144

2. Yıllık % 10 bileşik faizle bankaya yatırılan 1000 TL, 3 yıl sonra kaç TL olur?

How much does 1000 TL deposited at a bank with 10% yearly compound interest rate become after 3 years?

1331

3. Yıllık % 30 bileşik faizle bankaya yatırılan 200 TL, 2 yıl sonunda kaç TL faiz getirir?

How much interest does 200 TL deposited at a bank with 30% yearly compound interest rate bring after 2 years?

138

4. Bir miktar paranın yarısını % 50 bileşik faizle 2 yıllığına, diğer yarısını da % 50 basit faizle 2 yıllığına bankaya yatıran bir kişi, 550 TL faiz elde ettiğine göre ana para kaç TL'dir?

If a person who deposits half of a certain amount of money in a bank for 2 years with 50% compound interest and the other half for 2 years with 50% simple interest gets 550 TL interest, how much is the capital?

400

5. Atilla 300 TL parasının $\frac{1}{3}$'ünü yıllık % 40 basit faizle 1 yıllığına, geri kalanını da % 50 bileşik faizle 2 yıllığına bankaya yatırıyor. Buna göre, Atilla toplam kaç TL faiz elde etmiştir?

Atilla deposits 1/3 of his money in a bank for 1 year with 40% simple interest and the rest of the money for 2 years with 50% compound interest. According to this how much interest does Atilla get?

290

Kâr-Zarar Problemleri (Profit-Loss Problems)

ÖZELLİK|Property 24

Bir malın maliyeti M, satış fiyatı S olmak üzere;

S > M ise kâr elde edilir.

Kâr Miktarı = Satış Fiyatı – Maliyet

M > S ise zarar edilir.

Zarar Miktarı = Maliyet – Satış Fiyatı

$$\text{Kâr Oranı} = \frac{\text{Kâr Miktarı}}{\text{Maliyet}}$$

$$\text{Zarar Oranı} = \frac{\text{Zarar Miktarı}}{\text{Maliyet}}$$

Kâr ve zarar oranları daima maliyet fiyatına göre hesaplanır.

If the cost of a certain item is C and the sale price is S;

Profit is obtained if S > C

Profit Amount = Sale Price – Cost

Money is lost if C > S

Loss Amount = Cost – Sale Price

$$\textit{Profit Ratio} = \frac{\textit{Profit Amount}}{\textit{Cost}}$$

$$\textit{Loss Ratio} = \frac{\textit{Loss Amount}}{\textit{Cost}}$$

Profit and Loss Ratios are always calculated according to the cost price.

1. Maliyeti 300 TL olan bir malın % 20 kârla satış fiyatı kaç TL'dir?

If the cost of an item is 300 TL, what is its sale price with 20% profit?

360

2. Maliyeti 200 TL olan bir malın % 10 zararla satış fiyatı kaç TL'dir?

If the cost of an item is 200 TL, what is its sale price with 10% loss?

180

3. % 20 kârla 144 TL'ye satılan bir malın maliyeti kaç TL'dir?

What is the cost of an item which is sold for 144 TL with 20% profit?

120

4. % 40 kârla 210 TL'ye satılan bir mal, % 20 zararla kaç TL'ye satılmış olur?

If an item is sold for 210 TL with 40% profit, how much does it is sold for with 20% loss?

120

5. Bir malın % 20 zararla satış fiyatı 240 TL, başka bir malın % 10 kârla satış fiyatı 220 TL'dir. Buna göre, bu iki malın toplam maliyeti kaç TL'dir?

An item's sale price with 20% loss is 240 TL and another item's sale price with 10% profit is 220 TL. According to this what is the total cost of these two items?

500

6. Etiket fiyatının % 20 eksiğine alınıp % 20 fazlasına satılan bir maldan yüzde kaç kâr elde edilir?

What percent of profit is obtained from an item which is bought for 20% less than its marked price and sold for 20% more?

50

7. % 30 kârla satılan bir mala 200 TL indirim yapıldığında % 10 zarar edildiğine göre, bu malın maliyeti kaç TL'dir?

If 10% loss is made when 200 TL discount is made from an item which is normally sold with 30% profit, what is the cost of this item?

500

8. Alış fiyatı 2000 TL olan bir mal kaç TL'ye satılırsa % 40 zarar edilir?

What should be the sale price of an item with a purchase price of 2000TL in order to make a 40% loss?

1200

9. Bir satıcı, satış fiyatı üzerinden % 40 indirim yaptığı halde % 20 kâr elde etmektedir. Buna göre, satıcının indirim yapmadan önceki kârı yüzde kaçtır?

A seller makes 20% profit even though he makes a discount of 40% over the sale price. According to this what is the profit of the seller before making a discount?

100

10. Bir satıcı, tanesini 40 TL'ye aldığı ayakkabıların $\frac{1}{3}$'ünü 50 TL'den, geri kalanlarını da 65 TL'den satarsa yüzde kaç kâr elde eder?

What % profit does a seller make if he sells 1/3 of the shoes he purchased for 40 TL a piece for 50 TL and sells the rest of the shoes for 65 TL?

50

Karışım Problemleri (Mixture Problems)

ÖZELLİK|Property 25

$$\text{Karışım Oranı} = \frac{\text{Oranı Verilen Madde Miktarı}}{\text{Toplam Madde Miktarı}}$$

$$\textit{Mixture Ratio} = \frac{\textit{Amount of Material with Given Ratio}}{\textit{Total Amount of Materials}}$$

1. Şeker oranı % 40 olan 80 gram şekerli su ile şeker oranı % 30 olan 20 gram şekerli su karıştırıldığında oluşan şekerli suyun şeker oranı % kaçtır?

What % is the sugar ratio of the sugared water obtained from mixing 80 grams of sugared water with sugar ratio of 40% and 20 grams of sugared water with a sugar ratio of 30%?

38

2. Tuz oranı % 50 olan 100 gram tuzlu su ile tuz oranı % 20 olan 200 gram tuzlu su karıştırıldığında oluşan tuzlu suyun tuz oranı % kaçtır?

What % is the salt ratio of the salt water obtained from mixing 100 grams of salt water with salt ratio of 50% and 200 grams of salt water with a salt ratio of 20%?

30

3. Tuz oranı % 40 olan 100 litre tuzlu su ile 100 litre saf su karıştırıldığında oluşan karışımın tuz oranı % kaçtır?

What % is the salt ratio of the mixture obtained by mixing 100 liters of salt water with a salt ratio of 40% and 100 liters of pure water?

20

4. Tuz oranı % 30 olan 60 litre tuzlu su ile 40 litre saf su karıştırıldığında oluşan karışımın tuz oranı % kaçtır?

What % is the salt ratio of the mixture obtained by mixing 60 liters of salt water with a salt ratio of 30% and 40 liters of pure water?

18

5. Tuz oranı % 60 olan 100 gr tuzlu suya 100 gr saf tuz ilave edildiğinde oluşan karışımın tuz oranı % kaçtır?

What % is the salt ratio of the mixture obtained by adding 100 gr of pure salt to 100 grams of salt water with a salt ratio of 60%?

80

6. Şeker oranı % 40 olan 50 gr şekerli suya 50 gr saf şeker ilave edildiğinde oluşan karışımın şeker oranı % kaçtır?

What % is the sugar ratio of the mixture obtained by adding 100 gr of pure sugar to 50 grams of sugared water with a sugar ratio of 40%?

70

7. Tuz oranı % 30 olan 50 gr tuzlu sudan 10 gr su buharlaştırıldığında oluşan yeni karışımın tuz oranı % kaçtır?

What % is the salt ratio of the mixture obtained by evaporating 10 gr water from 50 grams of salt water with a salt ratio of 30%?

37,5

8. Şeker oranı % 40 olan 100 gr şekerli sudan 50 gr su buharlaştırıldığında oluşan yeni karışımın şeker oranı % kaç olur?

What % is the sugar ratio of the mixture obtained by evaporating 50 gr water from 100 grams of sugared water with a sugar ratio of 40%?

80

9. Tuz oranı % 20 olan 50 litre tuzlu suya, 50 litre saf su karıştırıldığında yeni karışımın tuz oranı % kaç olur?

If 50 liters of pure water and 50 liters of salt water with a salt ratio of 20% is mixed, what % is the salt ratio of the new mixture?

10

10. Şeker oranı % 20 olan x litre şekerli su ile şeker oranı % 40 olan 10 litre şekerli su karıştırıldığında yeni karışımın şeker oranı % 30 olduğuna göre x kaç litredir?

If x liters of sugared water with a sugar ratio of 20% and 10 liters of sugared water with a sugar ratio of 40% is mixed the sugar ratio of the new mixture is 30% what is x?

10

Sayı Problemleri (Number Problems)

1. 1 eksiğinin yarısı 7 olan sayı kaçtır?

If the half of 1 more than a number is 7, then what is the number?

A) 16 B) 15 C) 14 D) 13 E) 12

2. 7 eksiğinin 3 katı 21 olan sayı kaçtır?

If 3 times 7 less than a number is 21, then what is the number?

A) 7 B) 11 C) 13 D) 14 E) 16

3. Hangi sayının 5 fazlasının $\frac{3}{4}$'ü 18'dir?

3/4 of 5 more than which number is 18?

A) 18 B) 19 C) 20 D) 21 E) 22

4. Hangi sayının $\frac{1}{8}$'inin 2 eksiği, aynı sayının 9 eksiğine eşittir?

2 less than 1/8 of which number is equal to 9 less than the same number?

A) 8 B) 12 C) 16 D) 20 E) 24

5. Toplamları 108 olan iki sayıdan büyük sayı, küçük sayının 8 katıdır. Buna göre büyük sayı kaçtır?

From two numbers with a sum of 108, the bigger number is 8 times the smaller number. Then, what is the bigger number?

A) 96 B) 98 C) 99 D) 100 E) 102

6. Toplamları 49 olan iki sayıdan büyük sayı, küçük sayının 5 eksiğinin 3 katıdır. Buna göre büyük sayı kaçtır?

From two numbers with a sum of 49, the bigger number is 3 times 5 less than the smaller number. Then, what is the bigger number?

A) 24 B) 27 C) 29 D) 33 E) 37

7. Farkları 1, toplamları 17 olan iki sayının çarpımları kaçtır?

What is the product of two numbers with a difference of 1 and a sum of 17?

A) 54 B) 64 C) 72 D) 81 E) 88

8. Çarpımları 343 olan iki doğal sayıdan biri, diğerinin 7 katı olduğuna göre küçük sayı kaçtır?

From two natural numbers with a product of 343, one of the numbers is 7 times the other number. Then, what is the smaller number?

A) – 14 B) – 7 C) 7 D) 14 E) 21

Sayı Problemleri (Number Problems)

9. Çarpımları 24 olan iki doğal sayıdan biri diğerinden 5 fazla olduğuna göre büyük sayı kaçtır?

From two natural numbers with a product of 24, one of the numbers is 5 more than the other number. Then, what is the bigger number?

A) 3 B) 5 C) 8 D) 12 E) 16

10. Ardışık iki tek sayının toplamı, bu sayılardan küçük olanın 3 katının 5 eksiğine eşittir. Buna göre büyük sayı kaçtır?

The sum of two consecutive odd numbers is equal to 5 less than 3 times the smaller number of these numbers. Then, what is the bigger number?

A) 7 B) 8 C) 9 D) 10 E) 11

11. Toplamları 48 olan iki sayıdan, büyük sayının yarısı ile küçük sayının $\frac{1}{3}$'ünün farkı 14 olduğuna göre büyük sayı kaçtır?

From two numbers with a sum of 48, the difference of half of the bigger number and 1/3 of the smaller number is 14. Then, what is the bigger number?

A) 30 B) 32 C) 34 D) 36 E) 38

12. 71 yolcu bulunan bir otobüsten 9 kadın ve 17 erkek inince otobüste kalan kadınların sayısının, erkeklerin sayısına oranı $\frac{1}{2}$ oluyor. Buna göre ilk durumda, otobüste kaç erkek vardır?

There are 70 passengers in a bus. When 9 women and 17 men get off the bus, the ratio of the women who are still on the bus to the men is 1/2. According to this, how many men were on the bus at the beginning?

A) 25 B) 27 C) 36 D) 46 E) 47

13. 1 defter ve 1 kalemin fiyatı 5 lira, 3 defter ve 2 kalemin fiyatı 14 lira olduğuna göre 1 defterin fiyatı kaç liradır?

The price of 1 notebook and 1 pencil is 5 TL. The price 3 notebooks and 2 pencils is 14 TL. Then, what is the price of 1 notebook?

A) 2 B) 2,5 C) 3 D) 3,5 E) 4

14. Deniz, parasının önce $\frac{2}{5}$'ini, sonra kalan parasının $\frac{1}{4}$'ünü harcamıştır. Cebinde 270 lirası kalan Deniz'in başlangıçta kaç lirası vardır?

Deniz has spent 2/5 of his money, and then the has spent 1/4 of his remaining money. He has 270 TL left in his pocket. Then, how much money did he have at the beginning?

A) 400 B) 450 C) 600 D) 650 E) 700

15. 48 kişinin katıldığı bir davete 5 evli çift katılırsa davetteki erkeklerin sayısı, davete katılanların sayısının yarısından 4 eksik olacaktır. Buna göre davete katılan kadınların sayısı, erkeklerin sayısından kaç fazladır?

When 5 married couples participate in an invitation attended by 48 people, the number of men attending will be 4 less than the half of the number of people attending. Then, what is the difference of the men and women attending the invitation?

A) 3 B) 5 C) 6 D) 8 E) 10

16. Bir konserde öğrenci bileti 10 lira iken tam bilet 15 liradır. 100 bilet satılarak 1200 lira kazanç sağlandığına göre seyircilerden kaç tanesi öğrencidir?

While the student ticket costs 10 TL, the adult ticket costs 15 TL for a concert. If 1200 TL has been earned by selling 100 tickets, then how many student are there among the audience?

A) 25 B) 30 C) 40 D) 45 E) 60

Sayı Problemleri (Number Problems)

1. 2 fazlasının 3 katı 12 olan sayı kaçtır?

If 3 times 2 less than a number is 12, what is the number?

A) 2 B) 5 C) 7 D) 9 E) 11

2. 4 eksiğinin 3 katı 15 olan sayı kaçtır?

If 3 times 4 less than a number is 15, then what is the number?

A) 5 B) 9 C) 11 D) 12 E) 15

3. Hangi sayının 2/3'ünün 2 eksiği, aynı sayının 5 fazlasına eşittir?

2 less than 2/3 of which number is equal to 5 more than the same number?

A) –21 B) –18 C) –15 D) –10 E) – 8

4. Yarısının 2 fazlası ile 3 katının toplamı 23 olan sayı kaçtır?

2 more than a half of a number plus 3 times of which number is equal to 23?

A) –2 B) 0 C) 2 D) 4 E) 6

5. Toplamları 30 olan iki sayının oranı 2/3 ise küçük olan sayı kaçtır?

If the ratio of two numbers whose sum is 30 is 2/3, then what is the smaller number?

A) 12 B) 10 C) 8 D) 6 E) 4

6. Toplamları 34 olan iki sayıdan büyük sayı, küçük sayının 2 katından 4 fazla ise küçük sayı kaçtır?

If from two numbers with a sum of 34, the bigger number is 4 more than twice the smaller number, then what is the smaller number?

A) 4 B) 6 C) 8 D) 10 E) 12

7. Toplamları 41 olan iki sayıdan büyük sayı, küçük sayının 3 katından 1 fazla ise büyük sayı kaçtır?

If from two numbers with a sum of 41, the bigger number is 1 more than 3 times the smaller number, then what is the bigger number?

A) 15 B) 17 C) 20 D) 27 E) 31

8. Farkları 8 olan iki sayıdan büyük sayı, küçük sayının 3 katından 2 fazla ise küçük sayı kaçtır?

If from two numbers with a difference of 8 ,the bigger number is 2 more than 3 times the smaller number, then what is the smaller number?

A) 3 B) 5 C) 7 D) 10 E) 11

Sayı Problemleri (Number Problems)

9. Ardışık 4 çift sayının toplamı 44 ise küçük sayı kaçtır?

If the sum of 4 successive even numbers is 44, then what is the smallest number?

A) 4 B) 6 C) 8 D) 10 E) 12

10. Toplamları 26 olan 3 sayıdan küçük sayı, ortanca sayının yarısından 1 fazla, büyük sayı ortanca sayıdan 5 fazla ise ortanca sayı kaçtır?

If, among three numbers with a sum of 26, the smaller number is 1 more than half the middle number, and the bigger number is more than 5 more than the middle number, then what is the middle number?

A) 6 B) 8 C) 9 D) 10 E) 11

11. Murat ve Fatih'in paraları toplamı 6000 TL'dir. Murat, Fatih'e 300 TL verirse paraları eşit oluyor. Buna göre, başlangıçta Fatih'in kaç TL'si vardır?

The sum of Murat and Fatih's moneys is 6000 TL. If Murat gives 300 TL to Fatih the amount of money they have will be equal. According to this how much money did Fatih have at the beginning?

A) 2000 B) 2300 C) 2500 D) 2700 E) 3000

12. Ali'nin parası, Veli'nin parasının 4 katıdır. Ali, Veli'ye 1500 TL verdiğinde paraları eşit olduğuna göre, başlangıçta Ali'nin kaç TL'si vardır?

Ali's money is 4 times Veli's money. If their moneys become equal when Ali gives 1500 TL to Veli, how much money did Ali have at the beginning?

A) 3000 B) 3200 C) 3400 D) 3600 E) 4000

13. 40 kişinin bulunduğu bir gruba 5 kız katılırsa erkeklerin sayısı, kızların sayısının 4 katı olduğuna göre, başlangıçta gruptaki kızların sayısı kaçtır?

If when 5 girls are added to a group of 40, the number of boys becomes 4 times the number of girls, how many girls were there in the group at the beginning?

A) 12 B) 11 C) 10 D) 9 E) 4

14. Bir otobüste erkeklerin sayısı, kızların sayısının 3 katıdır. Bu otobüse 4 evli çift bindiğinde erkeklerin sayısı, kızların sayısının 2 katı olduğuna göre, başlangıçta otobüste kaç kişi bulunmaktadır?

In a bus the number of men is 3 times the number of women. If when 4 married couples enter the bus the number of men becomes twice the number of women, how many people were on the bus at the beginning?

A) 20 B) 19 C) 18 D) 16 E) 13

15. 100 TL ve 50 TL'lik 20 adet paranın toplamı 1500 TL olduğuna göre, bu paranın kaç tanesi 100 TL'dir?

If the sum of 20 bills comprising of 100 TL and 50 TL bills is 1500 TL, how many of these bills is a 100 TL bill?

A) 15 B) 13 C) 12 D) 11 E) 10

16. 90 yataklı bir otelde 2 ve 3 yataklı olmak üzere 40 oda vardır. Buna göre, oteldeki 2 yataklı oda sayısı kaçtır?

There are 40 rooms in a hotel with 90 beds. The rooms can be with 2 or 3 beds. According to this how many rooms in the hotel have only 2 beds?

A) 26 B) 28 C) 30 D) 32 E) 34

Sayı Problemleri (Number Problems)

1. Bir sınavda her doğru soruya 5 puan verilirken her yanlış soru için 1 puan siliniyor. 20 soru cevaplayan öğrenci 70 puan aldığına göre kaç soruyu yanlış cevaplamıştır?

In an exam, each correct answer is awarded 5 points and 1 point is subtracted for each incorrect answer. If a student that answered 20 questions gets 70 points how many questions has he answered incorrectly?

A) 2 B) 3 C) 4 D) 5 E) 6

2. 4 yanlışın bir doğruyu götürdüğü 20 soruluk bir sınavda, bir netin değeri 5 puandır. Tüm soruları yanıtlayan öğrenci 50 puan aldığına göre kaç soruyu doğru cevaplamıştır?

In an exam where 4 incorrect answers cancel 1 correct answer, the value of a net correct answer is 5 points. If a student that answered all questions has got 50 points how many questions has he answered correctly?

A) 12 B) 11 C) 10 D) 9 E) 8

3. Bir adam merdivenleri üçer üçer çıkıp beşer beşer iniyor. Çıkarken attığı adım, inerken attığı adımdan 10 fazla ise merdiven kaç basamaklıdır?

A man climbs up a ladder taking 2 stairs at a time and climbs down 5 stairs at a time. If the number of steps he takes when climbing up is 10 more than the number of steps he takes when climbing down, how many stairs does the ladder have?

A) 65 B) 70 C) 75 D) 80 E) 85

4. Bir sınıfta öğrenciler sıralara ikişerli oturduğunda 5 öğrenci ayakta kalıyor. Üçerli oturduklarında 1 sıra boşta kalıyor. Buna göre sınıfta kaç öğrenci vardır?

When the students in a classroom sit in doubles on the benches, 5 students are left standing. When they sit in triples 1 bench is left empty. According to this, how many students are there in this classroom?

A) 18 B) 20 C) 21 D) 22 E) 24

5. Bir miktar bilye bir grup çocuğa dörderli dağıtılırsa 2 bilye artıyor. Bir çocuk eksik olsaydı her çocuğa 5 bilye düşmüş olacaktı. Buna göre çocuk sayısı kaçtır?

If a certain quantity of marbles is divided among a group of children by giving 5 marbles to each children then 2 marbles are left out. If there was one less child in the group then each child would get five marbles. According to this, how many children are there?

A) 4 B) 5 C) 6 D) 7 E) 8

6. Bir bilet kuyruğunda Ali baştan 14. sırada, Aslı sondan 9. sıradadır. Ali ile Aslı arasında 4 kişi olduğuna göre, bilet kuyruğunda en az kaç kişi vardır?

In a ticket line, Ali is 14th from the head of the line and Aslı is 9th from the end of the line. If there are 4 people between Ali and Aslı, at least how many people are there in the ticket line?

A) 18 B) 17 C) 16 D) 15 E) 14

7. Her yıl boyunun iki katı uzayan sarmaşığın 4. yıl sonundaki boyu 486 cm olduğuna göre, 2. yılın sonundaki boyu kaç cm dir?

If the length of a vine which grows twice its length every year is 486 cm at the end of 4 years, what is its length at the end of the second year?

A) 45 B) 54 C) 63 D) 72 E) 81

8. Bir sınıfın sıralarından bazılarına 2 kişi, bazılarına da 3 kişi oturmaktadır. Sınıfta 37 öğrenci olduğuna göre, bu sınıfta en az kaç sıra olabilir?

In a classroom, 2 students sit in some of the benches and 3 students sit in the others. If there are 37 students in the classroom what is the minimum number of benches that could be in this classroom?

A) 13 B) 12 C) 11 D) 10 E) 9

Sayı Problemleri (Number Problems)

9. 3 kalem, 4 silgi, 2 defter alan bir kişi 300 TL ödüyor. Bu kişi eğer 7 kalem, 8 silgi, 4 defter almış olsaydı 650 TL ödeyecekti. Buna göre bir kalem kaç TL'dir?

A person who buys 3 pencils, 4 erasers and 2 notebooks pays 300 TL. If this person had bought 7 pencils, 8 erasers and 4 notebooks he would pay 650 TL. According to this how much does a pencil cost?

A) 45 B) 50 C) 55 D) 60 E) 65

10. Kazım parasının tamamı ile 4 kg elma, 6 kg portakal veya 5 kg elma, 4 kg portakal alabiliyor. Buna göre, Kazım parasının tamamı ile kaç kg portakal alabilir?

Kazım can buy 4 kg of apples, 6 kg of oranges or 5 kg of apples, 4 kg of oranges with all of his money. According to this how many kg of oranges can Kazım buy with all of his money?

A) 13 B) 14 C) 15 D) 16 E) 17

11. 15 kişinin katıldığı bir toplantıda herkes birbiri ile bir kez tokalaştığına göre toplam kaç tokalaşma yapılmıştır?

If in a meeting attended by 15 people everyone shakes hands with each other once, how many total handshakes has occurred?

A) 105 B) $\frac{14!}{2}$ C) $\frac{15!}{2}$ D) 14! E) 15!

12. 7 adım ileri, 5 adım geri adım atan adam 147 adım attığında toplam kaç adım ilerlemiş olur?

If a man who takes 7 steps forward and 5 steps back takes 147 steps, how many steps does he move forward?

A) 14 B) 20 C) 24 D) 27 E) 30

13. Bir kütüğü 10 parçaya bölmek için 90 TL alan işçi, 7 parçaya bölmek için kaç TL alır?

If a worker gets 90 TL to divide a log into 10 pieces, how much would he get to divide it into 7 pieces?

A) 45 B) 50 C) 60 D) 63 E) 70

14. Bir manavda iki boy portakal vardır. Küçük boy portakalın tanesi 100 gr, büyük boy portakalın tanesi 120 gr dır. Buna göre, 740 gr portakal alan bir kişi en çok kaç portakal almış olur?

There are two sizes of oranges in a fruit seller. Small oranges weigh 100 gr and large oranges weigh 120 gr each. According to this, what is the maximum number of oranges that can be bought by a person who buys 740 gr of oranges?

A) 5 B) 6 C) 7 D) 8 E) 9

15. Eşkenar üçgen biçimindeki bir bahçenin çevresine, her köşeye bir ağaç dikmek şartı ile 3 metre ara ile ağaç dikiliyor. Dikilen toplam ağaç sayısı 12 olduğuna göre, bahçenin bir kenarı kaç metredir?

Trees are planted with 3 meter intervals on a equilateral triangle shaped garden, with the condition that a tree is planted at each corner. If the total number of planted trees is 12, how many meters is each side of the triangle?

A) 6 B) 10 C) 12 D) 15 E) 18

16. Bir bakkal 3 boş gazoz şişesi getirene 1 dolu gazoz veriyor. Ali, biriktirdiği 50 boş gazoz şişesi ile en fazla kaç şişe gazoz içebilir?

A grocery store gives a soda to anyone who brings 3 empty soda bottles. How many bottles of soda can Ali get with 50 soda bottles he has collected?

A) 16 B) 22 C) 24 D) 25 E) 26

Sayı Problemleri (Number Problems)

1. Hangi sayının $\frac{1}{2}$'si ile $\frac{1}{3}$'ünün toplamı 30'dur?

1/2 and 1/3 of which number adds up to 30?

A) 36 B) 30 C) 25 D) 24 E) 20

2. Bir sayının $\frac{1}{20}$'si, aynı sayının $\frac{1}{2}$'sinin kaç katıdır?

A number's 1/20 is how many times the same number's 1/2?

A) 100 B) 10 C) 0,1 E) 0,01 E) 0,001

3. Bir miktar paranın önce $\frac{1}{4}$'ü, sonra $\frac{1}{5}$'i harcanıyor. Kalan para 44 TL olduğuna göre, harcanan para kaç TL'dir?

First 1/4, and then 1/5 of a certain amount of money is spent. If the remaining money is 44 TL, how much is the spent money?

A) 24 B) 32 C) 35 D) 36 E) 40

4. Murat parasının $\frac{1}{3}$'ünü Tuncay'a verirse Tuncay'ın parası, Murat'ın parasının $\frac{3}{4}$'üne eşit oluyor. İlk durumda Murat'ın parası, Tuncay'ın parasının kaç katına eşittir?

If Murat gives 1/3 of his money to Tuncay, Tuncay's money will be equal to 3/4 of Murat's money. Initially Murat's money was equal to how many times Tuncay's money?

A) 4 B) 5 C) 6 D) 7 E) 8

5. $\frac{1}{3}$'ü dolu olan bir havuza 400 litre su ilave edilince havuzun $\frac{1}{2}$'si doluyor. Buna göre, havuzun tamamı kaç litredir?

When 400 liters of water is added to a pool which is 1/3 full, it becomes 1/2 full. According to this how many liters is the total volume of the pool?

A) 2500 B) 2400 C) 2300 D) 2200 E) 2100

6. Cem elindeki paranın önce $\frac{1}{6}$'sını, daha sonra kalan paranın $\frac{1}{4}$'ünü harcıyor. Cem'in harcadığı toplam para 162 TL olduğuna göre, kalan parası kaç TL'dir?

Cem first spends 1/6 of his money and then spends ¼ of the remaining money. If the total money Cem spent is 162 TL, how much money has he got remaining?

A) 270 B) 272 C) 280 D) 296 E) 300

7. Bir sayının $\frac{2}{3}$'ünün $\frac{1}{4}$'üne 20 eklendiğinde sayı 27 oluyor. Buna göre, bu sayı kaçtır?

When 20 is added to 1/4 of 2/3 of a number the result is 27. According to this what is the number?

A) 42 B) 44 C) 48 D) 50 E) 52

8. Bir top her düşüşte, düştüğü yüksekliğin $\frac{1}{8}$'i kadar zıplıyor. Belli bir yükseklikten bırakılan bu top ikinci zıplayışta 10 cm yükseldiğine göre, top kaç metre yükseklikten bırakılmıştır?

A ball bounces to 1/8 of the height it fell from with each fall. If this ball which is dropped from a certain height bounces to a height of 10 cm. at its second bounce, from what height was it initially dropped from?

A) 5,6 B) 6 C) 6,2 D) 6,4 E) 6,6

Sayı Problemleri (Number Problems)

9. Bir sınıftaki erkek öğrencilerin sayısı, kız öğrencilerin sayısının $\frac{3}{5}$'ine eşittir. Sınıftaki öğrenci sayısı 34'ten fazla olduğuna göre, erkek öğrenci sayısı aşağıdakilerden hangisi olamaz?

The number of male students in a class is equal to 3/5 of the female students. If the number of students in the class is more than 34, which of the following cannot be the number of male students?

A) 15 B) 16 C) 18 D) 21 E) 24

10. Lütfü parasının $\frac{2}{5}$'i ile tanesi 10 TL olan biletlerden 4 tane alıyor. Buna göre, Lütfü'nün kaç TL'si vardır?

Lütfü buys 4 tickets which are priced at 10 TL per ticket, with 2/5 of his money. According to this how much money does Lütfü have?

A) 100 B) 80 C) 70 D) 60 E) 50

11. Bir marketteki mallar çürüyerek $\frac{1}{10}$ oranında fire vermiştir. Bunun sonucunda maliyeti ne oranda artmıştır?

The goods in a grocer have spoiled and diminished by 1/10. How much has its cost increased as a result of this?

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{9}$ E) $\frac{1}{12}$

12. Burak'ın fındıklarının sayısı, Mehmet'in fındıklarının sayısının $\frac{3}{2}$'sine, Levent'in fındıklarının sayısının $\frac{4}{3}$'üne eşittir. Buna göre, Mehmet'in fındıklarının sayısının, Levent'in fındıklarının sayısına oranı kaçtır?

The number of Burak's nuts is equal to 3/2 of the number of Mehmet's nuts, and to 4/3 of the number of Levent's nuts. According to this what is the ratio of the number of Mehmet's nuts to the number of Levent's nuts?

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{2}{5}$ D) $\frac{7}{9}$ E) $\frac{8}{9}$

13. Bir deponun $\frac{1}{3}$'ü su dolu iken 20 gr, $\frac{1}{2}$'si su dolu iken 25 gr gelmektedir. Bu deponun tamamı kaç gram su alır?

When 1/3 of a tank is full of water it weighs 20 gr. and when 1/2 of the same tank is full it weighs 25 gr. How many grams of water can the whole tank hold?

A) 50 B) 45 C) 40 D) 35 E) 30

14. Bir araç gideceği yolun önce $\frac{3}{8}$'ini, daha sonra kalanın $\frac{2}{5}$'ini gidiyor. Bu aracın geriye 90 km yolu kaldığına göre, yolun tamamı kaç km'dir?

A vehicle first travels 3/8 of the road it will travel, and then travels 2/5 of the remaining distance. If this vehicle has 90 km left to travel how many km is the total distance?

A) 80 B) 120 C) 160 D) 240 E) 400

15. Bir sınıfta öğrenciler sıralara 3'erli oturunca 2 öğrenci ayakta kalıyor. Eğer 4'erli otururlarsa 2 sıra boş kalıyor. Buna göre, sınıfta kaç öğrenci vardır?

When the students in a class sit in the benches in threes, 2 students are left standing. If the students sit in fours, then 2 benches are left empty. According to this how many students are there in the classroom?

A) 40 B) 36 C) 34 D) 32 E) 30

16. Enes elindeki parasının önce 1/3'ünü, daha sonra kalan parasının $\frac{1}{2}$'sini harcıyor. Enes'in harcadığı toplam para 60 TL olduğuna göre, başlangıçta kaç TL'si vardır.

Enes first spends 1/3 of his money and then spends 1/2 of the remaining money. If the total money Enes spent is 60 TL, how much money did he have initially?

A) 70 B) 80 C) 90 D) 100 E) 120

Yaş Problemleri (Age Problems)

1. Rıza 32 yaşındayken Uğur 10 yaşındadır. Kaç yıl sonra Rıza'nın yaşı Uğur'un yaşının iki katı olur?

When Rıza is 32 years old Uğur is 10 years old. In how many years will Rıza's age be twice the age of Uğur?

A) 10 B) 12 C) 16 D) 20 E) 28

2. Güldane 30 yaşındayken Büşra 20 yaşındaydı. Kaç yıl önce Güldane'nin yaşı, Büşra'nın yaşının iki katıydı?

When Güldane was 30 years old, Büşra was 20 years old. How many years ago was Güldane's age twice the age of Büşra?

A) 5 B) 6 C) 8 D) 10 E) 12

3. Ayşe 18, Betül 24 yaşındadır. Bu durumda, 4 yıl sonra yaşları farkı kaç olur?

Ayşe is 18 years old and Betül is 24 years old. In this case what will be the difference between their ages after 4 years?

A) 6 B) 10 C) 12 D) 16 E) 20

4. Mehmet 24, Ahmet 18 yaşındadır. Kaç yıl sonra yaşları toplamı, yaşları farkının 8 katı olur?

Mehmet is 24 years old and Ahmet is 18 years old. How many years later will the sum of their ages become 8 times the difference between their ages?

A) 1 B) 2 C) 3 D) 6 E) 8

5. Temel 18, Turan 22 yaşındadır. Temel, Turan'ın yaşına geldiğinde, Turan kaç yaşında olur?

Temel is 18 years old and Turan is 22 years old. When Temel reaches Turan's age how old will Turan be?

A) 28 B) 27 C) 26 D) 25 E) 24

6. Mehmet ile Burak'ın yaşları oranı $\frac{3}{4}$ tür. 2 yıl sonra bu oran $\frac{7}{9}$ olacağına göre Mehmet'in yaşı kaçtır?

The ratio of Mehmet and Burak's ages is ¾. If this ratio will become 7/9 in 2 years, how old is Mehmet now?

A) 10 B) 12 C) 14 D) 16 E) 18

7. Bir babanın 2 çocuğunun yaşları toplamı 20 dir. 4 yıl sonra babanın yaşı, iki çocuğunun yaşları toplamının 2 katı olacağına göre, babanın yaşı kaçtır?

The sum of the ages of two children of a father is 20. If 4 years later the father's age will become twice the sum of the two children's ages, how old is the father?

A) 52 B) 35 C) 25 D) 20 E) 10

8. Mehmet 3 yıl önce, Ahmet 2 yıl sonra doğmuş olsaydı yaşları eşit olacaktı. Mehmet ile Ahmet'in yaşları toplamı 25 olduğuna göre, Mehmet'in yaşı kaçtır?

If Mehmet had been born 3 years earlier and Ahmet had been born 2 years later their ages would be the same. If the sum of Mehmet and Ahmet's ages is 25 how old is Mehmet?

A) 8 B) 10 C) 12 D) 14 E) 16

Yaş Problemleri (Age Problems)

9. Ahmet ile Suat'ın yaşları toplamı 24'tür. Ahmet, Suat'ın yaşına geldiğinde yaşları toplamı 32 olacağına göre, Ahmet'in yaşı kaçtır?

The sum of Ahmet and Suat's ages is 24. If the sum of their ages will be 32 when Ahmet reaches Suat's age, how old is Ahmet now?

A) 10 B) 12 C) 14 D) 18 E) 20

10. Üç kardeşten ortanca kardeşin yaşı, büyük kardeşin yaşının yarısından bir fazla; küçük kardeşin yaşı ise ortanca kardeşin yaşının yarısı ve bu üç kardeşin yaşları toplamı 26 olduğuna göre, küçük kardeşin yaşı kaçtır?

If among three siblings, the middle sibling's age is 1 more than half the age of the older sibling, and the younger sibling's age is half the age of the middle sibling and the sum of these three siblings' ages is 26, how old is the younger sibling?

A) 4 B) 7 C) 8 D) 12 E) 14

11. Bir babanın yaşı, 2 çocuğunun yaşları toplamının 3 katıdır. 6 yıl sonra babanın yaşı, 2 çocuğunun yaşları toplamının 2 katı olacağına göre, babanın bugünkü yaşı kaçtır?

The age of a father is 3 times the sum of his 2 children's ages. If 6 years later the father's age will be twice the sum of his children's ages, how old is the father today?

A) 40 B) 44 C) 46 D) 48 E) 54

12. Baba, anne ve bir çocuktan oluşan bir ailede; anne, babanın yaşındayken, çocuğun doğmasına 4 yıl vardı. Çocuk 2 yaşında olduğuna göre, anne ile babanın yaşları farkı kaçtır?

In a family consisting of a father, a mother and a child; when the mother was at the same age as the father, there was still 4 years for the child to be born. If the child is 2 years old now, what is the difference between the mother's age and the father's age?

A) 2 B) 4 C) 6 D) 8 E) 10

13. Suat ile Fuat'ın yaşları toplamı 20'dir. Suat, Fuat'ın yaşına geldiğinde Suat ile Fuat'ın yaşları toplamı 28 olduğuna göre, Suat ile Fuat'ın yaşları farkı kaçtır?

The sum of Suat's age and Fuat's age is 20. If when Suat reaches Fuat's age the sum of their ages will become 28, what is the difference between Suat and Fuat's ages?

A) 4 B) 6 C) 8 D) 10 E) 12

14. 55 yaşındaki bir babanın 3 çocuğundan ikisi ikizdir. İkizler diğer çocuktan 7 yaş küçüktür. Çocukların yaşları toplamı, babanın yaşına eşit ise ikizler kaç yaşındadır?

2 of the 3 children of a 55 year old father are twins. The twins are 7 years younger than the other child. If the sum of the children's ages is equal to the father's age, how old are the twins?

A) 12 B) 14 C) 16 D) 18 E) 20

15. Suat ile Murat'ın yaşları farkı 6'dır. 4 yıl sonra yaşları toplamı, yaşları farkının 4 katı olduğuna göre, yaşları toplamı kaçtır?

The difference of Suat and Murat's ages is 6. If in 4 years the sum of their ages will become 4 times the difference between their ages, what is the sum of their ages today?

A) 16 B) 20 C) 22 D) 24 E) 28

16. 1993 yılında, doğum yılının rakamları toplamı kadar yaşta olan bir kişi, 1993 yılında kaç yaşındadır?

How old is someone in 1993, who was at the age obtained by adding his birth year's digits in 1993?

A) 15 B) 17 C) 18 D) 20 E) 22

Yaş Problemleri (Age Problems)

1. Zeynep 15, babası 38 yaşındadır. Kaç yıl sonra babasının yaşı, Zeynep'in yaşının 2 katı olur?

Zeynep is 15 years old and her father is 38. After how many years will her father's age be 2 times Zeynep's age?

A) 5 B) 6 C) 7 D) 8 E) 9

2. Mete ile annesinin yaşları farkı 23'tür. 8 yıl sonra yaşları farkı nasıl değişir?

The difference of Mete's age and his mother's age is 23. How does the difference change after 8 years?

A) Değişmez *(No change)* B) 8 artar *(increases by 8)*
C) 8 azalır *(decreases by 8)* D) 16 artar *(increases by 16)*
E) 16 azalır *(decreases by 16)*

3. Dört kardeşin bugünkü yaşları toplamı 37'dir. Buna göre 5 yıl sonraki yaşları toplamı kaç olur?

The sum of four siblings ages is 37. According to this. What is the sum of their ages after 5 years?

A) 50 B) 53 C) 57 D) 59 E) 60

4. Cansu 28, Elif 20 yaşındadır. Kaç yıl sonra yaşları toplamı, yaşları farkının 7 katı olur?

Cansu is 28 years old and Elif is 20. How many years later will the sum of their ages become 7 times the difference between their ages?

A) 1 B) 2 C) 3 D) 4 E) 5

5. Bir annenin yaşı 42, iki çocuğunun yaşları toplamı 27'dir. Kaç yıl sonra annenin yaşı, çocuklarının yaşları toplamına eşit olur?

A mother's age is 42 and the sum of her two children's ages is 27. How many years later will the mother's age become equal to the sum of her cildren's ages?

A) 7 B) 13 C) 15 D) 16 E) 19

6. Umut'un yaşı, Özgür'ün yaşının 2 katıdır. 3 yıl önce Umut'un yaşının, Özgür'ün yaşına oranı $\frac{7}{3}$ olduğuna göre, Umut ile Özgür'ün bugünkü yaşları toplamı kaçtır?

Umut's age is 2 times Özgür's age. The ratio of Umut and Özgür's ages was 7/3 three years ago. According to this, what is the sum of Umut and Özgür's ages now?

A) 29 B) 30 C) 32 D) 34 E) 36

7. Can, Burak'tan 8 yaş büyüktür. Can'ın 4 yıl sonraki yaşı, Burak'ın 3 yıl önceki yaşının 2 katından 5 fazladır. Buna göre Can'ın şimdiki yaşı kaçtır?

Can is 8 years older than Burak. Can's age -after 4 years- is 5 more than 2 times Burak's age -3 years ago. According to this how old is Can now?

A) 13 B) 15 C) 17 D) 21 E) 24

8. Barış ile Mine'nin yaşları oranı $\frac{5}{8}$'dir. Yaşları farkı 9 olduğuna göre, yaşları toplamı kaçtır?

The ratio of Barış and Mine's ages is 5/8. If the difference between their ages is 9, then what is the sum of their ages?

A) 48 B) 45 C) 42 D) 39 E) 36

Yaş Problemleri (Age Problems)

9. Beyazıt'ın 7 yıl sonrakı yaşı, 7 yıl önceki yaşının 2 katı olacaktır. Buna göre Beyazıt bugün kaç yaşındadır?

Beyazıt's age -after 7 years- will become 2 times his age -7 years ago- According to this, how old is Beyazıt now?

A) 20 B) 21 C) 23 D) 25 E) 26

10. Bir baba 35 yaşında iken kızı 2 yaşındadır. Kaç yıl sonra yaşları oranı $\frac{14}{3}$ olur?

When a father is 35, his daughter is 2 years old. How many years later will the ratio of their ages become 14/3?

A) 14 B) 7 C) 5,5 D) 3 E) 6

11. 2002 yılında 23 yaşında olan Oğuz ve 1997 yılında 13 yaşında olan Kaan'ın 2016 yılındaki yaşları toplamı kaçtır?

Oğuz was 23 years old in 2002 and Kaan was 13 years old in 1997. Then, what is the sum of their ages in 2016?

A) 49 B) 55 C) 63 D) 69 E) 79

12. Beste'nin yaşı, Buket'in yaşının 2 katıdır. 5 yıl sonra Beste'nin yaşı, Buket'in yaşının 3 katından 20 eksik olacaktır. Buna göre Buket'in bugünkü yaşı kaçtır?

Beste's age is 2 times Buket's age. After 5 years, Beste's age will be 20 less than 3 times Buket's age. According to this, how old is Buket now?

A) 4 B) 6 C) 8 D) 10 E) 12

13. Yiğit ile Cüneyt'in bugünkü yaşları oranı $\frac{1}{4}$'tür. 7 yıl sonra bu oran $\frac{3}{5}$ olacağına göre, Cüneyt ile Yiğit'in bugünkü yaşları toplamı kaçtır?

The ratio of Yiğit and Cüneyt's ages in 1/4 today. This ratio will be 3/5 in 7 years. Then, what is the sum of Yiğit and Cüneyt's ages now?

A) 9 B) 10 C) 12 D) 13 E) 16

14. Eylül doğduğunda Efe 9 yaşında, Ekin doğduğunde Eylül 6 yaşında idi. Üç kardeşin bugünkü yaşları toplamı 48 olduğuna göre Efe'nin bugünkü yaşı kaçtır?

Efe was 9 years old when Eylül was born and Eylül was 6 years old when Ekim was born. If the sum of three sibling's ages is 48, then how old is Efe today?

A) 22 B) 23 C) 24 D) 25 E) 26

15. Bir sınıftaki öğrencilerin yaşları toplamı 336'dır. Bu sınıftaki öğrencilerin 5 yıl sonraki yaş ortalamaları 19 olacaktır. Buna göre bu sınıfta kaç öğrenci vardır?

The sum of student's ages in a clasroom is 336. 5 years later, the arithmetic mean of these student's ages will be 19. How many students are there in this clasroom?

A) 21 B) 22 C) 23 D) 24 E) 25

16. Eda, Buğra'dın 4 yaş büyük, Gözde'den 4 yaş küçüktür. 2005 yılında üçünün yaşları toplamı 75 olduğuna göre, Buğra'nın doğum yılı kaçtır?

Eda is 4 years older than Buğra and 4 years younger Gözde. The sum of these three people's ages was 75 in 2005. Then, what is Buğra's year of birth?

A) 1980 B) 1982 C) 1984 D) 1986 E) 1987

Hareket Problemleri (Movement Problems)

1. 200 km uzunluğundaki bir yolu 4 saatte giden bir araç, dönüşte hızını kaç km/s artırırsa yolculuğun tamamı 6 saatte tamamlanır?

If a vehicle travels a 200 km long road in 4 hours, how many km/h should it increase when returning in order to complete the entire journey in 6 hours?

A) 25 B) 50 C) 75 D) 100 E) 200

2. 10 km uzunluğundaki yolu, dakikadaki hızı 100 m olan bir araç kaç dakikada alır?

How many minutes would it take for a vehicle with a velocity of 100 meters per minute to travel a distance of 10 km?

A) 60 B) 80 C) 100 D) 120 E) 130

3. Bir araç 60 km/s hızla gittiği yolu 80 km/s hızla gittiğinde 1 saat daha erken varıyor. Buna göre, bu araç 40 km/s hızla bu yolu kaç saatte alır?

A vehicle arrives 1 hour earlier if it travels a road with a velocity of 80 km/h instead of 60 km/h. According to this, how many hours would it take for this vehicle to travel this road with a velocity of 40 km/h?

A) 2 B) 3 C) 4 D) 5 E) 6

4. İstanbul'dan saatte 90 km hızla Ankara'ya giden bir otobüs 2 ayrı noktada 30 dakikalık molalar veriyor. Tüm yolculuk 6 saat sürdüğüne göre İstanbul ve Ankara arasındaki mesafe kaç km'dir?

A bus travelling from İstanbul to Ankara with a velocity of 90 km/h stops for 30 minutes at two separate locations. If the entire trip lasts for 6 hours what is the distance between İstanbul and Ankara?

A) 350 B) 400 C) 450 D) 500 E) 600

5. A kentinten B kentine giden bir araç B kentine ulaştığında 1 saat mola verdikten sonra A kentine geri dönüyor. Bu aracın gidişteki hızı 90 km/s ve dönüşteki hızı 60 km/s dir. Bu yolculuk toplam 6 saat sürdüğüne göre, |AB| kaç km'dir?

A vehicle travelling from city A to city B stops for 1 hour after reaching city B and then returns back to city A. The speed of this vehicle during the trip from city A to city B is 90 km/h and its speed during the return trip is 60 km/s. If the entire trip lasts 6 hours, how many km is |AB|?

A) 180 B) 160 C) 150 D) 120 E) 100

6. Bir araç 500 km'lik bir yolu gidecektir. Araç 1 saat yol aldıktan sonra hızını 20 km/s azaltıyor ve gideceği yere toplam 6 saatte varıyor. Buna göre bu araç hızını değiştirmeseydi yolun tamamını kaç saatte giderdi?

A vehicle will travel a distance of 500 km. The vehicle decreases its speed by 20 km/h after travelling for 1 hour and reaches its destination in 6 hours. According to this, how many hours would this entire trip take if the vehicle had not decreased its speed?

A) 3 B) 4 C) 5 D) 6 E) 8

7. Bir araç belli bir hızla harekete başladıktan sonra her saat başında hızını 20 km/s azaltarak 300 km uzunluğundaki yolu 3 saatte alıyor. Buna göre, bu aracın ilk hızı kaç km/s'dir?

A vehicle starts travelling at a certain speed and decreases its speed by 20 km/s every hour and travels a distance of 300 km in 3 hours. According to this how many km/s was the initial speed of this vehicle?

A) 100 B) 120 C) 130 D) 140 E) 150

8. Saatteki hızı 60 km olan araç harekete başladıktan sonra her saat başında hızını 20 km/s artırıyor. Bu araç 3 saat sonra toplam kaç km yol alır?

A vehicle with a speed of 60 km/s increases its speed by 20 km/s every hour after it takes off. How many km does this vehicle travel after 3 hours?

A) 100 B) 180 C) 240 D) 300 E) 340

9. Aralarında 100 km mesafe bulunan A ve B noktalarından aynı anda, aynı yönde 70 km/s ve 50 km/s hızlarla iki araç hareket ediyorlar ve C noktasında hızlı olan araç, yavaş olan araca yetişiyor. Buna göre |BC| kaç km'dir?

Two vehicles simultaneously take off from points A and B, which are 100 km apart from each other, in the same direction, with a velocity of 70 km/h and 50 km/h, respectively, and the faster vehicle catches up with the slower vehicle at point C. According to this how many km is |BC|?

A) 300 B) 280 C) 250 D) 240 E) 200

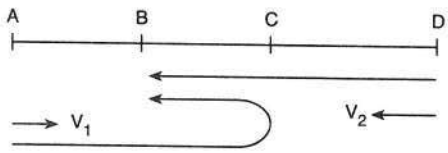
Hareket Problemleri (Movement Problems)

10. A kentinden hızı 100 km/s ve B kentinden hızı 80 km/s olan iki araç aynı anda, aynı yönde hareket ediyorlar. Hızlı olan araç, yavaş olana 18 saatte yetişiyor. Buna göre, bu iki araç birbirine doğru hareket ederse kaç saat sonra karşılaşırlar?

Two vehicles simultaneously take off from cities A and B, in the same direction, with respective speeds of 100 km/h and 80 km/h. The faster vehicle catches up with the slower vehicle in 18 hours. According to this, if these two vehicles were to travel towards each other how many hours would it take for them to encounter each other?

A) 1 B) 2 C) 3 D) 4 E) 5

11.



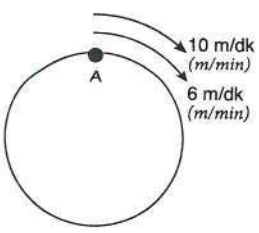
$3|AB| = 2|BC| = 4|CD|$

A noktasından V_1, D noktasından V_2 hızla iki araç aynı anda harekete başlıyorlar. V_1 hızındaki araç C noktasına uğrayıp geri dönüyor. D noktasından hareket eden araçla B noktasında karşılaşıyorlar. Buna göre V_1 / V_2 oranı kaçtır?

Two vehicles take off from points A and D with velocities V1 and V2, respectively. The vehicle with the velocity V1 reaches to point C and turns back. They meet with the vehicle which took off from point D at point B. According to this what is the ratio of V_1/V_2 ?

A) 1 B) $\frac{5}{3}$ C) $\frac{16}{9}$ D) $\frac{15}{8}$ E) 2

12.



Çevresi 200 m olan dairesel pistin üzerindeki bir A noktasından aynı anda, aynı yönde koşmaya başlayan iki atlet kaç dakika sonra 2. defa karşılaşırlar?

How many minutes would it take for two athletes starting to run in the same direction from point A on a circular track with a circumference of 200 m to encounter each other a 2nd time?

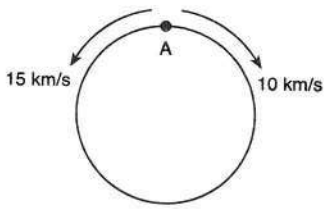
A) 25 B) 50 C) 100 D) 1500 E) 200

13. Bir araç 2 saat boyunca 200 km/s ve 3 saat boyunca 160 km/s hızla hareket ediyor. Buna göre, bu aracın ortalama hızı kaç km/s'dir?

A vehicle travels at 200 km/h for 2 hours and it travels 160 km/h for 3 hours. According to this how many km/h is the average speed of the vehicle?

A) 196 B) 181 C) 180 D) 176 E) 165

14.



Çevresi 50 km olan dairesel pist üzerindeki bir A noktasından aynı anda, zıt yönlerde 15 km/s ve 10 km/s hızlarla hareket eden iki araç 2. defa kaç saat sonra karşılaşırlar?

How many hours would it take for two vehicles taking off with velocities of 15 km/h and 10 km/h respectively, in opposite directions from point A on a circular track with a circumference of 50 km to encounter each other a 2nd time?

A) 1 B) 2 C) 4 D) 6 E) 8

15. Saatteki hızı 90 km olan bir tren bir direği 6 saniyede geçiyor. Buna göre uzunluğu 450 m olan bir tüneli kaç saniyede geçer? (Direğin genişliği ihmal edilecektir.)

A train with a speed of 90km/h passes a post every 6 seconds. According to this, how many minutes would it take for it to pass a tunnel with a length of 450 meters? (The width of the post is negligible).

A) 12 B) 15 C) 16 D) 18 E) 24

16. Durgun sudaki hızı 40 km/s olan bir deniz aracının 6 saat yetecek kadar yakıtı vardır. Akıntı hızının 20 km/s olduğu bir nehirde bu aracın başladığı noktaya geri dönebilmesi için hareket ettiği noktadan en fazla kaç km uzaklaşabilir?

A sea vehicle with a speed of 40 km/h on still water has enough fuel to last for 6 hours. How many km does this vehicle have to travel in a river with a flow rate of 20 km/h in order to be able to reach the point of take off?

A) 75 B) 90 C) 105 D) 120 E) 150

Hareket Problemleri (Movement Problems)

1. Bir araç 600 km uzunluğundaki yolu 4 saatte gidiyor. Aynı araç 3 saatte kaç km yol alır?

A vehicle travels a 600 km long road in 4 hours. How much distance would the same vehicle cover in 3 hours?

A) 500 B) 450 C) 400 D) 350 E) 300

2. Aralarında 400 km mesafe bulunan iki şehirden iki araç birbirlerine doğru aynı anda hareket ediyorlar. Araçlardan birinin hızı 60 km/s, diğerinin hızı 40 km/s olduğuna göre, bu iki araç kaç saat sonra karşılaşırlar?

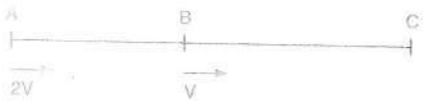
Two vehicles simultaneously take off towards each other from two cities which are 400 km apart. If the speed of one of the vehicles is 60 km/h, and the other is 40 km/h how many hours later will these two vehicles meet?

A) 2 B) 3 C) 4 D) 6 E) 8

3. A ve B şehirleri arasındaki mesafe 480 km'dir. A ve B şehirlerinden aynı anda, aynı yöne doğru hareket eden araçlardan arkadaki aracın hızı 90 km/s, öndeki aracın hızı 30 km/s'dir. Arkadaki araç, öndeki aracı kaç saat sonra yakalar?

The distance between city A and city B is 480 km. Among two vehicles which simultaneously take off in the same direction from city A and city B, respectively, the speed of the vehicle that is at the back is 90 km/h and the speed of the vehicle that is at the front is 30 km/s. How many hours later will the vehicle at the back catch up with the vehicle at the front?

A) 4 B) 5 C) 6 D) 7 E) 8

4. 

|AC| = 120 km

Aynı anda A ve B noktalarından 2V ve V hızlarıyla harekete başlayan iki araç C noktasında karşılaşıyorlar. Buna göre, |AB| kaç km'dir?

Two vehicles which simultaneously take off from points A and B with velocities 2V and V, respectively meet at point C. According to this how many km is |AB|?

A) 40 B) 60 C) 80 D) 90 E) 100

5. Bir araç A ve B kentleri arasındaki yolu 6 saatte gidiyor. Eğer bu araç hızını 20 km/s artırırsa aynı yolu 5 aatte gidiyor. Buna göre, A ve B kentleri arasındaki yol kaç km'dir?

A vehicle travels the distance between city A and city B in 6 hours. If this vehicle increases its speed by 20 km/h it travels the same distance in 5 hours. According to this what is the distance between city A and city B?

A) 600 B) 520 C) 500 D) 450 E) 360

6. Bir araç gideceği yolun $\frac{1}{2}$'sini 40 km/s hızla, kalan kısmını da 50 km/s hızla gidiyor. Araç toplam 9 saat hareket ettiğine göre, 40 km/s hızla kaç km yol almıştır?

A vehicle travels 1/2 of the distance it will travel at a speed of 40 km/h, and the rest of it at a speed of 50 km/h. If the vehicle travels for a total of 9 hours how many km has it traveled with a speed of 40 km/h?

A) 100 B) 120 C) 160 D) 180 E) 200

7. Bir araç gideceği yolu 2 katına çıkarır, hızını da yarıya düşürürse varış süresi nasıl değişir?

How does the travel time to destination change if a vehicle doubles the distance it will travel and halves its speed?

A) 2 katına çıkar *(it doubles)*
B) 4 katına çıkar *(it quadruples)*
C) Yarıya düşer *(it is halved)*
D) 3 katına çıkar *(it triples)*
E) Değişmez *(No change)*

8. Bir otomobil iki şehir arasındaki yolu 80 km/s hızla gidip 120 km/s hızla geri dönüyor. Otomobilin bu yolculuk boyunca ortalama hızı kaç km/s'dir?

A car travels the road between two cities with a speed of 80 km/h and returns to the city of origin with a speed of 120 km/h. How many km/h is the average speed of the car during this trip?

A) 88 B) 90 C) 92 D) 96 E) 104

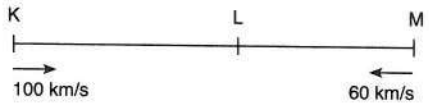
Hareket Problemleri (Movement Problems)

9. Bir otomobil gideceği yolun 2/3'ünü 30 km/s hızla, geri kalanını 60 km/s hızla gidiyor. Buna göre, otomobilin yol boyunca ortalama hızı kaç km/s'dir?

A car travels 2/3 of the road with a speed of 30 km/h and the rest of the road with a speed of 60 km/h. According to this what is the average speed of the car throughout the trip?

A) 32 B) 36 C) 45 D) 50 E) 54

10.

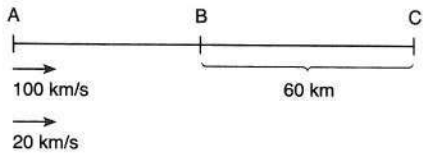


Hızları 100 km/s ve 60 km/s olan iki araç K ve M şehirlerinden birbirlerine doğru aynı anda hareket ediyorlar ve L şehrinde karşılaşıyorlar. Karşılaştıktan 3 saat sonra K şehrinden hareket eden araç M şehrine varıyor. Buna göre, |KL| kaç km'dir?

Two vehicles with velocities of 100 km/h and 60 km/h, respectively, simultaneously take off from cities of K and M and travel towards each other and meet at city L. After they meet, the vehicle which took off from city K reaches city M. According to this, how many km is |KL|?

A) 300 B) 420 C) 450 D) 500 E) 540

11.



A noktasından aynı anda, aynı yöne doğru 100 km/s ve 20 km/s hızlarla hareket eden iki araçtan hızlı giden araç C noktasına ulaştıktan sonra beklemeden geri dönüyor. Dönüşte B noktasında yavaş giden araçla karşılaşıyor.

|BC| = 60 km ise |AB| kaç km'dir?

Among two vehicles which simultaneously take off from point A in the same direction with a velocity of 100km/h and 20 km/h respectively, the faster vehicle turns back without delay once it reaches point C. It meets with the slower vehicle at point B on its way back. If |BC| = 60 km, then, how many km is |AB|?

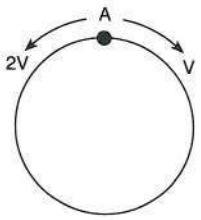
A) 20 B) 30 C) 36 D) 40 E) 48

12. Bir araç A şehrinden B şehrine 100 km/s hızla gidiyor. Dönüşte hızını 20 km/s artırıyor. Gidiş-dönüş yolculuğu toplam 11 saat sürdüğüne göre, A ile B şehirleri arasındaki mesafe kaç km'dir?

A vehicle is travelling from city A to city B with a velocity of 100 km/h. It increases its velocity by 20 km/h during the return to city A from city B. If the round trip takes a total of 11 hours, what is the distance between city A and city B?

A) 380 B) 400 C) 480 D) 600 E) 720

13.



Çevresi 300 km olan dairesel bir pistin A noktasından aynı anda, zıt yönlerde V ve 2V hızlarla hareket eden iki araç 2 saat sonra karşılaşıyorlar. Buna göre, V kaçtır?

Two vehicles which simultaneously take off from point A of a circular track with a circumference of 300 km in opposite directions and with velocities of V and 2V respectively meet after 2 hours. According to this what is V?

A) 50 B) 100 C) 150 D) 200 E) 250

14. Bir tekne akıntıya karşı 25 dakikada gidebildiği 400 m uzunluğundaki mesafeyi, akıntıyla aynı yönde 10 dakikada gidebiliyor. Buna göre, teknenin durgun sudaki hızı dakikada kaç metredir?

A boat can travel a distance of 400 m in 10 minutes if it travels in the same direction of the current, and 25 minutes if it travels against the current. According to this what is the velocity of this boat in still water?

A) 35 B) 30 C) 28 D) 16 E) 8

15. Bir araç 100 km/s hızla 4 saatte ulaşabileceği yere giderken, 200 km yol aldıktan sonra 20 dakika mola veriyor. Gideceği yere zamanında ulaşabilmesi için hızını saatte kaç km artırmalıdır?

When a vehicle is travelling to a destination which it can reach in 4 hours at a velocity of 100 km/h, it gives a 20 minute break after travelling for 200 km. How many km/h does it have to increase to reach its destination on time?

A) 10 B) 20 C) 30 D) 40 E) 50

16. Bir araç V km/s hızla t saat hareket ederek x km yol alıyor.

Bu araç 3V km/s hızla $\frac{t}{2}$ saat giderse kaç km yol alır?

A vehicle travels a distance of x km by traveling for t hours with a velocity of V km/s. How many km will this vehicle travel if it moves with a velocity of 3V for t/2 hours?

A) $\frac{x}{6}$ B) $\frac{2x}{3}$ C) 0 D) $\frac{3x}{2}$ E) 6x

İşçi Problemleri (Work Output Problems)

1. Mine bir işi tek başına 20 günde, Bahadır ise 5 günde bitirebiliyor. Buna göre ikisi birlikte aynı işi kaç günde bitirebilir?

Mine completes a work in 20 days by herself. Bahadır completes a work in 5 days on his own. According to this, how many days does it take for them to complete the same work together?

A) 2 B) 4 C) 5 D) 8 E) 10

2. Selin bir işi a günde, İpek aynı işe $\frac{a}{2}$ günde bitiriyor. İkisi birlikte çalışarak aynı işi 8 günde bitirebildiklerine göre a kaçtır?

Selin completes a work in "a" days. İpek completes the same work in "a/2" days. They complete the same work in 8 days by working together. Then, what is "a"?

A) 32 B) 24 C) 16 D) 8 E) 4

3. Bir işi bir işçi 24 günde yapabilmektedir. Bu işçi çalışma hızını 3 katına çıkarırsa aynı işi kaç günde yapar?

A worker can complete a work in 24 days. If this worker increases his speed by 3 times, how many days will it take for him to complete the same work?

A) 72 B) 64 C) 48 D) 32 E) 8

4. Bir işçi bir işi 8 saatte, diğer işçi aynı işi 24 saatte yapmaktadır. Buna göre iki işçi birlikte işin tamamını kaç saatte yapar?

A worker completes a work in 8 hours and another worker completes the same work in 24 hours. According to this, how many hours does it take for these two workers to complete the entire work together?

A) 4 B) 5 C) 6 D) 8 E) 10

5. Yağız'ın çalışma hızı, Eray'ın çalışma hızının 2 katı kadardır. İkisi birlikte aynı işi 6 günde bitirebildiklerine göre Yağız bu işi tek başına kaç günde bitirebilir?

The work speed of Yağız is 2 times the work speed of Eray. If they complete the same work in 6 days together, then how many days does it take for Yağız to complete the same work on his own?

A) 36 B) 32 C) 24 D) 18 E) 9

6. Gamze bir işi, Özgür'ün bitirdiği sürenin 3 katı kadar sürede bitirebilmektedir. İkisi birlikte aynı işi 18 günde bitirebildiklerine göre Özgür bu işi tek başına kaç günde bitirir?

Gamze completes a work 3 times faster than Özgür does. If they complete the same work in 18 days together, then how many days does it take for Özgür to complete this work by himself?

A) 16 B) 18 C) 24 D) 36 E) 40

7. Can ile Efe bir işi birlikte 10 günde bitiriyorlar. Can 5 gün, Efe 2 gün çalışırsa işin $\frac{2}{5}$'ini bitiriyorlar. Can bu işi tek başına kaç günde bitirir?

Can and Efe complete a work together in 10 days. If Can works 5 days and Efe works 2 days, they complete the 2/5 of the work. How many days does it take for Can to complete this work in his own?

A) 10 B) 15 C) 20 D) 25 E) 30

8. Bir işi tek başına Emre 18 günde, Merve 24 günde, Altuğ 36 günde bitiriyor. Üçü birlikte çalıştıktan 6 gün sonra Merve işi bırakıyor. Kalan işi Emre ile Altuğ kaç günde bitirirler?

Emre completes a work in 17 days, Merve completes it in 24 days, and Altuğ completes it in 36 days. After they all work together for 6 days, Merve stops working. How many days does it take for Emre and Altuğ to complete to rest of the work?

A) 12 B) 8 C) 6 D) 4 E) 3

İşçi Problemleri (Work Output Problems)

9. Mete bir işi 40 günde yapmaktadır. Buna göre işin $\frac{7}{8}$'ini kaç günde yapar?

Mete completes a work in 40 days. According to this, how many days does it take for him to complete 7/8 of the work?

A) 37 B) 35 C) 33 D) 30 E) 27

10. Bir işi Ömer ile Burak 10 saatte, Burak ile Ceyhun 15 saatte, Ömer ile Ceyhun 20 saatte yapabiliyorlar. Buna göre Ömer işin tamamını tek başına kaç saatte bitirir?

Ömer and Burak complete a work in 10 hours, Burak and Ceyhun complete it in 15 hours and Ömer and Ceyhun complete it in 20 hours. According to this, how many hours does it take for Ömer to complete the entire work by himself?

A) 36 B) 30 C) 28 D) 24 E) 20

11. Bir işi 6 usta 12 günde, 6 çırak 18 günde bitirebilmektedir. Buna göre 1 usta ve 3 çırak aynı işi beraber kaç günde bitirirler?

6 masters complete a work in 12 days and 6 apprentices complete it in 18 days. According to this, how many days does it take for 1 master and 3 apprentices to complete the same work together?

A) 6 B) 12 C) 24 D) 32 E) 36

12. Deniz bir işin tamamını 15 günde yapabilmektedir. İşe başladıktan 3 gün sonra yanına bir yardımcı olarak işin kalan kısmını birlikte 4 günde bitirdiklerine göre, aynı işin tümünü yardımcısı tek başına kaç günde yapabilir?

Deniz completes an entire work in 15 days. After he works for 3 days, the rest of the work is completed together in 4 days when Deniz takes someone to help with her. Then, how many days does it take for her helper to complete the entire work on his own?

A) $\frac{15}{2}$ B) 19 C) $\frac{8}{3}$ D) 6 E) 5

13. İki işçi bir işi birlikte 3 günde bitiriyorlar. Birinci işçi tek başına 2 gün, ikinci işçi tek başına 4 gün çalışınca işin $\frac{5}{6}$'sı bitiyor. Kalan işi ikinci işçi tek başına kaç günde bitirir?

Two workers complete a work together in 3 days. When the firs worker works for 2 days on his own and the second worker works for 4 days, 5/6 of the work is completed. How many days does it take for the second worker to complete the rest of the work by himself?

A) 8 B) 12 C) 16 D) 20 E) 22

14. Kerem 24 günde bitirebildiği bir işi, her gün 2 saat fazla çalışarak 12 günde bitirmiştir. Buna göre Kerem günlük kaç saat çalışmıştır?

Kerem completes a work in 24 days. He has completed the same work in 12 days by working 2 extra hours per day. According to this, how many hours has he worked in a day?

A) 1 B) 2 C) 3 D) 4 E) 5

15. Eşit güçteki 5 işçi beraber bir işe başlıyorlar. Her gün bir işçi ayrılarak işin tamamını 4 günde bitiriyorlar. Buna göre, bir işçi bu işin tamamını tek başına kaç günde bitirir?

5 workers having to equivalent strengths start working together. They complete the entire work in 4 days on condit'an that one worker quits working each day. According to this, how many days does it take for 1 worker to complete the entire work?

A) 12 B) 14 C) 16 D) 18 E) 20

16. Bir işi Elif ile Alp birlikte 16 günde yapmaktadır. Elif 3 gün, Alp 4 gün çalışırsa işin $\frac{4}{5}$'i kalmış oluyor. Buna göre Elif bu işi tek başına kaç günde yapar?

Elif and Alp complete a work together in 16 days. If Elif works for 3 days and Alp works for 4 days, 4/5 of the work is left. Then, how many days does it take for Elif to complete this work on her own?

A) 16 B) 20 C) 24 D) 28 E) 32

İşçi Problemleri (Work Output Problems)

1. Bir işin $\frac{2}{3}$'ünü 12 günde bitiren işçi tamamını kaç günde bitirir?

How many days would it take for a worker who completes 2/3 of a work in 12 days to complete the entire work?

A) 24 B) 20 C) 18 D) 16 E) 12

2. Bir işi tek başına Murat 6 günde, Fatih 12 günde bitirdiğine göre, ikisi beraber aynı işi kaç günde bitirler?

If Murat completes a work by himself in 6 days, and Fatih completes it by himself in 12 days, how many days would it take for them to complete the same work together?

A) 2 B) 3 C) 4 D) 5 E) 6

3. Bir işi Leyla 8 günde, Mecnun 12 günde yapabilmektedir. Leyla 4 gün, Mecnun 3 gün çalışırsa geriye işin ne kadarı kalır?

Leyla completes a work in 8 days and Mecnun completes it in 12 days. If Leyla works for 4 days and Mecnun works for 3 days, how much of the work will be left unfinished?

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{2}{3}$ D) $\frac{3}{5}$ E) $\frac{1}{7}$

4. Gül'ün 8 günde yaptığı işi, Eser 6 günde yapıyor. İkisi beraber aynı işin $\frac{7}{12}$'sini kaç günde yaparlar?

Eser completes a work in 6 days, which Gül completes in 8 days. How many days would it take for them to complete 7/12 of the same work together?

A) 2 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

5. Ceren'in çalışma hızı, Musa'nın çalışma hızının iki katına eşittir. İkisi beraber bir işi 12 günde yaptığına göre, Musa bu işi tek başına kaç günde bitirir?

Ceren's working speed is equal to twice the working speed of Musa. If they complete a work in 12 days together, how many days would Musa need to complete it by himself?

A) 36 B) 32 C) 24 D) 18 E) 16

6. Çalışma kapasitesi aynı olan 3 işçiden birisi bir işi 12 günde bitiriyor. Buna göre üçü birlikte aynı işi kaç günde bitirir?

One of three workers with identical working capacities completes a work in 12 days. According to this how many days would it take for the three of them to complete the work?

A) 2 B) 3 C) 4 D) 6 E) 8

7. 6 parça işi tek başına Fevzi 4 günde, Tuncay 8 günde bitiriyor. 36 parça işi ikisi beraber kaç günde bitirirler?

Fevzi completes 6 pieces of work by himself in 4 days, and Tuncay completes the same work by himself in 8 days. In how many days can they complete 36 pieces of work together?

A) 10 B) 12 C) 16 D) 20 E) 24

8. Bir işi 12 günde bitiren bir işçi hızını % 20 azaltarak aynı işi kaç günde bitirir?

How long would it take a worker who completes a work in 12 days, to finish the same work if he reduced his speed by 20%?

A) 15 B) 17 C) 18 D) 20 E) 24

İşçi Problemleri (Work Output Problems)

9. Ayşe bir işi 4 günde, Fatma 6 günde bitirmektedir. İkisi beraber işe başladıktan 2 gün sonra Ayşe işi bırakıyor. Fatma kalan işi kaç günde bitirir?

Ayşe completes a work in 4 days and Fatma completes it in 6 days. Ayşe stops working 2 days after they start the work together. How many days does it take Fatma to complete the remaining work?

A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

10. Necati bir işi tek başına 15 günde, aynı işi Meral tek başına 20 günde bitirmektedir. İkisi beraber 5 günde aynı işin ne kadarını bitirirler?

Necati completes a work in 15 days by himself, and Meral completes the same work in 20 days by herself. How much of the work can they complete if they work together for 5 days?

A) $\frac{1}{3}$ B) $\frac{1}{6}$ C) $\frac{3}{14}$ D) $\frac{7}{12}$ E) $\frac{9}{14}$

11. Tunç bir işi x günde, Sıla ise aynı işi 2x günde tamamlayabiliyor. Tunç ile Sıla bu işi birlikte 4 günde bitirdiklerine göre, Tunç bu işi tek başına kaç günde bitirir?

Tunç completes a work in x days and Sıla completes the same work in 2x days. If Tunç and Sıla complete this work in 4 days when they work together, how long would it take for Tunç to complete it by himself?

A) 10 B) 9 C) 8 D) 7 E) 6

12. Selim ile Kerim bir işi birlikte 6 günde bitiriyorlar. Selim 2 gün, Kerim 3 gün çalışırsa bu 2/5'i bitiyor. Buna göre Selim bu işin tamamını kaç günde bitirir?

Selim and Kerim complete a work in 6 days when they work together. If Selim works for 2 days and Kerim works for 3 days 2/5 of the work is completed. According to this how many days would it take for Salim to complete all of this work?

A) 20 B) 18 C) 16 D) 12 E) 10

13. Gökçe bir işin 1/3'ünü yaptıktan sonra çalışma hızını iki katına çıkarıyor ve 4 gün sonra iş bitiyor. Buna göre hızını artırmasaydı işin tamamını kaç günde bitirirdi?

Gökçe doubles her working speed after completing 1/3 of a work, and she finishes the work after 4 days. According to this, how many days would it take her to complete the work if she hadn't increased her speed?

A) 8 B) 12 C) 16 D) 20 E) 22

14. Fırat'ın 8 günde yaptığı işin 2 katını Murat 12 günde bitiriyor. İkisi beraber 2 günde işin ne kadarını bitirirler?

Murat completes in 12 days twice the work Fırat completes in 8 days. How much of the work would they be able to finish together in 2 days?

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{7}{12}$ D) $\frac{5}{12}$ E) $\frac{3}{17}$

15. Bir işi Kadir 10 günde, Mehmet 15 günde bitiriyor. İkisi işe başladıktan 5 gün sonra Kadir işi bırakıyor. Mehmet kalan işi tek başına kaç günde bitirir?

Kadir completes a work in 10 days and Mehmet completes it in 15 days. Kadir stops working 5 days after they start working together. How many days will it take for Mehmet to complete the remaining work?

A) 2 B) $\frac{5}{2}$ C) 3 D) $\frac{7}{2}$ E) 4

16. Saffet ile Mehmet bir işi birlikte 2 saatte bitiriyor. Saffet aynı işi tek başına, Mehmet'in tek başına bitirebileceğinden 3 saat erken bitiriyor. Buna göre Saffet bu işi tek başına kaç saatte bitirir?

Saffet and Mehmet can finish a work in 2 hours when they work together. Saffet completes the work on his own 3 hours earlier than Mehmet would complete it on his own. According to this how many hours would it take for Saffet to complete this work?

A) 2 B) 3 C) 4 D) 6 E) 12

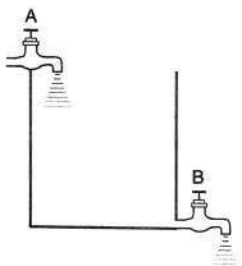
Havuz Problemleri (Pool Problems)

1. Bir havuzu iki musluk birlikte 4 saatte doldururken üçüncü musluk 6 saatte boşaltıyor. Havuz boş iken üç musluk da birlikte açılırsa 2 saat sonra havuzun kaçta kaçı dolar?

Two faucets fill a pool together in 4 hours and the third faucet empties it in 6 hours. When the pool is empty, these three faucets are opened at the same time. After 2 hours, how much of the pool will be filled (in ratio)?

A) $\frac{1}{3}$ B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) $\frac{1}{6}$ E) $\frac{3}{4}$

2.

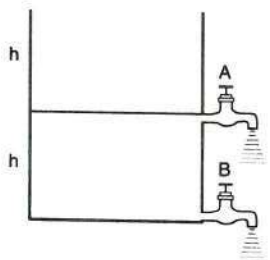


Şekildeki boş havuzu A musluğu tek başına 6 saatte dolduruyor. B musluğu dolu havuzu tek başına 24 saatte boşaltıyor. Buna göre havuzun $\frac{1}{4}$'ü dolu iken iki musluk birlikte açıldığında havuz kaç saatte dolar?

Faucet A fills the empty pool in the figure in 6 hours by itself. Faucet B empties the full pool in 24 hours by itself. According to this, how many hours will it take for the pool to be filled if both faucets are opened at the some time when the 1/4 of the pool is full?

A) 6 B) 7 C) 8 D) 12 E) 15

3.

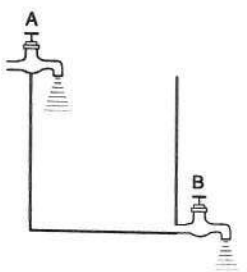


A ve B muslukları birlikte açıldığında dolu havuz 75 dakikada boşalıyor. Buna göre B musluğu dolu havuzu tek başına kaç dakikada boşaltır?

When faucets A and B are opened at the same time, the pool is emptied in 75 minutes. How many minutes does it take for the faucet B to empty the pool?

A) 80 B) 90 C) 100 D) 120 E) 160

4.

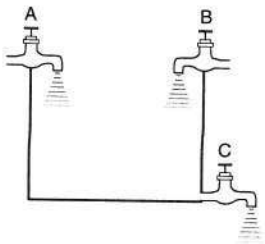


Şekildeki boş havuzu A musluğu 8 saatte dolduruyor. B musluğu 12 saatte boşaltıyor. İki musluk aynı anda açıldıktan 4 saat sonra havuzun dolu kısmının boş kısmına oranı ne olur?

Faucet A fills the pool in the figure in 8 hours. Faucet B empties it in 12 hours. What will the ratio of the full side of the pool to the empty side of it become after both faucets are left open for 4 hours?

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$ E) 1

5.



Şekildeki boş havuzu A ve B muslukları birlikte 8 saatte dolduruyor. Havuzun dibindeki C musluğu dolu havuzu 12 saatte boşaltıyor. Bu üç musluk aynı anda açılıyor ve 3 saat açık kalıyor. Havuzun kaçta kaçı dolar?

Faucets A and B fill the pool in the figure together in 8 hours. Faucet C at the bottom of the pool empties the full pool in 12 hours. These three faucets are opened at the same time and they are left open for 3 hours. How much of the pool will be filled (in ratio)?

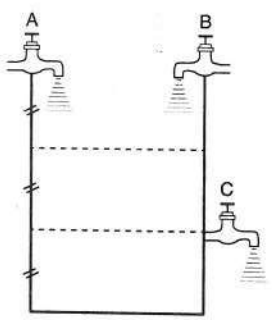
A) $\frac{1}{8}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

6. Bir musluk boş bir havuzu 24 saatte doldurmaktadır. Buna göre bu musluğun kapasitesi 2 kat artırılırsa aynı havuzu kaç saatte doldurur?

A faucet fills an empty pool in 24 hours. According to this, if the capacity of the faucet is increased by 2 times, then how many hours will it take for the faucet to fill the same pool?

A) 6 B) 8 C) 12 D) 48 E) 72

7.

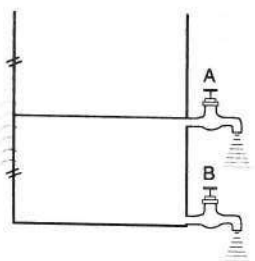


Boş bir havuzu A musluğu 36, B musluğu 12 saatte dolduruyor. C musluğu ise havuzun üst kısmını 24 saatte boşaltıyor. Üçü birlikte açıldığında boş havuzun tamamı kaç saatte dolar?

Faucet A fills an empty pool in 36 hours. Faucet B fills it in 12 hours. Faucet C empties it in 24 hours. Then, how many hours will it take to fill the entire pool when these three faucets are opened together?

A) 8 B) 9 C) 10 D) 11 E) 12

8.



Şekildeki boş havuzu A ve B muslukları aynı anda açıldığında 9 dakikada boşaltmaktadır. A ve B muslukları özdeş olduğuna göre, B musluğu dolu havuzu kaç dakikada boşaltır?

Faucets A and B empty the pool in the figure in 9 minutes when they are opened at the same time. If faucets A and B are identical, then how many minutes does it take for faucet B to empty the full pool?

A) 10 B) 12 C) 14 D) 16 E) 18

Havuz Problemleri (Pool Problems)

9. Bir havuzu tek başına 14 saatte doldurabilen bir musluğun kapasitesi % 75 artırılırsa aynı havuz kaç saatte dolar?

A faucet fills a pool by itself in 14 hours. If the capacity of the faucet is increased by 75%, the how many hours will it take for the pool to be filled?

A) 9 B) 8 C) 7 D) 6 E) 5

10. Boş bir havuzu iki musluktan birinicisi, ikincisinden 15 saat daha kısa sürede doldurmaktadır. Bu havuz boş iken iki musluk birlikte havuzu 10 saatte doldurduğuna göre ikinci musluk tek başına kaç saatte doldurur?

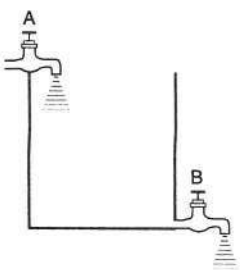
From two faucets, the first faucet fills the pool 15 hours faster than the second one. These two faucets fills the pool together in 10 hours. When this pool is empty. Then, how many hours does it take for the second faucet to fill to pool by itself?

A) 20 B) 25 C) 30 D) 35 E) 40

11. Bir musluk bir havuzu 6 saatte doldurabiliyor. Aynı musluğun havuzu 5 saatte doldurabilmesi için birim zamanda akıttığı su miktarı yüzde kaç artırılmalıdır?

A faucet fill a pool in 6 hours. To how much percent should the faucet's rate of flow be increased in order for the faucet to fill the pool in 5 hours?

A) 20 B) 25 C) 30 D) 40 E) 50

12. 

Yandaki şekilde verilen boş havuzu A musluğu tek başına 4 saatte dolduruyor. B musluğu dolu havuzu tek başına 8 saatte boşaltıyor. Havuz dolu iken B musluğu 2 saat açık bırakıldıktan sonra A musluğu da açılıyor. A musluğu açıldıktan kaç saat sonra havuz tamamen dolar?

Faucet A fills the pool given in the figure in 4 hours by itself. Faucet B empties the full pool in 8 hours. Faucet B is left open for 2 hours when the pool is full. And then, faucet A is opened, as well. How many hours will it take for the pool to be filled completely after faucet A is opened?

A) 2 B) 4 C) 6 D) 8 E) 10

13. Özdeş 7 musluk bir havuzu birlikte 10 saatte doldurmaktadır. Bu musluklardan 5'i aynı anda havuzu kaç saatte doldurur?

7 identical faucets fill a pool together in 10 hours. How many hours does it take for 5 of these faucets to fill the same pool?

A) 7 B) 10 C) 11 D) 12 E) 14

14. Aynı miktarda su akıtan iki musluk birlikte boş bir havuzu 12 saatte doldurabiliyor. Musluklardan ikisinin de hızı yarıya düşürülüyor. Buna göre son durumda iki musluk boş havuzu birlikte kaç saatte doldurur?

The faucets with the same rate of flow fill an empty pool together in 12 hours. Both of their flow velocities are decreased by half. According to the last situation, how many hours does it take for the two faucets to fill the pool together?

A) 36 B) 24 C) 12 D) 6f E) 4

15. İki musluktan birincisi havuzu 24 saatte, ikincisi 12 saatte doldurabiliyor. Havuz boş iken musluklar aynı anda açıldığında havuzun $\frac{3}{4}$'ü kaç saatte dolar?

From two faucets, the first faucet fills the pool in 24 hours and the second one fills in 12 hours. How many hours will it take for these two faucets to fill the 3/4 of the pool when the pool in empty and the faucets are opened at the same time?

A) 6 B) 5 C) 4 D) 3 E) 2

16. Bir musluk bir depoyu a günde dolduruyor. Musluk açıldıktan 4 gün sonra deponun dolu kısmı, musluk açıldıktan 2 gün sonraki boş kısmına eşit olduğuna göre a kaçtır?

A faucet fills a water tank in "a" days. The faucet is opened and after 4 days the full side of the tank becomes equal to the empty side after 2 days. Then, what is "a"?

A) 4 B) 6 C) 8 D) 10 E) 12

Havuz Problemleri (Pool Problems)

1. A musluğu boş havuzu 3 saatte, B musluğu 6 saatte dolduruyor. Buna göre, bu iki musluk birlikte boş havuzu kaç saatte doldurur?

Faucet A fills an empty pool in 3 hours and faucet B fills it in 6 hours. According to this, how many hours will it take for these two faucets to fill the pool together?

A) 1 B) $\frac{3}{2}$ C) 2 D) $\frac{5}{2}$ E) 3

2. Boş bir havuzu 1. musluk 3 saatte, 2. musluk 6 saatte doldurabilmektedir. Havuzun 1/3'ü dolu iken bu iki musluk birlikte açılırsa havuzun kalan kısmı kaç saatte dolar?

First faucet fills an empty pool in 3 hours and the second faucet fills it in 6 hours. If these two faucets are opened when 1/3 of the pool is full, how many hours will it take for the remainder of the pool to fill?

A) $\frac{1}{2}$ B) 1 C) $\frac{4}{3}$ D) 2 E) $\frac{5}{2}$

3. A musluğu boş havuzu 4 saatte doldurmakta, havuzun dibindeki B musluğu dolu havuzu 8 saatte boşaltmaktadır. Buna göre bu iki musluk açıldıktan kaç saat sonra boş havuz dolar?

Faucet A fills an empty pool in 4 hours and faucet B located at the bottom of the pool empties a full pool in 8 hours. According to this, how many hours will it take for the empty pool to be filled after both of these faucets are opened?

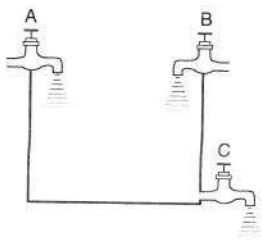
A) 6 B) 8 C) 10 D) 12 E) 16

4. Boş bir havuzu x ve y muslukları doldururken z musluğu boşaltmaktadır. Bu havuz; x ve y muslukları açıkken 3 saatte, x ve z muslukları açıkken 8 saatte, y ve z muslukları açıkken 6 saatte dolmaktadır. Buna göre z musluğu dolu havuzu kaç saatte boşaltır?

While x and y faucets fill a pool, z faucet empties it. This pool fills in 3 hours when faucets x and y are open, in 8 hours when faucets x and z are open and in 6 hours when faucets y and z are open. According to this how many hours does it take for faucet z to empty a full pool.

A) 48 B) 36 C) 32 D) 28 E) 24

5.

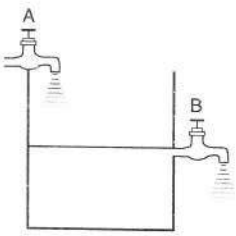


A musluğu boş havuzu 2 saatte, B musluğu boş havuzu 4 saatte dolduruyor. C musluğu da dolu havuzu 12 saatte boşaltıyor. Buna göre, boş havuz üç musluk aynı anda açıldıktan kaç saat sonra dolar?

Faucet A fills an empty pool in 2 hours and faucet B fills it in 4 hours. Faucet C empties a full pool in 12 hours. According to this, how many hours will it take for the empty pool to be filled after all three of these faucets are opened?

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

6.



A musluğu boş havuzu 4 saatte dolduruyor. Havuzun yarısında bulunan B musluğu seviyesine kadarki kısmı 4 saatte boşaltıyor. Buna göre boş havuz iki musluk aynı anda açıldıktan kaç saat sonra dolar?

Faucet A fills an empty pool in 4 hours and faucet B empties a pool to its level in 4 hours. According to this, how many hours will it take for the empty pool to be filled after both of these faucets are opened at the same time?

A) 10 B) 8 C) 6 D) 5 E) 4

7. Boş havuzu A musluğu 6 saatte, B musluğu 12 saatte doldurmaktadır. 5 saat sonra 60 litre su taştığına göre, havuzun tamamı kaç litre su alır?

Faucet A fills an empty pool in 6 hours and faucet B fills it in 12 hours. If after 5 hours 60 liters of water overflows, how many liters of water can the pool hold?

A) 300 B) 280 C) 240 D) 200 E) 180

8. Bir havuzun tamamını 6 ve 12 saatte dolduran musluklar birlikte kaç saat açık bırakıldığında havuzun 2/3'ü dolmuş olur?

How many hours should two faucets filling the empty pool in 6 and 12 hours respectively, be left open to fill the pool to 2/3 of its full capacity?

A) $\frac{5}{2}$ B) 3 C) $\frac{7}{2}$ D) $\frac{14}{5}$ E) $\frac{8}{3}$

Havuz Problemleri (Pool Problems)

9. İki musluktan biri 3 saatte, diğeri 4 saatte havuzu doldurmaktadır. Musluklardan biri diğerine göre saatte 20 lt daha fazla su akıttığına göre, havuz kaç litre su alır?

One of the two faucets fills a pool in 3 hours and the other fills it in 4 hours. If one of the faucets pours 20 lt. more water than the other, how many liters of water does the pool hold?

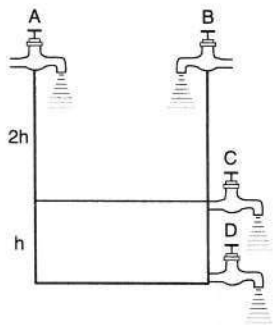
A) 270 B) 240 C) 180 D) 150 E) 120

10. A musluğu, B musluğunun 2 katı, C musluğu da B musluğunun 3 katı su akıtmaktadır. 3 musluk boş havuzu 4 saatte doldurduğuna göre, B musluğu boş havuzu tek başına kaç saatte doldurur?

Faucet A pours twice the amount of water faucet B pours, and faucet C pours three times the amount of water faucet B pours. If these three faucets together fill an empty pool in 4 hours, how many hours will it take for faucet B to fill the pool on its own?

A) 30 B) 28 C) 24 D) 22 E) 16

11.

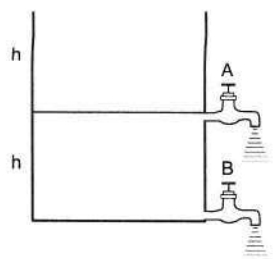


Boş havuzu A musluğu 9 saatte, B musluğu 12 saatte dolduruyor. C musluğu kendi seviyesine kadar olan kısmı 12 saatte boşaltıyor. D musluğu ise tamamını 18 saatte boşaltıyor. Buna göre, dört musluk aynı anda açıldığında havuz kaç saatte dolar?

Faucet A fills an empty pool in 9 hours and faucet B fills it in 12 hours. Faucet C empties a pool to its level in 12 hours. Faucet D empties a full pool in 18 hours. According to this, how many hours will it take for the empty pool to be filled when all four of these faucets are opened?

A) 4 B) $\frac{12}{5}$ C) $\frac{48}{7}$ D) $\frac{51}{7}$ E) $\frac{52}{5}$

12.



A ve B muslukları özdeş musluklardır. B musluğu tek başına havuzu 12 saatte boşalttığına göre, A ve B muslukları aynı anda açıldıklarında havuzu kaç saatte boşaltır?

Faucets A and B are identical. If faucet B empties a full pool by itself in 12 hours, how many hours does it take to empty a full pool when both faucets are opened?

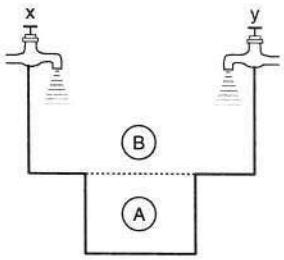
A) 12 B) 9 C) 8 D) 6 E) 4

13. A musluğu boş havuzu 6 saatte, B musluğu ise 4 saatte doldurmaktadır. A musluğu 2 saat açık kaldıktan sonra B musluğu da açılıyor. Buna göre havuzun tamamı kaç saatte dolar?

Faucet A fills an empty pool in 6 hours and faucet B fills it in 4 hours. Faucet B is opened 2 hours after opening faucet A. According to this how many hours does it take to fill the entire pool?

A) $\frac{18}{5}$ B) 4 C) $\frac{21}{5}$ D) 5 E) 6

14.

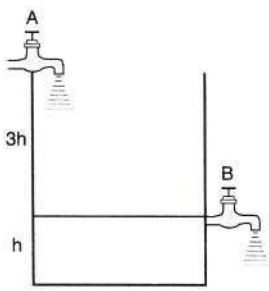


Havuzun tamamını x musluğu tek başına 20 saatte, y musluğu ise 12 saatte doldurmaktadır. x ve y muslukları B kısmını 6 saatte doldurduğuna göre, y musluğu A kısmını tek başına kaç saatte doldurur?

Faucet x fills the entire pool in 20 hours by itself and faucet y fills it in 12 hours. If x and y faucets fill the B section together in 6 hours, how many hours does it take for faucet y to fill section A by itself?

A) $\frac{17}{5}$ B) 3 C) $\frac{12}{5}$ D) 2 E) 1

15.

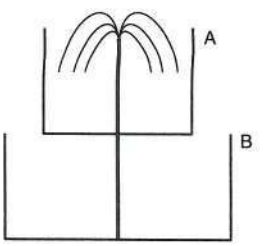


A musluğu boş havuzu 12 saatte doldurmakta, B musluğu da seviyesine kadar olan kısmı 24 saatte boşaltmaktadır. Bu iki musluk açıldıktan kaç saat sonra boş havuzun yarısı dolar?

Faucet A fills an empty pool in 12 hours and faucet B empties a pool to its level in 24 hours. How many hours after both of these faucets are opened will half of the pool be filled?

A) $\frac{24}{5}$ B) 2 C) $\frac{39}{5}$ D) $\frac{37}{5}$ E) 6

16.



Şekildeki A ve B havuzlarının hacimleri sırasıyla V ve 2V dir. B havuzu A'dan taşan suyla dolmaktadır. Havuzlar boş iken 14 saat sonra B havuzunun 2/3'ü dolduğuna göre, A ve B havuzlarının tamamı kaç saatte dolar?

The volumes of the A and B pools shown in the figure are V and 2V, respectively. Pool B is filled with the water overflowing from pool A. If after 14 hours 2/3 of pool B is filled, how many hours does it take for both A and B pools to be filled?

A) 20 B) 18 C) 16 D) 12 E) 10

İşçi ve Havuz Problemleri (Worker and Pool Problems)

1. Cüneyt bir işin tamamını 24 saatte bitirebiliyor. Buna göre, Cüneyt işin 3/4'ünü kaç saatte bitirebilir?

Cüneyt can complete a work in 24 hours. According to this, how many hours does it take for Cüneyt to complete 3/4 of this work?

A) 20 B) 18 C) 16 D) 14 E) 12

2. Mehmet bir işin 1/3'ünü 12 günde bitiriyor. Buna göre, Mehmet bu işin 3/4'ünü kaç günde bitirir?

Mehmet can complete 1/3 of a work in 12 days. According to this, how many days does it take for Mehmet to complete 3/4 of this work?

A) 27 B) 24 C) 20 D) 18 E) 15

3. Mert bir işin 1/4'ünü yaptıktan sonra aynı hızla 24 saat daha çalışarak kalan işin 1/2'sini yapmıştır. Buna göre, Mert bu işin tamamını kaç günde yapar?

Mert has completed 1/4 of a work, and then he has continued working at the same speed for another 24 hours and completed 1/2 of the remaining work. According to this, how many days does it take for Mert to complete the entire work?

A) 70 B) 68 C) 66 D) 64 E) 60

4. Suat bir işin 1/4'ünü (x – 1) günde aynı işin 1/3'ünü (x + 1) günde bitiriyor. Buna göre, x kaçtır?

Suat completes 1/4 of a work in (x-1) days and 1/3 of the same work in (x + 1) days. According to this what is the value of x?

A) 14 B) 12 C) 7 D) 4 E) 2

5. İki işçi bir işi birlikte 28 günde bitirebiliyorlar. Bu işçilerden biri tek başına bu işin 2/3'ünü 28 günde bitirebildiğine göre, diğer işçi bu işin tamamını kaç günde bitirebilir?

Two workers can complete a work together in 28 days. If one of the workers is able to complete 2/3 of this work in 28 days by himself, how many days does it take for the other worker to complete the entire work by himself?

A) 42 B) 70 C) 80 D) 84 E) 90

6. Burak ile Umut bir işi birlikte 10 günde bitirebilmektedir. Burak 2 gün, Umut 4 gün çalışırsa işin 4/15'i bitiyor. Buna göre, Umut işin tamamını tek başına kaç günde bitirir?

Burak and Umut can complete a work together in 10 days. If Burak works for 2 days and Umut works for 4 days then 4/15 of the work is completed. According to this how many days does it take for Umut to complete the entire work by himself?

A) 15 B) 16 C) 24 D) 28 E) 30

7. Fuat'ın çalışma hızı, Rıza'nın çalışma hızının 3 katıdır. İkisi birlikte bir işi 30 günde bitirebildiklerine göre, Fuat'ın bu işi tek başına bitirebilme süresi kaç gündür?

Fuat's working speed is 3 times the working speed of Rıza. If they can complete a work in 30 days together, how many days does it take for Fuat to complete this work by himself?

A) 40 B) 48 C) 60 D) 90 E) 120

8. İki işçi bir işi 9 günde bitirmektedir. Bu işçiler birlikte 2 gün çalıştıktan sonra yanlarına bir işçi daha katılıyor. İşin tamamı 8 günde bittiğine göre, en son katılan işçinin bu işi tek başına bitirme süresi kaç gündür?

Two workers complete a work in 9 days. After these workers work for 2 days together, a third worker joins them. If the entire work is completed in 8 days, how many days does it take for the worker which joined later to complete the entire work by himself?

A) 52 B) 54 C) 56 D) 58 E) 60

İşçi ve Havuz Problemleri (Worker and Pool Problems)

9. A musluğu boş bir havuzu 4 saatte dolduruyor. B musluğu ise dolu havuzu 5 saatte boşaltıyor. Buna göre, iki musluk aynı anda açıldığında boş havuzu kaç saatte dolar?

Faucet A fills an empty pool in 4 hours. Faucet B empties a full pool in 5 hours. According to this how many hours does it take for an empty pool to be filled if both faucets are opened at the same time?

A) 12 B) 15 C) 20 D) 24 E) 25

10. Boş bir havuzu A musluğu 12 saatte, B musluğu 9 saatte dolduruyor. İlk olarak A musluğu 4 saat açık kaldıktan sonra kapatılıp havuzun kalan kısmını B musluğu dolduruyor. Buna göre, B musluğu kaç saat açık kalmıştır?

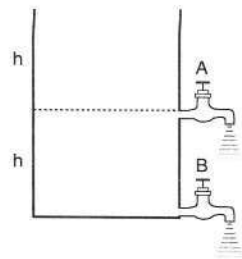
Faucet A fills an empty pool in 12 hours and faucet B fills it in 9 hours. After first opening the faucet A for 4 hours it is closed and the rest of the pool is filled by faucet B. According to this how many hours was faucet B left open?

A) 8 B) 7 C) 6 D) 5 E) 4

11. Boş bir havuzu bir musluk tek başına 18 saatte dolduruyor. Bu havuzun 1/6'sını bu musluk kaç saatte doldurur?

A faucet fills an empty pool by itself in 18 hours. How many hours does it take for this faucet to fill 1/6 of this pool?

A) 2 B) 2,4 C) 3 D) 3,2 E) 4

12. 

Şekildeki A ve B özdeş muslukları dolu havuzu birlikte 9 saatte boşalttığına göre, B musluğu dolu havuzu tek başına kaç saatte boşaltır?

If the identical faucets shown in the figure empty a full pool in 9 hours when opened together, how many hours does it take for faucet B to empty the pool by itself?

A) 20 B) 18 C) 15 D) 12 E) 9

13. Bir musluğun akış hızı 3 kat artırılırsa boş bir havuzu 6 saatte doldurmaktadır. Buna göre, bu musluk eski hızıyla aksaydı boş havuz kaç saatte dolardı?

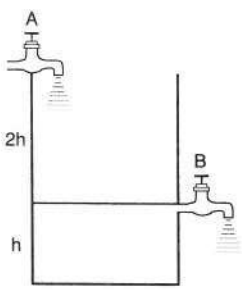
If the water pouring speed of a faucet is increased 3 times it fills an empty pool in 6 hours. According to this, how many hours would it take for this faucet to fill the empty pool if it was pouring water at its original speed?

A) 30 B) 24 C) 20 D) 16 E) 12

14. A musluğu boş bir havuzun 2/3'ünü 4 günde, B musluğu aynı havuzun 3/5'ini 6 günde doldurmaktadır. Buna göre, A ve B muslukları birlikte 1 günde boş havuzun kaçta kaçını doldurur?

Faucet A fills 2/3 of an empty pool in 4 days and faucet B fills 3/5 of an empty pool in 6 days. According to this, what fraction of the empty pool can faucets A and B fill in 1 day if they're opened together?

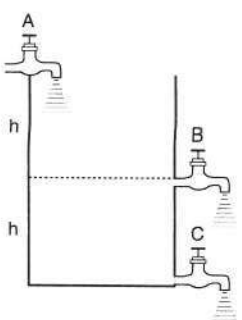
A) $\frac{4}{15}$ B) $\frac{2}{13}$ C) $\frac{1}{3}$ D) $\frac{7}{15}$ E) 1

15. 

A musluğu boş havuzu 6 saatte dolduruyor. B musluğu ise kendi seviyesine kadar olan kısmı 5 saatte boşaltıyor. Buna göre, iki musluk aynı anda açıldığında boş havuz kaç saatte dolar?

Faucet A fills an empty pool in 6 hours. Faucet B empties a pool to its level in 5 hours. According to this, how many hours does it take for the pool to be filled if both of these faucets are opened at the same time?

A) 14 B) 16 C) 20 D) 21 E) 22

16. 

A musluğu boş havuzu 4 saatte doldurmaktadır. Özdeş B ve C muslukları birlikte dolu havuzu 18 saatte boşaltmaktadır. Buna göre, bu 3 musluk aynı anda açıldığında boş havuz kaç saatte dolar?

Faucet A fills an empty pool in 4 hours. İdentical B and C faucets together empty a full pool in 18 hours. According to this, how many hours does it take for the pool to be filled if all three of these faucets are opened at the same time?

A) 4,8 B) 5,4 C) 6,8 D) 8,2 E) 10,8

Yüzde-Faiz Problemleri (Percentage–Interest Problems)

1. 120 sayısının % 40'ı kaçtır?

What is 40% of the number 120?

A) 25 B) 48 C) 75 D) 100 E) 150

2. Hangi sayının % 80'i, o sayının 40 eksiğine eşittir?

80% of which number is equal to 40 less than the same number?

A) 200 B) 180 C) 160 D) 120 E) 100

3. Messi parasının % 25'ini Ronaldo'ya verince paraları eşit oluyor. Başlangıçta paraları toplamı 4500 TL olduğuna göre, Messi'nin başlangıçtaki parası kaç liradır?

When Messi gives 25% of his money to Ronaldo, they have the equal amount of money. If initially the sum of their moneys was 4500 TL, how much money does Messi have at the start?

A) 3000 B) 2750 C) 2500 D) 2000 E) 1500

4. 120 soruluk bir sınavda soruların % 60'ını cevaplayan Mustafa, cevaplarının % 50'sinin doğru olduğunu öğreniyor. Buna göre Mustafa kaç soruyu doğru cevaplamıştır?

Mustafa, answering 60% of the questions in an exam out of 120 questions, learns that 50% of his answers are correct. According to this how many of the questions has Mustafa answered correctly?

A) 30 B) 32 C) 36 D) 38 E) 40

5. Bir okulun mevcudu ilk yıl % 20 artmış, ikinci yıl % 20 azalmıştır. Buna göre, iki yılın sonunda okulun mevcudu yüzde kaç değişmiştir?

The attendance of a school has increased 20% in the first year, and dropped 20% in the second year. According to this what % has the attendance of this school changed at the end of the two years?

A) % 4 azalmış *(decreased)* B) %4 artmış *(increased)*
C) % 2 azalmış *(decreased)* D) % 2 artmış *(increased)*
E) Değişmemiş *(no change)*

6. Taban uzunluğu % 20, yüksekliği de % 40 artırılan bir üçgenin alanı yüzde kaç artar?

What % does the area of a triangle increase if its base length is increased by 20% and its height is increased by 40%?

A) 22 B) 32 C) 40 D) 60 E) 68

7. Bir deponun % 70'i doludur. Depodan 40 litre su boşaltıldığında deponun % 50'si dolu kalıyor. Buna göre, deponun tamamı kaç litredir?

70% of a tank is full. When 40 liters of water is removed from the tank 50% of the tank remains full. According to this how many liters is the total capacity of the tank?

A) 200 B) 180 C) 160 D) 140 E) 100

8. Bir karenin her kenarı % 20 artırıldığında alanı yüzde kaç artar?

What % does the area of a square increase when the length each side is increased by 20%?

A) 69 B) 44 C) 40 D) 20 E) 14

Yüzde-Faiz Problemleri (Percentage-Interest Problems)

9. Bir bankaya yatırılan 200 TL, yıllık % 40 basit faizle, 2 yıl sonra kaç TL faz getirir?

How much interest will 200 TL, deposited at a bank with 40% yearly simple interest, bring after 2 years?

A) 240 B) 200 C) 160 D) 120 E) 100

10. Bir bankaya yıllık % 20 basit faizle yatırılan bir miktar para 2 yıl sonunda 280 TL olduğuna göre, bankaya yatırılan para kaç TL'dir?

If a certain amount of money deposited at a bank with 20% yearly simple interest becomes 280 TL at the end of 2 years, how much is the initial amount deposited at the bank?

A) 120 B) 160 C) 180 D) 200 E) 240

11. 300 TL yıllık % x basit faizle 2 yıllığına bankaya yatırılıyor. 2 yıl sonunda 540 TL olarak çekiliyor. Buna göre, x kaçtır?

300 TL is deposited at a bank with x% yearly simple interest for 2 years. At the end of 2 years it is withdrawn as 540 TL. According to this what is x?

A) 50 B) 45 C) 40 D) 30 E) 25

12. Bir miktar para % x ve % (x + 2) basit faizle bankaya yatırılıyor. 2 yıl sonunda getirdikleri faiz farkı 200 TL olduğuna göre, faize verilen para kaç TL'dir?

A certain amount of money is deposited at the bank with x% and (x+2)% yearly simple interest. If the difference between the interests they bring is 200 TL, at the end of 2 years how much is the amount deposited at the bank?

A) 5000 B) 4500 C) 4000 D) 3500 E) 3000

13. Yıllık % 10 bileşik faizle bankaya yatırılan 200 TL, 2 yıl sonunda kaç TL olur?

How much will 200 TL, deposited at the bank with 10% yearly compound interest, become at the end of 2 years?

A) 220 B) 230 C) 242 D) 250 E) 252

14. Yıllık % 20 bileşik faizle 2 yıllığına bankaya yatırılan bir miktar para 440 TL faiz getirdiğine göre, bankaya yatırılan para kaç TL'dir?

If a certain amount of money deposited at the bank for 2 years with 20% yearly compound interest brings 440 TL interest, how much is the money deposited at the bank?

A) 100 B) 200 C) 500 D) 1000 E) 1200

15. 1 doların 3 TL olduğu bir dönemde 50 doları olan bir kişi parasını TL olarak % 40 basit faizle bankaya yatırmak yerine dolar olarak % 10 basit faizle bankaya yatırıyor. Bir yıl sonunda bu kişinin zarar etmemesi için dolar en az kaç TL olmalıdır?

During a time when 1 dollar is equal to 3 TL, a person who has 50 dollars deposits his money in the bank in dollars, with a yearly simple interest rate of 10% instead of depositing it in TL with a yearly simple interest rate of 40%. At the end of 1 year, what should the minimum value of dollar be in TL for this person not to lose money?

A) 3 B) $\frac{42}{11}$ C) 4 D) $\frac{45}{11}$ E) 5

16. Sait 200 TL parasının yarısını % 40 basit faizle, kalanını da % 60 bileşik faizle 2 yıllığına bankaya yatırıyor. Buna göre, Sait'in 2 yıl sonunda kaç TL'si olur?

Sait deposits half of his 200 TL at a bank with 40% simple interest and the rest with 60% compound interest for 2 years. According to this how much money does Sait have at the end of two years?

A) 300 B) 350 C) 378 D) 382 E) 436

Yüzde Problemleri (Percentage Problems)

1. 48'in % 25 ile 160'ın % 60'ının toplamı kaçtır?

What is the sum of 25% of 48 and 60% of 160?

A) 108 B) 112 C) 124 D) 130 E) 132

2. 170'in yüzde kaçı 34'tür?

What percent of 170 is 34?

A) 10 B) 20 C) 30 D) 36 E) 45

3. % 21'i 42 olan sayı kaçtır?

The 21% of a number is 52. Then, what is this number?

A) 98 B) 100 C) 104 D) 200 E) 300

4. % 6'sının % 18'i 216 olan sayı kaçtır?

18% of 6% of a number is 216. What is this number?

A) 876 B) 900 C) 916 D) 10000 E) 20000

5. Bir ofisteki erkeklerin % 21'i, kadınların % 24'üne eşittir. Ofisteki çalışan sayısı 165 olduğuna göre erkek sayısı kaçtır?

In an office, 21% of the man is equal to 24% of the women. The number of employees in the office is 165. Then, how many men are there?

A) 44 B) 55 C) 66 D) 77 E) 88

6. $x + y$ sayısının % 25'i $4x - 3y$ olduğuna göre $\frac{x}{y}$ kaçtır?

25% of the number $x + y$ is $4x - 3y$. Then, what is x/y?

A) $\frac{13}{15}$ B) $\frac{13}{17}$ C) $\frac{15}{11}$ D) $\frac{13}{11}$ E) $\frac{15}{17}$

7. 2000 TL maaş alan bir kadın, maaşının % 12'sine çanta alıyorsa geriye kaç TL'si kalır?

A women earns a salary of 2000 TL. If she buys a bag with the 12% of her salary, then how much money (TL) does she have left?

A) 1700 B) 1760 C) 1800 D) 1870 E) 1880

8. Bir okuldaki öğrencilerin % 12'si matematik bilmiyor. Matematik bilen 264 öğrenci olduğuna göre okulda kaç öğrenci vardır?

In a school, 12% of students don't know mathematics. If the number students who know mathematics is 264, then how many students are there in the school?

A) 110 B) 240 C) 280 D) 300 E) 320

Yüzde Problemleri (Percentage Problems)

9. Puza'daki kız öğrenci sayısı 80'dir. 16 yeni öğrenci gelirse toplam öğrenci sayısı 120 olacaktır. Puza'daki öğrencilerin % kaçı erkektir?

There are 80 female students at Puza. If 16 new female students come to the institution, the total number of students will be 120. What percent of the students of Puza is male?

A) 5 B) 10 C) 20 D) 25 E) 30

10. 180 kişilik bir salonun % 40'ı erkektir. Salona 10 evli çift gelirse salonun % kaçı kadın olur?

40% of a hall with 180 people is man. If 10 maried couples come to the hall, what percent of the hall will be women?

A) 32 B) 59 C) 70 D) 82 E) 96

11. Ali parasının % 30'unu Kemal'e verdiğinde ikisinin paraları birbirine eşit oluyor. Buna göre Ali'nin başlangıçtaki parasının, Kemal'in başlangıçtaki parasına oranı kaçtır?

When Ali gives 30% of his money to Kemal, their money will become equal to each other, What is the ratio of Ali's money at the beginning to Kemal's money at the beginning?

A) $\frac{5}{2}$ B) $\frac{7}{2}$ C) $\frac{7}{4}$ D) $\frac{2}{5}$ E) $\frac{2}{7}$

12. Asya, şişedeki suyun önce % 40'ını sonra da kalanın % 30'unu içiyor. Şişede 210 mlt su kalıyor. Buna göre başlangıçta şişede kaç mlt su vardır?

Asya drinks firstly 40% of the water in the bottle, and then she drinks 30% of the remainder. There is 210 mililiters of water left in the bottle. Then, how much water (mililiter) was there at the beginning?

A) 100 B) 200 C) 300 D) 400 E) 500

13. A sayısı B'nin % 30'u, B sayısı da C'nin % 20'sidir. Buna göre A sayısı, C sayısının yüzde kaçıdır?

Number A is 30% of the number B and number B is 20% of the number C. Then, what percent is number A of number C?

A) 5 B) 6 C) 7 D) 8 E) 9

14. 260 m boyundaki odun iki parçaya ayrılıyor. I. parçanın % 24'ü, II. parçanın % 54'üne eşittir. Buna göre küçük parça kaç m'dir?

The log with a length of 260 m is divided into two pieces 24% of the first piece is equal to 54% of the second piece. According to this, how many meters is the smaller piece?

A) 50 B) 70 C) 80 D) 110 E) 180

15. $3^{80} + 3^{82}$ toplamının % 30'u kaçtır?

What is 30% of $3^{80} + 3^{82}$?

A) 3^{80} B) 3^{81} C) 3^{82} D) $10 \cdot 3^{80}$ E) $10 \cdot 3^{81}$

16. Bir sınıftaki kız öğrencilerin sayısının % 36'sı, erkek öğrencilerin sayısının $\frac{3}{2}$'sine eşittir. Sınıfta 93 öğrenci olduğuna göre erkek öğrenci sayısı kaçtır?

In a class, 36% of the number of female students is equal to 3/2 of the number of male students. If there are 93 students in the class, how many male students are there?

A) 18 B) 36 C) 45 D) 75 E) 80

Yüzde Problemleri (Percentage Problems)

1. % 10'u 20 olan sayının % 40'ı kaçtır?

If 10% of a number is 20 what is the 40% of the same number?

A) 20 B) 30 C) 40 D) 60 E) 80

2. % 1'i 0,0001 olan bir sayının tamamı kaçtır?

If 1% of a number is 0,0001? What is 100% of this number?

A) 10 B) 1 C) 0,1 D) 0,01 E) 0,001

3. 2b = 5c

10a = 3b

ise a sayısı c sayısının yüzde kaçıdır?

If 2b = 5c, and

10a = 3b,

What percent of number c is number a?

A) 20 B) 25 C) 50 D) 60 E) 75

4. 80 kişilik bir sınıfın % 20'si erkektir. Sınıfa 4 erkek gelir ve sınıftan 4 bayan ayrılırsa erkeklerin sayısı, sınıfın % kaçı olur?

20% of a class of 80 students is male. If 4 male students are added to and 4 female students are removed from the class, what % of the class will the number of male students be?

A) 15 B) 20 C) 25 D) 40 E) 50

5. Bir sınıfta 20 erkek, 5 kız öğrenci vardır. Bu sınıfın % kaçı erkektir?

There are 20 male and 5 female students in a class. What % of this class is male?

A) 80 B) 75 C) 60 D) 50 E) 40

6. 1200 TL'ye alınan bir mal, kaç TL'ye satılırsa % 20 zarar edilmiş olur?

What would be the sale price of a product purchased for 1200 TL in order to make a loss of 20%?

A) 1060 B) 1040 C) 1020 D) 100 E) 960

7. Bir mal, alış fiyatı üzerinden % 40 kârla satılıyor. Daha sonra satış fiyatı üzerinden % 20 fiyat artışı yapılıyor. Buna göre, bu mal alış fiyatı üzerinden % kaç kârla satılmış olur?

An item is sold with 40% profit over its purchase price. Afterwards its price is increased 20% over the sale price. According to this, at what % of profit will this item be sold over the purchase price?

A) 48 B) 50 C) 58 D) 60 E) 68

8. Maliyeti üzerinden % 20 kârla satılan bir malı satış fiyatı üzerinden % 20 indirim yapılırsa yüzde kaç zarar edilmiş olur?

If 20% discount over its sale price is applied to an item sold with 20% profit over its cost, what % will the loss ratio be?

A) 2 B) 4 C) 6 D) 8 E) 10

Yüzde Problemleri (Percentage Problems)

9. Bir malın $\frac{2}{3}$'ü % 20 kârla, geri kalanı da % 40 zararla satılıyor. Bu satıştaki kâr/zarar durumu nedir?

2/3 of a good is sold with a 20% profit and the rest is sold with a 40% loss. What is the profit/loss status in this sale?

A) % 10 zarar *(loss)*
B) % 20 zarar *(loss)*
C) Değişmez *(no change)*
D) % 20 kâr *(profit)*
E) % 10 kâr *(profit)*

10. 80 kg olan tuzlu suyun % 20'si tuzdur. Karışıma ne kadar tuz eklenirse yeni karışımın tuz orunı % 50 olur?

20% of 80gr salt water is salt. How much salt should be added to the mixture to have a new mixture with a salt ratio of 50%?

A) 40 B) 42 C) 48 D) 60 E) 64

11. Şeker oranı % 20 olan 300 kg şekerli suya kaç kg su ilave edilirse karışımın şeker oranı % 10 olur?

How many kg of water should be added to 300 kg sugared water with a sugar ratio of 20% in order to obtain a mixture with a sugar ratio of 10%?

A) 250 B) 300 C) 350 D) 500 E) 600

12. 600 litre olan tuzlu su karışımının % 20'si tuzdur. Karışımdan kaç litre su buharlaştırılırsa karışımın tuz oranı % 25 olur?

20% of 600 lt. salt water mixture is salt. How many lt. of water should be evaporated from the mixture so that the salt ratio of the mixture becomes 25%?

A) 80 B) 90 C) 100 D) 110 E) 120

13. Tuz oranı % 60 olan 120 litre tuzlu su karışımına, tuz oranı % 80 olan tuzlu su karışımından kaç litre eklenmelidir ki yeni karışımın tuz oranı % 70 olsun?

How many liter of salt water mixture with 80% salt ratio should be added to 120 liters of salt water mixture with 60% salt ratio so that the salt ratio of the new mixture becomes 70%?

A) 135 B) 130 C) 120 D) 115 E) 110

14. Hamur, ekmek olduğunda ağırlığının % 40'ını kaybediyor. 300 gr ekmek elde etmek için kaç gram hamur kullanmak gerekir?

When dough becomes bread it loses 40% of its weight. How many grams of dough should be used in order to obtain 300 gr of bread?

A) 600 B) 550 C) 500 D) 450 E) 400

15. 300 TL, yıllık % 20 basit faizle 6 ayda kaç TL faiz getirir?

How much interest does 300 TL bring in 6 months with 20% yearly simple interest?

A) 120 B) 80 C) 60 D) 50 E) 30

16. % 20 basit faizle bankaya yatırılan bir miktar para bir yıl sonra faiziyle birlikte 60 TL olarak çekiliyor. Buna göre, bankaya yatırılan para kaç TL'dir?

A certain amount of money deposited at the bank with 20% simple interest is withdrawn as 60 TL together with its interest. According to this how much was the money that was initially deposited in the bank?

A) 44 B) 50 C) 55 D) 60 E) 70

Kâr-Zarar Problemleri (Profit–Loss Problems)

1. % 50 kârla satılan ve etiket fiyatı 120 TL olan bir malın maliyeti kaç TL'dir?

How many TL is the cost of an item which is sold with 50% profit and has a marked price of 120 TL?

A) 40 B) 50 C) 60 D) 70 E) 80

2. 80 TL'ye alınıp 100 TL'ye satılan bir maldan elde edilen kâr yüzde kaçtır?

What % is the profit gained from an item which is purchased for 80 TL and sold for 100 TL?

A) 15 B) 20 C) 25 D) 30 E) 40

3. % 20 kârla 80 TL'ye satılan bir mal, % 20 zararla kaç TL'ye satılırdı?

What would be the sales price of a product which is sold for 80 TL with a profit of 20% in order to make a loss of 20%?

A) 120 B) 100 C) 80 D) $\frac{200}{3}$ E) $\frac{160}{3}$

4. Etiket fiyatı üzerinden % 40 indirim yapılarak bir mal % 50 kârla satılıyor. Bu malın etiket fiyatı yüzde kaç kârla belirlenmiştir?

An item is sold with 50% profit by making a 40% discount over the marked price. What % of profit was determined for this item initially?

A) 200 B) 150 C) 100 D) 80 E) 60

5. 4000 TL'ye alınan bir mal kaç TL'ye satılırsa satış fiyatının % 25'i kadar zarar edilir?

What price should an item which is purchased for 4000 TL be sold in order to obtain a 25% loss?

A) 3000 B) 3200 C) 3500 D) 3800 E) 3900

6. Maliyeti x lira olan bir mal % 50 kârla y liraya satılıyorsa, maliyeti y lira olan bir mal x liraya satıldığında yüzde kaç zarar edilir?

If an item with a cost of x TL is sold for y TL with 50% profit what % loss is made when an item with a cost of y TL is sold for x TL?

A) 25 B) $\frac{100}{3}$ C) 50 D) $\frac{175}{3}$ E) $\frac{200}{3}$

7. Bir manavda elmaların % 20'si çürük çıkarsa elmaların maliyeti yüzde kaç artar?

If 20% of a fruit seller's apples are spoiled, what % does the cost of apples increase?

A) 50 B) 35 C) 25 D) 20 E) 10

8. 5 tanesini aldığı fiyata, 4 tanesini satan bir satıcının kârı yüzde kaçtır?

What % is the profit of a seller who sells 4 pieces for the price he bought 5 pieces?

A) 50 B) 45 C) 30 D) 25 E) 20

Kâr-Zarar Problemleri (Profit–Loss Problems)

9. Yaş incirin kilogramı 100 TL'den alınıyor. Yaş incir kuruyunca ağırlığının % 20'sini kaybediyor. Buna göre, kuru incirin % 20 kârla satış fiyatı ne olur?

1 kg fresh fig is bought for 100 TL. When fresh fig dries it loses 20% of its weight. According to this what is the sale price of dried fig with a profit of 20%.

A) 175 B) 150 C) 125 D) 100 E) 80

10. Bir manav soğanın kilogramını 2 TL'den satarsa 35 TL zarar, 3 TL'den satarsa 50 TL kâr ediyor. Buna göre manavın satacağı soğan kaç kg'dir?

If a greengrocer sells 1 kilogram of onion for 2 TL he loses 35 TL, if he sells it for 3 TL he makes a profit of 50 TL. According to this how many kg of onion is this greengrocer selling?

A) 100 B) 90 C) 85 D) 80 E) 75

11. Bir konserin bilet fiyatında % 50 indirim yapıldığında konsere gelen dinleyici sayısı% 60 artıyor. Buna göre, konserden elde edilen gelir yüzde kaç değişmiştir?

When a 50% discount is made on the ticket price of a concert, the number of people going to that concert increases by 60%. According to this, what % has the generated income changed?

A) % 20 artar *(increased)* B) %30 artar *(increased)*
C) Değişmez *(no change)* D) % 20 azalır *(decreased)*
E) % 30 azalır *(decreased)*

12. Bir satıcı malının % 60'ını % 20 kârla, geri kalanını da % 40 zararla satıyor. Bu satıcının kâr-zarar durumu nedir?

A seller sells 60% of his goods with 20% profit, and the rest with 40% loss. What is the profit – loss status of this seller?

A) % 2 kâr *(profit)* B) % 2 zarar *(loss)*
C) % 4 kâr *(profit)* D) % 4 zarar *(loss)*
E) % 8 zarar *(loss)*

13. Mağazasına gelen 10 kişiden 2'sine % 20 indirim yapan bir satıcının günlük cirosu yüzde kaç azalır?

What is the % loss of a seller, on his daily income if he grants a 20% discount to every 2 customer out of 10 that comes to his store?

A) 2 B) 4 C) 6 D) 8 E) 10

14. Bir mal x liraya satılırsa % 20 kâr, y liraya satılırsa % 40 zarar ediliyor. Buna göre, y, x'in yüzde kaçıdır?

If an item is sold for x TL it makes a 20% profit, and if it is sold to y TL it makes a 40% loss. According to this, what % of x is y?

A) 45 B) 50 C) 60 D) 70 E) 80

15. Bir tüccar bir malın 2/3'ünü % 60 kârla, geri kalanını da % 30 kârla satıyor. Buna göre, satıcının tüm satıştan kâr durumu yüzde kaçtır?

A trader sells 2/3 of his goods with 60% profit, and the rest with 30% profit. According to this what is the % of profit of this seller from the whole sale?

A) 30 B) 45 C) 50 D) 66 E) 60

16. Maliyeti a lira ve satış fiyatı b lira olan bir malın maliyeti ile satış fiyatı arasındaki bağıntı, b = 2a – 1600 TL'dir. Satıştaki kârı % 20 olduğuna göre, maliyeti kaç TL'dir?

The relationship between the cost and sale price of a good whose cost is a TL and sale price is b TL, b = 2a – 1600 TL. If the profit at sale is 20% what is the buying price?

A) 200 B) 400 C) 600 D) 800 E) 2000

Karışım Problemleri (Mixture Problems)

1. 60 gr şeker ile 90 gr su karıştırılıp şekerli su oluşturuluyor. Karışımın % kaçı sudur?

The sugared water mixture is obtained by mixing 60 gr of sugar with 90 gr of water. What % is the water ratio of the mixture?

A) 20 B) 30 C) 40 D) 50 E) 60

2. Tuz oranı % 18 olan 150 gr tuz-su karışımındaki tuz miktarı kaçtır?

How many grams is the salt amount in 150 gr of salty water mixture whose salt ratio is 18%?

A) 3 B) 9 C) 27 D) 36 E) 54

3. % 16'sı alkol olan 200 gr alkol-su karışımındaki saf alkol/saf su oranı kaçtır?

What is pure alcohol/pure water ratio in 200 gr of a mixture whose alcohol ratio is 16%?

A) $\frac{4}{7}$ B) $\frac{2}{21}$ C) $\frac{4}{21}$ D) $\frac{7}{4}$ E) $\frac{21}{2}$

4. Şeker oranı % 20 olan 240 gr şeker-su karışımındaki su miktarı kaçtır?

How many grams of water are there in 240 gr sugared water with 20% sugar ratio?

A) 180 B) 192 C) 196 D) 198 E) 210

5. Alkol oranı % 25 olan 100 gr alkol-su karışımına 20 gr alkol eklenirse yeni karışımın alkol oranı ne olur?

If 20 gr of alcohol is added to 100 gr of alcohol-water mixture with a alcohol ratio of 25%, what % is the alcohol ratio of the new mixture?

A) 20 B) 15 C) $\frac{7}{8}$ D) $\frac{5}{8}$ E) $\frac{3}{8}$

6. Tuz oranı % 20'lik 150 gr tuz-su karışımına 50 gr tuz eklenirse yeni karışımın su oranı % kaç olur?

If 50 gr of salt is added to 150 gr of salty water with 20% salt ratio, what % is the water ratio of the new mixture?

A) 75 B) 70 C) 60 D) 45 E) 30

7. Tuz oranı % 10 olan 50 lt tuz-su karışımına 10 gr tuz ve 20 gr su eklenir. Yeni karışımın tuz oranı % kaç olur?

10 gr of salt and 20 gr of water is added 50 lt of salty water with 10% salt ratio. What % is the salt ratio of the new mixture?

A) 60 B) 45 C) $\frac{75}{4}$ D) 25 E) $\frac{25}{2}$

8. Alkol oranı % 60 olan 10 lt alkol-su karışımına kaç litre su eklenirse alkol oranı $\frac{2}{5}$ olur?

How many liters of water should be added to 10 lt of alcohol-water mixture with 60% alcohol ratio in order to obtain 2/5 alcohol ratio?

A) 5 B) 8 C) 10 D) 12 E) 15

Karışım Problemleri (Mixture Problems)

9. Tuz oranı % 30 olan 60 gr bir karışımdaki suyun 10 gramı buharlaşırsa yeni karışımda kaç gr tuz olur?

If 10 gr of water evaporates from 60 gr of mixture with 30% salt ratio, then how many grams of salt are there in the new mixture?

A) 1,5 B) 2,4 C) 3,2 D) 3,6 E) 4,8

10. 50 gr su, 32 gr tuz, 18 gr un karıştırılıyor. Elde edilen karışımın tuz oranı % kaç olur?

What % is the salt ratio in a mixture obtained by mixing 50 gr of water, 32 gr of salt and 18 gr of flour?

A) 9 B) 18 C) 32 D) 64 E) 72

11. Alkol oranı % 20 olan 40 lt alkol-su karışımı ile alkol oranı % 10 olan 10 lt alkol-su karıştırılıyor. Elde edilen yeni karışımın alkol oranı % kaç olur?

40 lt of alcohol-water mixture with 20% alcohol ratio is mixed with 10 lt of alcohol-water mixture with 10% alcohol ratio. What % is the alcohol ratio of the new mixture?

A) 36 B) 18 C) 9 D) 6 E) 3

12. Şeker oranı % 30 olan 300 gr şeker-su karışımının yarısı dökülüp yerine aynı miktarda su ekleniyor. Oluşan yeni karışımın şeker oranı % kaç olur?

Half of 300 gr of sugared water with 30% sugar ratio is poured out and same amount of water is added to the mixture. According to this, what % is the sugar ratio of the new mixture?

A) 10 B) 15 C) 20 D) 25 E) 30

13. Tuz oranı % 20 olan 80 lt tuz-su karışımına, tuz oranı % 40 olan kaç litre tuzlu su karıştırılırsa yeni karışımın tuz oranı % 24 olur?

How many liters of salt-water mixture with 40% salt ratio should be added to 80 lt of salty water with 20% salt ratio to obtain 24% salt ratio?

A) 10 B) 20 C) 30 D) 40 E) 50

14. 120 gr şeker-su karışımın şeker oranı % 20'den % 25'e çıkarmak için aşağıdakilerden hangisi yapılmalıdır?

What should be done in order to increase the sugar ratio from 20% to 25% in a 120 gr of sugared-water?

A) 16 gr su eklemek *(Adding 16 gr of water)*
B) 16 gr su buharlaştırmak *(Evaporating 16 gr of water)*
C) 24 gr su buharlaştırmak *(Evaporating 24 gr of water)*
D) 24 gr şeker eklemek *(Adding 24 gr of sugar)*
E) 16 gr şeker eklemek *(Adding 16 gr of sugar)*

15. Su oranı % 20 olan 200 gr tuzlu su ile su oranı % 40 olan 300 gr tuzlu su karıştırılıyor. Buna göre oluşan yeni karışımın su oranı % kaç olur?

200 gr of salty water with 20% water ratio is mixed with 300 gr of salty water with 40% water ratio. According to this, what % is the water ratio of the new mixture?

A) 8 B) 16 C) 32 D) 64 E) 72

16. Şeker oranı $\frac{1}{5}$ olan bir miktar şekerli suya 40 gr şeker eklendiğinde karışımın şeker oranı % 25 oluyor. Buna göre başlangıçtaki karışım kaç gramdır?

When 40 gr of sugar is added to some amount of sugared water containing 1/5 sugar, the sugar ratio becomes 25%. According to this, how many grams was the mixture at the beginning?

A) 200 B) 300 C) 400 D) 500 E) 600

Karışım Problemleri (Mixture Problems)

1. 60 gr şeker ile 140 gr su karıştırıldığında elde edilen karışımın şeker oranı % kaçtır?

What % is the sugar ratio of a mixture obtained by mixing 60 gr of sugar with 140 gr of water?

A) 20 B) 30 C) 40 D) 50 E) 60

2. 50 gr şeker ile x gr su karıştırıldığında oluşan karışımın şeker oranı % 40 olduğuna göre, su miktarı kaç gramdır?

If the sugar ratio of the mixture obtained by mixing 50 gr of sugar with x gr of water is 40%, how many grams is the water amount?

A) 75 B) 70 C) 65 D) 60 E) 50

3. Tuz oranı % 40 olan 500 gr karışımın tuz miktarı kaç gramdır?

How many grams is the salt amount of a 500 gr mixture with a 40% salt ratio?

A) 200 B) 180 C) 160 D) 150 E) 120

4. Tuz oranı % 20 olan 100 gr tuzlu su karışımının tuz oranını % 60'a çıkarmak için kaç gram tuz ilave edilmelidir?

How many grams of salt should be added to increase the salt ratio of 100 gr of 20% salt mixture to 60%?

A) 50 B) 60 C) 70 D) 80 E) 100

5. Tuz oranı % 40 olan 30 litre tuzlu suya 10 litre tuz, 10 litre su eklenirse elde edilen yeni karışımın tuz oranı % kaç olur?

If 10 liters of salt and 10 liters of water is added to 30 liters of salt water with a salt ratio of 40%, what % is the salt ratio of the new mixture?

A) 52 B) 48 C) 44 D) 40 E) 38

6. Tuz oranı % 30 olan 60 gr tuzlu su ile tuz oranı % 20 olan 40 gr tuzlu su karıştırıldığında oluşan yeni karışımın tuz oranı % kaçtır?

If 60 gr salt water with 30% salt ratio is mixed with 40 gr of salt water with 20% salt ratio, what % is the salt ratio of the new mixture?

A) 26 B) 30 C) 32 D) 40 E) 42

7. Tuz oranı % 20 olan 20 litre tuzlu su karışımına 12 litre tuz ve 18 litre su eklenirse elde edilen yeni karışımın tuz oranı % kaç olur?

If 12 liters of salt and 18 liters of water is added to 20 liters of salt water mixture with a salt ratio of 20%, what % is the salt ratio of the new mixture?

A) 32 B) 36 C) 38 D) 40 E) 42

8. Şeker oranı % 35 olan 300 litre karışımın 1/3 ü alınarak yerine eşit miktarlarda şeker ve su ilave ediliyor. Elde edilen yeni karışımın şeker oranı % kaçtır?

1/3 of the 300 lt. mixture with 35% sugar ratio is removed and equal amounts of sugar and water are added to it. What % is the sugar ratio of the new mixture?

A) 32 B) 38 C) 40 D) 45 E) 50

Karışım Problemleri (Mixture Problems)

9. Alkol oranı % 20 olan 100 gr kolonya ile alkol oranı % 10 olan 100 gr kolonya karıştırıldığında oluşan yeni kolonyanın alkol oranı % kaçtır?

If 100 gr of cologne with 20% alcohol ratio is mixed with 100 gr of cologne with 10% alcohol ratio, what % is the alcohol ratio of the new mixture?

A) 15 B) 30 C) 45 D) 60 E) 75

10. Alkol oranı % 30 olan 200 litre karışımın 1/2'si ile alkol oranı % 60 olan 300 litre karışımın 1/3'ü karıştırılıyor. Elde edilen yeni karışımın alkol oranı % kaçtır?

1/2 of 200 lt. of a mixture with 30% alcohol ratio is mixed with 1/3 of 300 lt. of a mixture with 60% alcohol ratio. What % is the alcohol ratio of the new mixture?

A) 45 B) 50 C) 60 D) 80 E) 90

11. Alkol oranı % 40 olan bir karışımdan x litre, alkol oranı % 10 olan başka bir karışımdan y litre alınarak karıştırılıyor. Alkol oranı % 25 olan yeni bir karışım elde ediliyor. Buna göre, x/y oranı kaçtır?

X lt. of a mixture with 40% alcohol ratio is mixed with y lt. of a mixture with 10% alcohol ratio. A new mixture with an alcohol ratio of 25% is obtained. According to this what is the value of x/y?

A) $\frac{1}{2}$ B) 1 C) $\frac{3}{2}$ D) 2 E) $\frac{5}{2}$

12. Tuz oranı % 60 olan 160 litre tuzlu su ile tuz oranı % x olan 140 litre tuzlu su karıştırılıyor. Elde edilen yeni karışımın tuz oranı % 46 olduğuna göre, x kaçtır?

160 lt. of salt water with 60% salt ratio is mixed with 140 lt. of salt water with x% salt ratio. If the new mixtures salt ratio is 46%, what is the value of x/y?

A) 15 B) 20 C) 25 D) 30 E) 40

13. Şeker oranı % 30 olan 50 gr şekerli su karışımından 20 gr su buharlaştırıldığında oluşan yeni karışımın şeker oranı % kaçtır?

What is the sugar ratio of the new mixture obtained by evaporating 20 gr. of water from 50 gr. of sugared water mixture with a sugar ratio of 30%?

A) 55 B) 50 C) 45 D) 40 E) 35

14. Tuz oranı % 20 olan 40 gr tuzlu suya 60 gr saf tuz ilave edilirse oluşan yeni karışımın tuz oranı % kaç olur?

What is the salt ratio of the new mixture obtained by adding 60 gr. of pure salt to 40 gr. of salt water with a salt ratio of 20%?

A) 72 B) 70 C) 68 D) 64 E) 60

15. Tuz oranı % 50 olan 50 litre tuzlu su ile 50 litre saf su karıştırıldığında oluşan karışımın tuz oranı % kaçtır?

What is the salt ratio of the new mixture obtained by mixing 50 liters of salt water with a salt ratio of 50% and 50 liters of pure water?

A) 20 B) 25 C) 30 D) 35 E) 40

16. 18 ayar olan 240 gr altının kaç gramı saf altındır?

How many grams of 240 grams of 18 carat gold is pure gold?

A) 200 B) 180 C) 160 D) 140 E) 120

PROBLEMLER PROBLEMS
Yanıt Anahtarı Answer Key

TEST 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	B	A	A	D	C	C	C	C	D	E	E	C	D	E

TEST 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	A	E	A	D	E	A	C	B	D	E	E	D	E	C

TEST 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	C	C	C	B	B	A	B	B	A	D	C	C	C	C

TEST 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	C	D	C	B	A	A	D	B	A	D	E	E	D	D	C

TEST 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	A	C	C	B	A	B	A	A	E	C	A	C	A	D

TEST 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	C	D	C	E	D	D	B	B	D	D	B	C	D	C

TEST 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	E	C	A	C	B	C	C	B	C	C	D	C	E	B

TEST 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	C	E	B	A	E	B	D	B	D	B	D	A	C	B	D

TEST 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	B	E	C	E	C	B	E	B	D	C	A	B	B	B	B

TEST 10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	B	A	A	C	C	A	A	D	E	E	B	C	B	B

TEST 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D	A	C	A	A	B	D	B	B	C	A	A	E	B	A	B

TEST 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
C	C	B	A	C	C	C	E	B	C	E	B	A	C	C	B

TEST 13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	A	D	C	D	E	A	B	C	C	C	D	B	A	E	C

TEST 14

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	A	A	C	A	E	A	B	C	D	C	A	C	D	B	E

TEST 15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	D	E	E	A	B	D	C	B	A	E	B	E	B	A

TEST 16

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	D	E	C	A	E	E	B	C	C	B	E	C	C	E	B

TEST 17

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	C	E	B	A	B	C	D	B	C	D	D	B	B	C	E

TEST 18

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
E	C	C	B	E	C	C	A	A	C	B	B	B	C	C	E

TEST 19

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	A	A	E	C	A	A	C	A	A	B	D	B	C	B	B

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