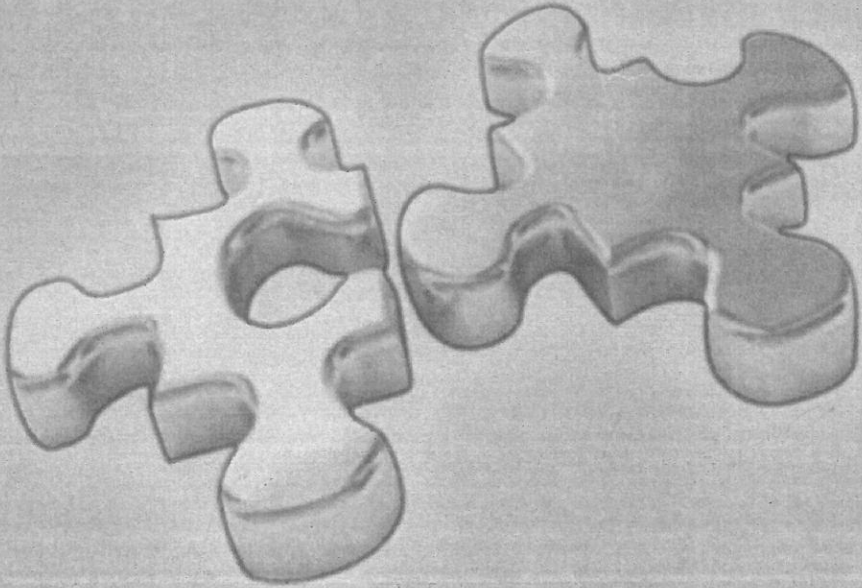


ÇAĞDAŞ ANALİZ

YÖS



**MATEMATİK
SORU BANKASI**

ÖNSÖZ

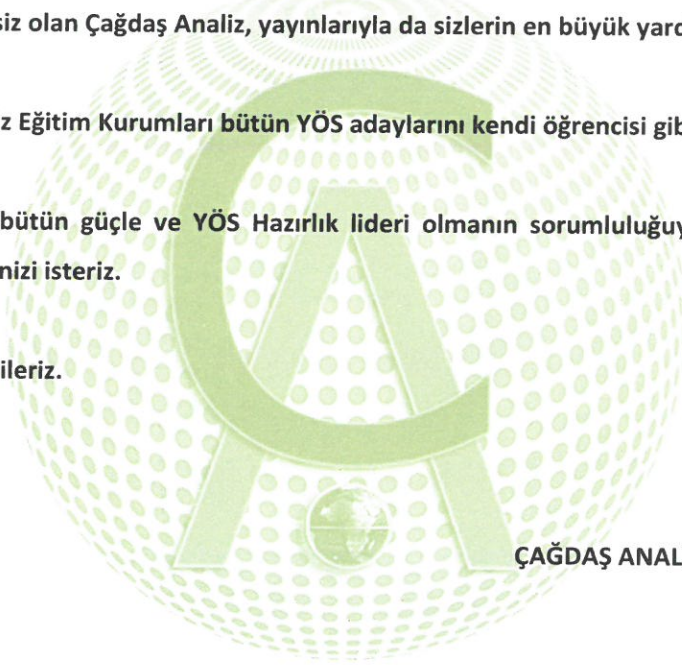
Sevgili YÖS Adayları;

Çağdaş Analiz Eğitim Kurumları, Türkiye'nin SADECE YÖS HAZIRLIK yapan ilk ve tek kurumudur. Eğitim kalitesiyle, YÖS konusundaki bilgi, birikim ve tecrübesiyle, öğrencilerinin her yıl katlanarak artan başarılarıyla rakipsiz olan Çağdaş Analiz, yayınlarıyla da sizlerin en büyük yardımcısı olmaktadır.

Çünkü Çağdaş Analiz Eğitim Kurumları bütün YÖS adaylarını kendi öğrencisi gibi görmektedir.

Sahip olduğumuz bütün güçle ve YÖS Hazırlık lideri olmanın sorumluluğuyla her zaman yanınızda olduğumuzu bilmenizi isteriz.

Hepinize başarılar dileriz.



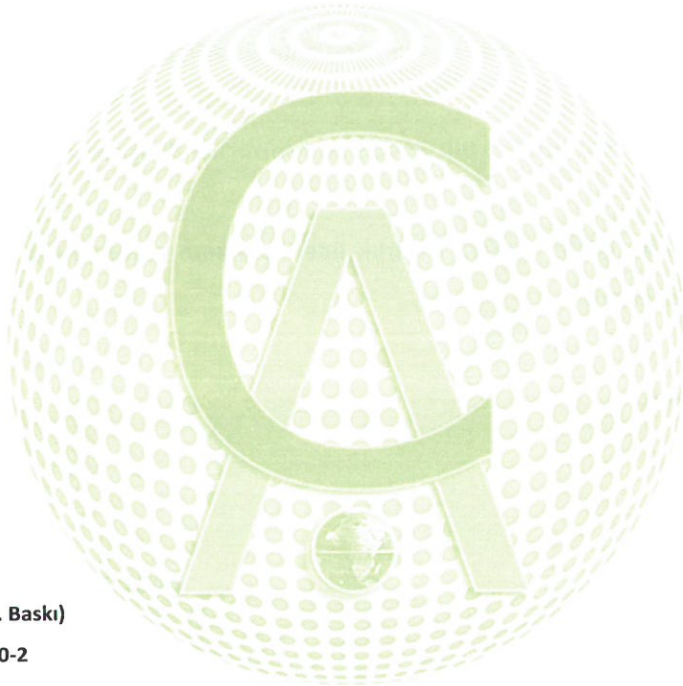
ÇAĞDAŞ ANALİZ EĞİTİM KURUMLARI

Bu kitabın tüm hakları Özel BERFİN EĞİTİM HİZ. SAN. TİC. LTD ŞTİ ve ÇAĞDAŞ ANALİZ Eğitim Kurumlarına aittir.

Kitabın herhangi bir kısmı veya tamamı kurumdan izin alınmaksızın kopyalanamaz, çoğaltılamaz, yayınlanamaz.

Kitabın tüm basım ve yayın hakları Türkiye Cumhuriyeti'nin ilgili Telif Yasası hükümlerince güvence altına alınmıştır.

Ayrıca, kitabın izinsiz kullanımını önlemek amacıyla özel güvence önlemleri mevcuttur. İzinsiz kullanım durumunda tüm maddi ve manevi yasal sorumluluklar kullanıcıya aittir.



Baskı: İstanbul 2014 (II. Baskı)

ISBN : 978-9944-5997-0-2

Kitap İsteme Adresi

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Y Ö S



MATEMATİK SORU BANKASI

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1. BÖLÜM

SAYILAR







1. $14 - 4 \cdot 2 : 4 - 1 = ?$

- A) 2 B) 10 C) 11 D)
- $\frac{28}{3}$
- E) 13

2. $12 - [2(7 - 4) - (2 + 4) : 3] = ?$

- A) -8 B) -7 C) 7 D) 8 E) 10

3. $3 + 5 + 7 + \dots + 63 = ?$

- A) 993 B) 1003 C) 1023 D) 1133 E) 1145

4. $0 + 2 + 4 + 6 + \dots + 20 = x$

$1 + 3 + 5 + \dots + 21 = y$

$x + y = ?$

- A) 211 B) 221 C) 231 D) 242 E) 282

5.

$$\frac{A}{-B} \quad \frac{C}{-D}$$

$(A + C) - (B + D) = ?$

- A) 6 B) 7 C) 8 D) 9 E) 10

6. $a, b, c, d \in \mathbb{N}^+$

$a \cdot b = 20$

$b \cdot c = 30$

$b \cdot d = 35$

$\min(a + b + c + d) = ?$

- A) 18 B) 19 C) 20 D) 21 E) 22

7. $x = y + 4$

$x^2 = y^2 + 32$

$x \cdot y = ?$

- A) 4 B) 8 C) 10 D) 12 E) 16

8.

$$\begin{array}{r} (34) \\ x \quad (ab) \\ \hline xy \\ + mn \\ \hline 408 \end{array}$$

$m \cdot x = ?$

- A) 15 B) 18 C) 28 D) 32 E) 36



9. $A > B > C$

$$\begin{array}{r} (AB) \\ (BC) \\ + (CA) \\ \hline 88 \end{array}$$

$\max(A) - \min(A) = ?$

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

10. $x = (A2B3)$
 $y = (A1B5)$

$x - y = ?$

- A) 12 B) 15 C) 92 D) 98 E) 105

11. $A, B \in \mathbb{Z}^+$

$$\begin{array}{r} A \quad | \quad 12 \\ - \quad \quad | \quad 5 \\ \hline B \end{array}$$

$\max(A) - \max(B) = ?$

- A) 60 B) 61 C) 62 D) 65 E) 70

12. $x^2 \cdot y < 0$
 $y^2 \cdot z < 0$
 $x \cdot y < 0$

$(x, y, z) = ?$

- A)
- $(-, +, -)$
- B)
- $(+, +, -)$
- C)
- $(+, -, -)$
-
- D)
- $(-, -, +)$
- E)
- $(+, -, +)$

13.
$$\begin{array}{r} (ab) \quad | \quad a \\ - \quad \quad | \quad 10 \\ \hline 3 \end{array} \quad \begin{array}{r} (ab) \quad | \quad b \\ - \quad \quad | \quad 14 \\ \hline 1 \end{array}$$

$3a - 2b = ?$

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

14. $a = b - 8$

$(ba) - (ab) = ?$

- A) 60 B) 61 C) 62 D) 68 E) 72

15. $A, B \in \mathbb{N}$

$$\begin{array}{r} A \quad | \quad 6 \\ - \quad \quad | \quad B \\ \hline 3 \end{array} \quad \begin{array}{r} A + B \quad | \quad x \\ - \quad \quad | \quad B \\ \hline 3 \end{array}$$

$x = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7



1. $(a7) + 6 = (b3)$

$\max(a, b) = ?$

- A) 48 B) 56 C) 63 D) 72 E) 75

2. $\frac{(ABAB)}{(AB)} = ?$

- A) 11 B) 101 C) 110 D) 1001 E) 1010

3. $\begin{array}{r} (xyz3) \mid (xyz) \\ - \\ \hline 3 \end{array} \quad \begin{array}{r} xyxy \mid xy \\ - \\ \hline 0 \end{array}$

$A + B = ?$

- A) 11 B) 101 C) 111 D) 121 E) 1001

4. $A, B \in \mathbb{N}^+$

$$\begin{array}{r} A \mid B^2 \\ - \\ \hline 4B \end{array}$$

$\min(A) = ?$

- A) 125 B) 130 C) 134 D) 140 E) 145

5. $(abc) - (cba) = 396$

$2c + a = 19$

$c = ?$

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

6. $(ab) + (ba) = 132$

$(ab) - (ba) = 18$

$a + 3b = ?$

- A) 25 B) 22 C) 18 D) 16 E) 15

7.

$$\begin{array}{r} A8B4 \\ - A2B6 \\ \hline ? \end{array}$$

- A) 308 B) 508 C) 598 D) 608 E) 618

8. $5(x + y) = (xy)$

$x + y = ?$

- A) 5 B) 6 C) 7 D) 8 E) 9

9. $(ab) + (ba) = 176$

$$a + b = ?$$

- A) 8 B) 9 C) 12 D) 16 E) 18

10.
$$\begin{array}{r} 428 \overline{) (xy)} \\ \underline{25} \\ 3 \end{array}$$

$x + y = ?$

- A) 7 B) 8 C) 9 D) 10 E) 12

11. $\frac{(xy) + (yx)}{10} = 11$

$x + y = ?$

- A) 8 B) 9 C) 10 D) 11 E) 15

12. $3(xyz) = (zzz)$

$x + y + z = ?$

- A) 16 B) 15 C) 14 D) 13 E) 12

13. $z \neq 0$

$$\begin{array}{r} (xyz) \\ - (xy) \\ \hline 486 \end{array}$$

$x + y + z = ?$

- A) 20 B) 17 C) 15 D) 13 E) 11

14.
$$\begin{array}{r|l} (6abc) & (abc) \\ - & 26 \\ \hline & 0 \end{array}$$

$a + b + c = ?$

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

15. $(3AB) = 13(BA) + 18$

(BA) = ?

- A) 17 B) 19 C) 21 D) 25 E) 28



1. $x, y, z \in \mathbb{Z}^+$

$$\begin{array}{r} x+y \mid x \\ - \quad \quad \quad \mid 6 \\ \hline 2 \end{array} \quad \begin{array}{r} y \mid z \\ - \quad \quad \quad \mid 4 \\ \hline 2 \end{array}$$

$\min(y) = ?$

- A) 22 B) 25 C) 27 D) 29 E) 31

2. $\begin{array}{r} (abab7) \mid (ab) \\ - \quad \quad \quad \mid x \\ \hline y \end{array}$

$x - y = ?$

- A) 103 B) 107 C) 1003 D) 1007 E) 1113

3. $\begin{array}{r} A \mid B \\ - \quad \quad \mid 27 \\ \hline 20 \end{array}$

$\begin{array}{r} A \mid 9 \\ - \quad \quad \mid C \\ \hline x \end{array}$

$x = ?$

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

4. $a + b = 11$

$(ab) - (ba) = 27$

$a = ?$

- A) 7 B) 6 C) 5 D) 3 E) 2

5. $\begin{array}{r} (ab) \\ \times (7c) \\ \hline 180 \\ + 315 \\ \hline \dots \end{array}$

$c = ?$

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

6. $\begin{array}{r} a \mid b \\ - \quad \quad \mid 3 \\ \hline 2 \end{array} \quad \begin{array}{r} (b+1) \mid c \\ - \quad \quad \mid 5 \\ \hline 4 \end{array}$

$a = ?$

- A)
- $15c + 11$
- B)
- $11c + 15$
- C)
- $5c + 6$
-
- D)
- $6c + 5$
- E)
- $5c + 11$

7. $\begin{array}{r} a \mid 7 \\ - \quad \quad \mid b \\ \hline 3 \end{array} \quad \begin{array}{r} b \mid c \\ - \quad \quad \mid 3 \\ \hline 4 \end{array} \quad \begin{array}{r} a \mid 21 \\ - \quad \quad \mid d \\ \hline x \end{array}$

$x = ?$

- A) 7 B) 8 C) 9 D) 10 E) 11

8. $\begin{array}{r} a \mid b \\ - \quad \quad \mid 3 \\ \hline 6 \end{array} \quad \begin{array}{r} b \mid c \\ - \quad \quad \mid 2 \\ \hline 3 \end{array}$

$\min(a) = ?$

- A) 15 B) 23 C) 29 D) 37 E) 39



9. $\frac{a}{c} \mid \frac{b}{4}$ $\frac{b}{2} \mid c$

min (a) = ?

- A) 18 B) 20 C) 23 D) 25 E) 28

10. $\frac{x}{2y-9} \mid \frac{y}{6}$

max(x) = ?

- A) 45 B) 55 C) 65 D) 75 E) 85

11. $\frac{271}{a} \mid \frac{(a+1)}{(a+1)}$

a = ?

- A) 14 B) 15 C) 16 D) 17 E) 18

12. $\frac{x}{0} \mid \frac{y}{z}$ $\frac{x-z}{z} = ?$

- A) y - 1 B) y C) z + 2 D) y + z E) x

13. $\frac{(ab)}{(ba)} \frac{(ab)}{(ba)} + \frac{(ab)}{(ba)} \frac{(ba)}{(ab)}$

max (ab) = ?

- A) 80 B) 71 C) 62 D) 53 E) 44

14. $\frac{12+21+30+\dots+147}{4+7+10+\dots+49} = ?$

- A) 9 B) 7 C) 5 D) 4 E) 3

15. $\frac{A}{3} \mid \frac{6}{B}$ $\frac{B}{7} \mid \frac{8}{C}$ $\frac{A}{x} \mid \frac{24}{D}$

x = ?

- A) 23 B) 21 C) 17 D) 15 E) 12



1. $x, y, z \in \mathbb{N}^+$

$$x \cdot y = 11$$

$$y \cdot z = 7$$

$$x + y + z = ?$$

- A) 19 B) 20 C) 21 D) 22 E) 23

2. $x, y \in \mathbb{Z}^+$

$$x + y = 9$$

$$\max(3x + 2y) = ?$$

- A) 15 B) 18 C) 23 D) 26 E) 29

3. $a, b, c \in \mathbb{Z}^+$

$$3a = 5b$$

$$c = 2a$$

$$\min(c) = ?$$

- A) 5 B) 6 C) 8 D) 10 E) 30

4. $a, b, c \in \mathbb{Z}^+$

$$a - b = 1$$

$$a - c = 5$$

$$\min(a + b + c) = ?$$

- A) 9 B) 12 C) 13 D) 14 E) 17

5. $a, b, c \in \mathbb{Z}^+$

$$3a = 2b$$

$$5b = 6c$$

$$\min(a) = ?$$

- A) 2 B) 3 C) 4 D) 6 E) 8

6. $x, y, z \in \mathbb{R}$

$$\frac{x}{y} < 0 \quad y \cdot z > 0 \quad x \cdot y^{99} \cdot z^{1001} > 0$$

$$(?, ?, ?) = ?$$

- A) (+, +, -) B) (+, -, +) C) (-, +, +)
D) (-, +, -) E) (+, -, -)

7. $n, a \in \mathbb{Z}^+$

$$363 \cdot n = a^2$$

$$\min(a) = ?$$

- A) 11 B) 13 C) 33 D) 66 E) 121

8. $\frac{15! + 14!}{13! + 12!} = ?$

- A) 208 B) 200 C) 182 D) 180 E) 172



9. $\frac{8! - 7!}{6! + 5!} = ?$

- A) 12 B) 30 C) 36 D) 42 E) 56

10. $\frac{n! + (n-1)!}{(n-1)!} = ?$

- A) $n! + 1$ B) $n!$ C) $n + 1$
D) n E) $n - 1$

11. $\frac{(2n)! \cdot (n-2)!}{(2n-1)! \cdot (n-1)!} = ?$

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

12. $\frac{(n+2)! + (n+1)!}{n! + (n-1)!} = 180$

$n = ?$

- A) 9 B) 10 C) 11 D) 12 E) 13

13. $\frac{(n-3)! \cdot (n+2)!}{n! \cdot (n-1)!} = \frac{7}{2}$

$(n-2)! = ?$

- A) 1 B) 2 C) 6 D) 24 E) 120

14. $a, b, c \in \mathbb{Z}^+$

$A = 3a + 2 = 5b + 4 = 7c + 6$

$\min(A) = ?$

- A) 34 B) 104 C) 105 D) 210 E) 211

15. $A, B \in \mathbb{N}^+$

$\frac{A}{12} + \frac{A}{18} = B$

$\min(B) = ?$

- A) 5 B) 9 C) 15 D) 36 E) 48



1. $x, y, z \in \mathbb{Z}^+$

$$A = 4x + 3 = 5y + 4 = 8z + 7$$

$$\min(A) = ?$$

- A) 39 B) 40 C) 41 D) 42 E) 45

2. $x > 300$

$$x = 5a + 2 = 4b + 1$$

$$\min(x) = ?$$

- A) 307 B) 312 C) 317 D) 322 E) 327

3. $x, y \in \mathbb{N}^+$

$$x^2 - y^2 = 23$$

$$x \cdot y = ?$$

- A) 111 B) 121 C) 132 D) 154 E) 165

5. $a, b \in \mathbb{Z}^+$

$$12 \cdot a = b^2$$

$$\min(a) = ?$$

- A) 3 B) 4 C) 5 D) 6 E) 12

6. $A, n \in \mathbb{N}$

$$A = \frac{79!}{10^n}$$

$$\max(n) = ?$$

- A) 15 B) 16 C) 17 D) 18 E) 19

7. $a, b \in \mathbb{N}^+$

$$\frac{32!}{8^a} = b$$

$$\max(a) = ?$$

- A) 6 B) 7 C) 8 D) 9 E) 10

4. $A, n \in \mathbb{Z}^+$

$$A \cdot 3^n = 42!$$

$$\max(n) = ?$$

- A) 15 B) 17 C) 18 D) 19 E) 20

8. $a, b \in \mathbb{Z}^+$

$$a^3 = 240 \cdot b$$

$$\min(b) = ?$$

- A) 300 B) 600 C) 900 D) 1200 E) 1500



9. $a, b, c \in \mathbb{Z}^+$

$$\frac{13!}{3^a \cdot 2^b \cdot 5^c} \in \mathbb{N}$$

$$\max(a + b + c) = ?$$

- A) 14 B) 15 C) 16 D) 17 E) 18

10. $a, b, c \in \mathbb{Z}$

$$x = 3a + 2 = 5b + 2 = 7c + 2$$

$$\min(x) = ?$$

- A) 47 B) 92 C) 107 D) 112 E) 117

11. $a, b \in \mathbb{N}$

$$\frac{53!}{6^a} = b$$

$$\max(a) = ?$$

- A) 23 B) 24 C) 25 D) 26 E) 27

12. $a, b \in \mathbb{N}^+$

$$a^2 - b^2 = 29$$

$$a + 2b = ?$$

- A) 35 B) 37 C) 43 D) 47 E) 55

13. $x, k, m, n \in \mathbb{N}$

$$1999 + x = 12k$$

$$1999 + x = 15m$$

$$1999 + x = 18n$$

$$\min(x) = ?$$

- A) 159 B) 160 C) 161 D) 162 E) 163

14. $A = 0! + 1! + 2! + \dots + 100!$

$$\begin{array}{r} A \\ \hline K \end{array} \begin{array}{l} 5 \\ \hline \end{array}$$

$$K = ?$$

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

15. $A = 0! + 1! + 2! + \dots + 50!$

$$\begin{array}{r} A \\ \hline K \end{array} \begin{array}{l} 8 \\ \hline \end{array}$$

$$K = ?$$

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



1. $y = -1$
 $a + x = 3$
 $-xy - y - ay = ?$

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

(YÖS - 1990)

2. $b > 0$, $\frac{a}{b} = -\frac{4}{3}$, $a + b = c$

$? < ? < ?$

A) $a < c < b$

B) $a < b < c$

C) $b < c < a$

D) $b < a < c$

E) $c < a < b$

(YÖS - 1990)

3. $a < 0$, $\frac{a \cdot b}{1} = \frac{b \cdot c}{-2} = \frac{c \cdot a}{9}$

$? < ? < ?$

A) $c < a < b$

B) $c < b < a$

C) $b < a < c$

D) $a < c < b$

E) $a < b < c$

(YÖS - 1991)

4. $\frac{(3n)!(n-3)!}{(3n-1)!(n-2)!} = ?$

A) $\frac{n-3}{n-2}$

B) $\frac{3n}{n-2}$

C) $\frac{n-3}{3n-1}$

D) $3n-3$

E) n

(YÖS - 1985)

5. $\frac{n! \cdot (n+1)!}{(n-1)! \cdot (n+2)!} = ?$

A) $\frac{n+1}{n-1}$

B) $\frac{n}{n+2}$

C) $\frac{n+1}{n}$

D) $\frac{n}{n-1}$

E) $\frac{n-1}{n+2}$

(YÖS - 1986)

6. $\frac{27! \cdot 52!}{54! \cdot 25!} = ?$

A) $\frac{13}{53}$

B) $\frac{27}{53}$

C) $\frac{32}{53}$

D) $\frac{11}{27}$

E) $\frac{13}{27}$

(YÖS - 1987)

7. $\frac{3! \cdot (x-4)!}{4! \cdot (x-5)!} = 4!$

$x = ?$

A) 120

B) 100

C) 82

D) 26

E) 4

(YÖS - 1988)

8. $\frac{n! \cdot (n+4)!}{(n+3)! \cdot (n-1)!} = 45$

$n = ?$

A) 5

B) 6

C) 7

D) 8

E) 9

(YÖS - 1988)



9. $C(10,3) = \binom{10}{3} = ?$

- A) 120 B) 300 C) 420 D) 560 E) 720

(YÖS - 1989)

10. $n > 0$

$$\frac{(n-6)!}{2 \cdot (n-5)!} = \frac{1}{14}$$

$n = ?$

- A) 10 B) 11 C) 12 D) 13 E) 14

(YÖS - 1990)

11. $\frac{(A-5)}{10} \cdot \frac{(B+1)}{4} = \frac{(A+2)}{6} \cdot \frac{(B-3)}{7}$

$A - B = ?$

- A) 47 B) 49 C) 53 D) 55 E) 57

(YÖS - 1998)

12. $25 + 27 + 29 + \dots + (2n-1) = 1456$

$n = ?$

- A) 34 B) 36 C) 38 D) 40 E) 42

(YÖS - 1998)

13. $(x+2)^2 + (3y+6)^2 + (y+z)^2 = 0$

$(x+y+z)^2 = ?$

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

(YÖS - 1999)

14. $\frac{a+b}{2} = 1$

$\sqrt{bc} = 2$

$a - c = -2$

$a = ?$

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

(YÖS - 2000)

15. $5 + 6 + 7 + 8 + 9 + \dots + n = 290$

$n = ?$

- A) 40 B) 36 C) 32 D) 28 E) 24

(YÖS - 2000)

16. $4 + 8 + 12 + \dots + 44 + 48 = ?$

- A) 312 B) 316 C) 320 D) 324 E) 328

(YÖS - 2001)



17.
$$\begin{array}{r} \text{K L} \\ \times \quad \text{L} \\ \hline 624 \end{array}$$
 $K = ?$
- A) 5 B) 6 C) 7 D) 8 E) 9
- (YÖS - 2001)

20.
$$\begin{array}{r} \text{K L M} \\ \text{K L M} \\ \text{K L M} \\ \text{K L M} \\ + \text{K L M} \\ \hline 1630 \end{array}$$
 $K + L + M = ?$
- A) 8 B) 9 C) 10 D) 11 E) 12
- (YÖS - 2003)

18. $P(n, r) = \frac{n!}{(n-r)!}$
- $P(4, 2) = 3 \cdot P(k, 1)$
- $k = ?$
- A) 0 B) 1 C) 2 D) 3 E) 4
- (YÖS - 2001)

21. $(35)_{10} = (x)_8$
- $x = ?$
- A) 35 B) 36 C) 40 D) 43 E) 45
- (YÖS - 2004)

19. $C(n, r) = \frac{n!}{r!(n-r)!}$
- $C(5, 3) = C(k, 2)$
- $k = ?$
- A) 7 B) 6 C) 5 D) 4 E) 3
- (YÖS - 2002)

22. $5 + 10 + 15 + \dots + 40 - 4 - 8 - 12 - \dots - 32 = ?$
- A) 18 B) 24 C) 36 D) 45 E) 60
- (YÖS - 2004)



23. $A = 28 + 35 + 42 + \dots + 112$
 $B = 7 + 14 + 21 + \dots + 105$

$A - B = ?$

- A) 7 B) 35 C) 70 D) 77 E) 100

(YÖS - 2005)

26. $\frac{5! - 4!}{12} = ?$

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

(YÖS - 2007)

24. $\frac{a}{2} = \frac{2}{b}$

$a \cdot b \cdot c = 12$

$c = ?$

- A) 2 B) 3 C) 4 D) 6 E) 12

(YÖS - 2006)

27. $n! = 1 \cdot 2 \cdot 3 \cdot \dots \cdot (n-1) \cdot n$

$\frac{(n+2)! + (n+1)!}{(n+1)!} = ?$

- A) $(n-1)!$ B) $n!$ C) $2n$
D) $n+2$ E) $n+3$

(YÖS - 2009)

25.
$$\begin{array}{r|l} A & B \\ \hline - & 24 \\ \hline 2 & \end{array}$$

$A - B = 991$

$B = ?$

- A) 39 B) 40 C) 41 D) 42 E) 43

(YÖS - 2006)



1. $-xy - y - ay = -y \cdot (x + a) - y$

$$\begin{aligned} &= -(-1) \cdot 3 - (-1) \\ &= 1 \cdot 3 + 1 \\ &= 3 + 1 \\ &= 4 \end{aligned}$$

Yanıt – Answer: C

2. $b > 0, \frac{a}{b} = \frac{-4}{3} \Rightarrow b = 3k, a = -4k$

$$a + b = c \Rightarrow c = -k$$

$$a < c < b$$

Yanıt – Answer: A

3. $a < 0, \frac{a \cdot b}{1} = \frac{b \cdot c}{-2} = \frac{c \cdot a}{9} = k$

$$a \cdot b = k$$

$$b \cdot c = -2k$$

$$c \cdot a = 9k$$

$$\frac{a \cdot b}{b \cdot c} = \frac{k}{-2k} \Rightarrow \frac{a}{c} = -\frac{1}{2} = -\frac{9}{18}$$

$$\frac{b \cdot c}{c \cdot a} = \frac{-2k}{9k} \Rightarrow \frac{b}{a} = \frac{2}{-9}$$

$$a = -9, b = 2, c = 18 \quad a < b < c$$

Yanıt – Answer: E

4. $\frac{(3n)!. (n-3)!}{(3n-1)!. (n-2)!} = \frac{3n \cdot (3n-1)! \cdot (n-3)!}{(3n-1)! \cdot (n-2)! \cdot (n-3)!}$

$$= \frac{3n}{n-2}$$

Yanıt – Answer: B

5. $\frac{n! \cdot (n+1)!}{(n-1)! \cdot (n+2)!} = \frac{n \cdot (n-1)! \cdot (n+1)!}{(n-1)! \cdot (n+2) \cdot (n+1)!}$

$$= \frac{n}{n+2}$$

Yanıt – Answer: B

6. $\frac{27! \cdot 52!}{54! \cdot 25!} = \frac{27 \cdot 26 \cdot 25! \cdot 52!}{54 \cdot 53 \cdot 52! \cdot 25!} = \frac{13}{53}$

Yanıt – Answer: A

7. $\frac{3! \cdot (x-4)!}{4! \cdot (x-5)!} = 4!$

$$\frac{3! \cdot (x-4)!}{4 \cdot 3! \cdot (x-5)!} = 4!$$
$$\frac{x-4}{4} = 24$$
$$x-4 = 96$$
$$x = 100$$

Yanıt – Answer: B

8. $\frac{n! \cdot (n+4)!}{(n+3)! \cdot (n-1)!} = 45$

$$\frac{n \cdot (n-1)! \cdot (n+4) \cdot (n+3)!}{(n+3)! \cdot (n-1)!} = 45$$
$$n \cdot (n+4) = 45$$
$$n = 5$$

Yanıt – Answer: A



$$\begin{aligned} 9. \quad C(10,3) &= \frac{10!}{3!(10-3)!} \\ &= \frac{10!}{3! \cdot 7!} \\ &= \frac{10 \cdot 9 \cdot 8 \cdot 7!}{3 \cdot 2 \cdot 1 \cdot 7!} \\ &= 10 \cdot 3 \cdot 4 = 120 \end{aligned}$$

Yanıt – Answer: A

$$\begin{aligned} 10. \quad \frac{(n-6)!}{2 \cdot (n-5)!} &= \frac{1}{14} \\ \frac{(n-6)!}{2 \cdot (n-5) \cdot (n-6)!} &= \frac{1}{14} \\ \frac{1}{2n-10} &= \frac{1}{14} \\ 2n-10 &= 14 \\ 2n &= 24 \\ n &= 12 \end{aligned}$$

Yanıt – Answer: C

$$\begin{aligned} 11. \quad 4(B+1) + 10 &= A - 5 \\ 4B + 14 &= A - 5 \Rightarrow 4B - A = -19 \\ 7(B-3) + 6 &= A + 2 \\ 7B - 15 &= A + 2 \Rightarrow 7B - A = 17 \\ \begin{array}{r} 4B - A = -19 \\ 7B - A = 17 \\ \hline -3B = -36 \Rightarrow B = 12 \\ A = 67 \end{array} \\ A - B &= 67 - 12 = 55 \end{aligned}$$

Yanıt – Answer: D

$$\begin{aligned} 12. \quad N_1 &= 1 + 3 + 5 + \dots + (2n-1) = n^2 \\ N_2 &= 1 + 3 + 5 + \dots + 23 = 12^2 \\ 2n-1 &= 23 \\ 2n &= 24 \Rightarrow n = 12 \\ N_1 - N_2 &= n^2 - 12^2 = 1456 \\ n^2 &= 1456 + 144 = 1600 \\ n &= 40 \end{aligned}$$

Yanıt – Answer: D

$$\begin{aligned} 13. \quad a^2 &\geq 0, \quad b^2 \geq 0, \\ a^2 + b^2 &= 0 \Rightarrow a = 0 \text{ ve } b = 0 \\ (x+2)^2 + (3y+6)^2 + (y+z)^2 &= 0 \\ \underbrace{(x+2)^2}_0 + \underbrace{(3y+6)^2}_0 + \underbrace{(y+z)^2}_0 &= 0 \\ \begin{array}{lll} x+2=0 & 3y+6=0 & y+z=0 \\ x=-2 & y=-2 & -2+z=0 \\ & & z=2 \end{array} \\ (x+y+z)^2 &= (-2+2+2)^2 = 4 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned} 14. \quad \frac{a+b}{2} &= 1 \Rightarrow a+b=2 \\ a-c &= -2 \Rightarrow -a+c=2 \\ \begin{array}{r} a+b=2 \\ -a+c=2 \\ \hline b+c=4 \end{array} & \quad \sqrt{bc} = 2 \Rightarrow b \cdot c = 4 \\ \begin{array}{l} b+c=4 \\ b \cdot c=4 \end{array} \Rightarrow \begin{array}{l} b=2 \\ c=2 \end{array} \Rightarrow a=0 \end{aligned}$$

Yanıt – Answer: B



15. $1+2+3+\dots+n = \frac{n(n+1)}{2}$

$$\underbrace{1+2+3+4}_{10} + \underbrace{5+6+\dots+n}_{290} = \frac{n(n+1)}{2}$$
$$300 = \frac{n \cdot (n+1)}{2}$$
$$600 = n(n+1) \Rightarrow n = 24$$

$\downarrow \quad \downarrow$
24 25

Yanıt – Answer: E

16. $4 + 8 + 12 + \dots + 44 + 48 = X$

$$X = \frac{(48+4) \cdot (48-4+4)}{2 \cdot 4} = \frac{52 \cdot 48}{8} = 312$$

Not:

$$a + (a+n) + (a+2n) + \dots + k = X \Rightarrow$$
$$X = \frac{(k+a) \cdot (k-a+n)}{2 \cdot n}$$

Yanıt – Answer: A

17. $L \cdot L = 64 \Rightarrow L = 8$
 $62 = 8 \cdot K + 6 \Rightarrow 8K = 56$
 $K = 7$

Yanıt – Answer: C

18. $P(4, 2) = 3 \cdot P(k, 1)$

$$\frac{4!}{2!} = 3 \cdot \frac{k!}{(k-1)!}$$

$$\frac{4 \cdot 3 \cdot 2}{2} = 3 \cdot \frac{k(k-1)!}{(k-1)!}$$

$$12 = 3k \quad k = 4$$

Yanıt – Answer: E

19.

Not:

$a \neq b$

$$C(n, a) = C(n, b) \Rightarrow n = a + b$$

$$C(5, 3) = C(k, 2)$$

$$C(5, 3) = C(5, 2) = C(k, 2)$$

$$k = 5$$

Yanıt – Answer: C

20. $5(KLM) = 1630 \Rightarrow (KLM) = 326$

$$K = 3, L = 2, M = 6$$

$$K + L + M = 3 + 2 + 6 = 11$$

Yanıt – Answer: D



21.

$$\begin{array}{r} 35 \overline{) 8} \\ - 32 \\ \hline 3 \end{array}$$

$$x = 43$$

Yanıt – Answer: D

$$22. (5-4) + (10-8) + (15-12) + \dots (40-32) = 1+2+3+\dots+8$$

$$\begin{aligned} &= \frac{8.9}{2} \\ &= \frac{72}{2} \\ &= 36 \end{aligned}$$

Yanıt – Answer: C

23.

$$\left. \begin{array}{l} A = 28 + 35 + 42 + \dots + 112 \\ B = 7 + 14 + 21 + \dots + 105 \end{array} \right\} \Rightarrow A - B = ?$$

$$A = \frac{(112+28)(112-28+7)}{2.7} = \frac{140.91}{14} = 910$$

$$B = \frac{(105+7)(105-7+7)}{2.7} = \frac{112.105}{14} = 840$$

$$A - B = 910 - 840 = 70$$

Yanıt – Answer: C

24.

$$\frac{a}{2} = \frac{2}{b}$$

$$a \cdot b \cdot c = 12 \Rightarrow c = ?$$

$$a \cdot b = 4$$

$$\underbrace{a \cdot b}_{4} \cdot c = 12 \Rightarrow \cancel{4} \cdot c = \cancel{12}_3$$

$$c = 3$$

Yanıt – Answer: B

25.

$$\begin{array}{r} A \overline{) B} \\ 24 \end{array}$$

$$A - B = 991$$

$$A = 24B + 2$$

$$24B + 2 - B = 991$$

$$23B = 989$$

$$B = 43$$

Yanıt – Answer: E

26.

$$\frac{5! - 4!}{12} = \frac{5.4! - 4!}{12}$$

$$= \frac{4!(5-1)}{12}$$

$$= \frac{\cancel{4} \cdot \cancel{3} \cdot 2 \cdot 1 \cdot 4}{12} = 8$$

Yanıt – Answer : C

27.

$$\frac{(n+2)! + (n+1)!}{(n+1)!} = \frac{(n+2) \cdot (n+1)! + (n+1)!}{(n+1)!}$$

$$= \frac{\cancel{(n+1)!} \cdot [n+2+1]}{\cancel{(n+1)!}} = n+3$$

Yanıt – Answer : E

2. BÖLÜM

RASYONEL SAYILAR







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

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

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

- A) 8 B) 9 C) 24 D) 36 E) 72

3. $\frac{\left(\frac{5}{3} - 7\right) + \left(\frac{1}{3} + 7\right)}{\left(\frac{13}{12} + 2\right) - \left(\frac{1}{12} + 2\right)} = ?$

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

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

- A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{7}{6}$ D) $\frac{8}{3}$ E) $\frac{11}{3}$

5. $\left(\frac{2}{3} - \frac{1}{17} + \frac{3}{5}\right) - \left(\frac{1}{2} - \frac{1}{17} - \frac{2}{5}\right) = ?$

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

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

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

7. $3 - \frac{2}{1 - \frac{1}{1 - \frac{1}{11}}} = ?$

- A) 13 B) 15 C) 23 D) 28 E) 30

8. $3 + \frac{18}{3 + \frac{18}{3 + \frac{18}{\vdots}}}$

- A) 3 B) 5 C) 6 D) 9 E) 12



9. $(1+0,2) \cdot (0,1+0,15) = ?$

- A) 0,01 B) 0,03 C) 0,2 D) 0,3 E) 0,6

10. $\left(\frac{1,5}{0,5} + \frac{12}{0,08} \right) : 0,9 = ?$

- A) 170 B) 96 C) 47 D) 19 E) 2,7

11. $\frac{\frac{3}{0,15} + \frac{2,5}{0,25}}{0,5} = ?$

- A) 120 B) 75 C) 60 D) 40 E) 30

12. $\frac{1,4\overline{6}}{4,8} = ?$

- A) 0,2 B) 0,3 C) 0,35 D) 0,4 E) 0,45

13. $\frac{0,81}{(0,3)^2 - (0,3)} : \frac{0,027}{(0,3)^2} = ?$

- A) 3 B) $-\frac{9}{7}$ C) $-\frac{7}{8}$ D) $-\frac{90}{7}$ E) -2

14. $A = 2 + \frac{2}{2 - \frac{1}{2}}$ $B = 2 + \frac{2}{2 + \frac{1}{2}}$

$\frac{A-B}{A \cdot B} = ?$

- A) 3 B) $\frac{5}{2}$ C) $\frac{2}{35}$ D) $\frac{1}{3}$ E) $\frac{1}{5}$

15. $a = -\frac{1}{2}$ $b = -\frac{3}{8}$ $c = -\frac{6}{7}$

$? > ? > ?$

- A) $a > b > c$ B) $a > c > b$ C) $b > a > c$
D) $b > c > a$ E) $c > b > a$



1. $\frac{xyz}{xy,z} - \frac{xy,z}{x,yz} + \frac{x,yz}{0,xyz} = ?$

- A) 1 B) 10 C) 100 D) 101 E) 111

2. $\left(1 - \frac{1}{2}\right) \cdot \left(1 - \frac{1}{3}\right) \cdot \left(1 - \frac{1}{4}\right) \dots \left(1 - \frac{1}{x}\right) = \frac{1}{2}$

$x = ?$

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

3. $b \neq -6$
 $\frac{2a+b}{a-3} = 0$

$a = ?$

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

4. $a < 0$ $x = \frac{a}{4}$ $y = \frac{a}{6}$ $z = \frac{a}{7}$

$? < ? < ?$

- A) $z < y < x$ B) $x < z < y$ C) $x < y < z$
D) $y < z < x$ E) $y < x < z$

5. $x \neq 0, y \neq 0$

$\frac{x, \bar{x} + y, \bar{y}}{0, \bar{x} + 0, \bar{y}} = ?$

- A) 3 B) 6 C) 10 D) 12 E) 15

6. $\frac{1}{3} - \left(\frac{5}{4} \cdot \frac{4}{3}\right) - \frac{1}{6} : \left(\frac{1}{2} - \frac{1}{3}\right) = ?$

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

7. $\left(1 + \frac{1}{2}\right) \cdot \left(1 + \frac{1}{3}\right) \cdot \left(1 + \frac{1}{4}\right) \dots \left(1 + \frac{1}{11}\right) = ?$

- A) 6 B) 7 C) 9 D) 11 E) 17

8. $(0,735 + 0,265) + (0,17 + 0,43 - 0,1) = ?$

- A) 0,75 B) 0,85 C) 1 D) 1,25 E) 1,5



1.
$$\frac{\frac{1}{3} + \frac{3}{5} + \frac{5}{7} + 9 : (-3)}{\frac{2}{3} + \frac{2}{5} + \frac{2}{7}} = ?$$

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

2. $6\frac{1}{4} = x \cdot \left(1\frac{1}{4}\right)$

$x = ?$

- A) 5 B) 6 C) 10 D) 12 E) 24

3. $a = \frac{99}{100}$ $b = \frac{999}{1000}$ $c = \frac{9999}{10000}$

$? < ? < ?$

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

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

- A) $\frac{15}{16}$ B) $\frac{15}{8}$ C) $\frac{15}{4}$ D) $\frac{3}{7}$ E) $\frac{1}{2}$

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

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

6.
$$\frac{0, x}{0, y} + \frac{0, 0 x}{0, 00 y} + \frac{x}{0, 0 y} = \frac{74}{3}$$

$x + y = ?$

- A) 9 B) 11 C) 12 D) 14 E) 15

7. $x = 3,4\overline{34}$ $y = 3,\overline{434}$ $z = 3,43\overline{4}$

$? < ? < ?$

- A) $x < y < z$ B) $x < z < y$ C) $y < x < z$
D) $z < y < x$ E) $z < x < y$

8.
$$\frac{\frac{11}{0,3} + \frac{0,2}{0,33} - \frac{0,5}{0,55}}{0,22} = ?$$

- A) 121 B) 21 C) $12,1$ D) $1,21$ E) $0,21$



9. $x = -\frac{2}{3}$ $y = -\frac{3}{4}$ $z = \frac{2}{3}$ $t = \frac{3}{4}$

? < ? < ? < ?

- A) $x < y < z < t$ B) $y < x < t < z$
C) $t < z < x < y$ D) $y < x < z < t$
E) $x < y < t < z$

10. $3 + \frac{4}{10} + \frac{2}{1000} + \frac{1}{10000} = ?$

- A) 3,4021 B) 3,4201 C) 3,421
D) 3,0421 E) 3,4012

11. $x = 0,\overline{63}$ $y = 0,\overline{127}$

$\frac{x}{y} = ?$

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

12. $a, b, c \in \mathbb{Z}^-$ $\frac{a}{0,8} = \frac{b}{0,5} = \frac{c}{0,9}$

? > ? > ?

- A) $c > b > a$ B) $c > a > b$ C) $a > b > c$
D) $b > a > c$ E) $b > c > a$

13. $\frac{\frac{4}{3} - \frac{3}{2}}{2} = \frac{x}{4} - 2$

$x = ?$

- A) 2 B) 4 C) 8 D) 12 E) 16

14. $12 - \frac{36}{12 - \frac{36}{12 - \frac{36}{\vdots}}}$

- A) 3 B) 4 C) 5 D) 6 E) 9

15. $\frac{(0,8 - 0,72) \cdot 0,5 + 0,2}{0,8} = ?$

- A) 1,2 B) 0,9 C) 0,6 D) 0,4 E) 0,3



1. $\frac{2,4}{0,08} + \frac{0,21}{0,07} + \frac{5}{0,5} = ?$

- A) 70 B) 43 C) 39 D) 16 E) 7

(YÖS - 1985)

4. $\frac{\frac{a}{b}}{a} - \frac{a}{\frac{b}{a}} = ?$

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

(YÖS - 1988)

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

A) $\frac{x+3}{3}$

B) $x+5$

C) x

E) 0

D) 1

(YÖS - 1985)

5. $x > 0$

$$\frac{1}{\frac{x}{3}} + \frac{1}{\frac{3}{x}} = \frac{x}{6}$$

$x = ?$

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

(YÖS - 1989)

3. $\frac{x+3}{3} + \frac{3}{x-3} = ?$

A) $\frac{x+6}{x}$

B) $\frac{x^2}{3x-9}$

C) $\frac{3x}{x-1}$

D) $\frac{x^2+3x}{3x-9}$

E) $\frac{3x}{x+1}$

(YÖS - 1987)

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

$x = ?$

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

(YÖS - 1990)



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

$x = ?$

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

(YÖS - 1991)

10. $\left[\frac{a}{b} - \left(2 - \frac{b}{a} \right) \right] : \frac{a-b}{ab} = ?$

- A) $-ab$ B) $2ab$ C) $a + b$

- D) $b - a$ E) $a - b$

(YÖS - 1994)

8. $0 < x$

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

$x = ?$

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

(YÖS - 1993)

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

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

(YÖS - 1997)

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

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

(YÖS - 1994)

12. $0,003 = \frac{1}{100} \cdot k$ $k = ?$

- A) $\frac{3}{10}$ B) $\frac{3}{100}$ C) $\frac{3}{20}$ D) $\frac{1}{30}$ E) 300

(YÖS - 2000)



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

- A) $\frac{-1}{30}$ B) $\frac{-5}{5}$ C) $\frac{-1}{5}$ D) -6 E) -5

(YÖS - 2001)

16. $\frac{x^{-2} + y^{-2}}{x^{-1}y + y^{-1}x} = ?$

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

(YÖS - 2006)

14. $0,000758 = 75,8 \cdot 10^{-a}$
 $a = ?$

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

(YÖS - 2004)

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

- A) 2 B) 4 C) 5 D) 10 E) 20

(YÖS - 2008)

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

$x = ?$

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

(YÖS - 2005)

18. $\frac{x+1}{x} + \frac{x+2}{x+1} + \frac{x+3}{x+2} = k$

$\frac{1}{x} + \frac{1}{x+1} + \frac{1}{x+2} = ?$

- A) $k-3$ B) $3k-1$ C) $3k+1$

- D) $\frac{k-1}{3}$ E) $\frac{k+1}{3}$

(YÖS - 2008)



$$1. \quad \frac{2,4}{0,08} + \frac{0,21}{0,07} + \frac{5}{0,5} = \frac{240}{8} + \frac{21}{7} + \frac{50}{5}$$
$$= 30 + 3 + 10$$
$$= 43$$

Yanıt – Answer: B

$$2. \quad x - \frac{x+5}{\frac{5}{x}+1} = x - \frac{x(x+5)}{5+x}$$
$$= x - x = 0$$

Yanıt – Answer: E

$$3. \quad \frac{x+3}{3} + \frac{3}{x-3} = \frac{(x+3)(x-3)+9}{3(x-3)}$$
$$= \frac{x^2-9+9}{3x-9}$$
$$= \frac{x^2}{3x-9}$$

Yanıt – Answer: B

$$4. \quad \frac{\frac{a}{b}}{\frac{a}{\frac{b}{a}}} = \frac{a}{ab} \cdot \frac{a^2}{b}$$
$$= \frac{a-a^3}{ab}$$
$$= \frac{a(1-a^2)}{ab} = \frac{1-a^2}{b}$$

Yanıt – Answer: D

$$5. \quad \frac{1}{x} + \frac{3}{x} = \frac{x}{6}$$

$$\frac{1}{3x} + \frac{1}{3x} = \frac{x}{6}$$

$$\frac{2}{3x} = \frac{x}{6} \Rightarrow 3x^2 = 12$$

$$x^2 = 4$$
$$x > 0$$
$$x = 2$$

Yanıt – Answer: B

$$6. \quad \frac{x}{2} - \frac{x-1}{4} = 1$$

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

$$2x - x + 1 = 4 \Rightarrow x = 3$$

Yanıt – Answer: C

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

$$\frac{4}{x} - \frac{1}{x-1} = 1 \Rightarrow \frac{4x-4-x}{x^2-x} = 1$$

$$\Rightarrow 3x-4 = x^2-x$$
$$x^2-4x+4 = 0$$
$$(x-2)^2 = 0$$
$$x = 2$$

Yanıt – Answer: B

$$8. \quad \frac{\frac{2}{x}}{\frac{3}{\frac{2}{x}}} = 0 \Rightarrow \frac{2}{3x} - \frac{3x}{2} = 0 \Rightarrow \frac{2}{3x} = \frac{3x}{2}$$

$$9x^2 = 4$$

$$x^2 = \frac{4}{9} \Rightarrow x = \frac{2}{3}$$
$$(x > 0)$$

Yanıt – Answer: C



$$9. \frac{3^{-1}+3}{2^{-1}+2} = \frac{\frac{1}{3}+3}{\frac{1}{2}+2} = \frac{\frac{10}{3}}{\frac{5}{2}} = \frac{20}{15} = \frac{4}{3}$$

Yanıt – Answer: C

$$10. \left[\frac{a}{b} - \left(2 - \frac{b}{a} \right) \right] : \frac{a-b}{ab} = \left[\frac{a}{b} - \frac{2a-b}{a} \right] \cdot \frac{ab}{a-b}$$
$$= \frac{a^2 - 2ab + b^2}{ab} \cdot \frac{ab}{a-b} = \frac{(a-b)^2}{a-b} = a-b$$

Yanıt – Answer: E

$$11. \frac{\left(\frac{1}{3} - 2 \right) + \left(\frac{1}{2} - 3 \right)}{\left(2 - \frac{3}{4} \right) \cdot \left(\frac{3}{2} - 4 \right)} = \frac{-\frac{5}{3} - \frac{5}{2}}{\frac{5}{4} \cdot \left(-\frac{5}{2} \right)} = \frac{-\frac{25}{6}}{-\frac{25}{8}}$$
$$= \frac{25}{6} \cdot \frac{8}{25} = \frac{8}{6} = \frac{4}{3}$$

Yanıt – Answer: D

$$12. 0,003 = \frac{1}{100} \cdot k$$

$$0,003 \cdot 100 = k$$

$$0,3 = k \Rightarrow k = \frac{3}{10}$$

Yanıt – Answer: A

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

$$\frac{\frac{2}{3}}{-\frac{1}{3}} \cdot \frac{\frac{5}{3}}{2} = -6 \cdot \left(\frac{5}{6} \right) = -5$$

Yanıt – Answer: E

$$14. 0,000758 = 75,8 \cdot 10^{-a}$$
$$758 \cdot 10^{-6} = 758 \cdot 10^{-1} \cdot 10^{-a}$$
$$10^{-6} = 10^{-1-a}$$
$$-6 = -1-a$$
$$a = 6-1$$
$$a = 5$$

Yanıt – Answer: B

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

Yanıt – Answer: B



$$16. \frac{x^{-2} + y^{-2}}{x^{-1}y + y^{-1}x} = \frac{\frac{1}{x^2} + \frac{1}{y^2}}{\frac{y}{x} + \frac{x}{y}}$$
$$= \frac{\frac{x^2 + y^2}{x^2 \cdot y^2}}{\frac{y^2 + x^2}{x \cdot y}} = \frac{\cancel{x^2 + y^2}}{\cancel{x^2} \cdot \cancel{y^2}} \cdot \frac{\cancel{x} \cdot \cancel{y}}{\cancel{x^2 + y^2}} = \frac{1}{xy}$$

Yanıt – Answer: D

$$17. \left(\frac{2}{5}\right)^{-3} \cdot \left(\frac{4}{5}\right)^2 =$$
$$\frac{5^3}{2^3} \cdot \frac{4^2}{5^2} = 5 \cdot 2 = 10$$

Yanıt – Answer : D

$$18. \frac{x+1}{x} + \frac{x+2}{x+1} + \frac{x+3}{x+2} = k$$
$$-1/\frac{1}{x} + \frac{1}{x+1} + \frac{1}{x+2} = A$$
$$+ \frac{1}{1} + \frac{1}{1} + \frac{1}{1} = k - A$$
$$3 = k - A \Rightarrow A = k - 3$$

Yanıt – Answer : A

3. BÖLÜM

ÜSLÜ SAYILAR







1. $(-3^2) + (-3)^2 + (-3)^3 = ?$

- A) -3 B) -9 C) -27 D) -36 E) -45

2. $\left(9^9 \cdot \frac{1}{3}\right) \cdot \left(8^6 \cdot \frac{1}{2}\right) = ?$

- A) 6^{15} B) 6^{16} C) $2 \cdot 6^{16}$ D) 6^{17} E) 12^{11}

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

- A) 8 B) 10 C) 16 D) 20 E) 40

4. $\left(\frac{0,36}{0,04}\right)^x = 27^{x-1}$

$x = ?$

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

5. $\left(\frac{0,4}{2}\right)^{x+1} = (0,008)^{x-2}$

$x = ?$

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

6. $2^{x+10} + 2^{x+11} + 2^{x+12} = 112$

$x = ?$

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

7. $6^x = 2^{x+1}$

$9^x + 3^{x+1} = ?$

- A) 10 B) 12 C) 30 D) 55 E) 108

8. $3^{a-1} = x$ $3^{a+1} + 3^{a+2} = 720$

$x = ?$

- A) 60 B) 45 C) 30 D) 20 E) 12



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

- A) -64 B) -16 C) 16 D) 32 E) 64

10. $\left[(-x^2)^3 \right]^5 = ?$

- A) $-x^{30}$ B) $-x^{15}$ C) x^{15} D) x^{30} E) x^{-30}

11. $5^x = 2$

$25^x + 125^{x+1} = ?$

- A) 125 B) 250 C) 450 D) 1000 E) 1004

12. $\frac{2^{2004} - 2^{2002}}{2^{2001}} = ?$

- A) 2 B) 4 C) 6 D) 8 E) 12

13. $\frac{1,22 \cdot 10^{-2} - 0,2 \cdot 10^{-3}}{4 \cdot 10^{-5}} = ?$

- A) $3 \cdot 10^2$ B) $3 \cdot 10^{-2}$ C) $4 \cdot 10^{-3}$
D) $4 \cdot 10^3$ E) $-5 \cdot 10^{-1}$

14. $\left. \begin{array}{l} 2^a = x \\ 3^a = y \end{array} \right\}$
 $72^a = ?$

- A) $x^2 y$ B) xy^2 C) $x^3 y^2$
D) $x^2 y^3$ E) $(xy)^3$

15. $\frac{(-3)^4 \cdot (-3^0) \cdot 9^{-1}}{(81)^{-1} \cdot (-9)^2} = ?$

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



1. $\frac{5^7 + 5^9 + 5^{11}}{5^7 + 5^5 + 5^3} = ?$

- A) 5 B) 25 C) 125 D) 625 E) 3000

2. $12^4 \cdot (500)^3 = 2^x \cdot 3^y \cdot 5^z$
 $x + y + z = ?$

- A) 24 B) 25 C) 26 D) 27 E) 28

3. $\left(\frac{2}{2^n \cdot 3^6} \right)^n = 12$
 $n = ?$

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

4. $x = 2^{60}$
 $y = 3^{40}$
 $z = 7^{20}$
 $? < ? < ?$

- A) $x < y < z$ B) $x < z < y$ C) $y < x < z$
D) $y < z < x$ E) $z < x < y$

5. $2^{x-y} = \frac{1}{3}$
 $\frac{2^{x+y}}{4^x + 4^y} = ?$

- A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) $\frac{3}{5}$ D) $\frac{3}{10}$ E) $\frac{3}{13}$

6. $(0,0016)^{\frac{3}{4}} \cdot 10^4 = ?$

- A) 1600 B) 800 C) 400 D) 80 E) 8

7. $2^x - 2^{-x} = 6$
 $4^x + 4^{-x} = ?$

- A) 18 B) 24 C) 32 D) 34 E) 38

8. $\left. \begin{array}{l} 9^{a+b} = 2^3 \\ 3^{a-b} = 2 \end{array} \right\} \Rightarrow \frac{a}{b} = ?$

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



9. $5^x \cdot 6^y = 180$, $5^y \cdot 6^x = 150$

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

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

10. $\frac{a}{b} = \frac{1}{6}$, $\left(\frac{b}{a}\right)^{\frac{1}{n}} = 6^3$

$$n = ?$$

- A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{5}$ D) $\frac{1}{9}$ E) $\frac{1}{16}$

11. $3^a = x$, $\frac{3^a + 3^{a-1}}{3^{-1}} = ?$

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

12. $a \neq 0$

$$\frac{(-a)^{-7} \cdot (-a^6) \cdot (-a)^{-4}}{(-a)^{-8}} = ?$$

- A) $\frac{-a}{3}$ B) $-a^3$ C) 1 D) a^{-3} E) a^3

13. $2^x = a$
 $3^x = b$

$$(96)^x = ?$$

- A) a^2b B) ab^5 C) a^3b^2
D) a^5b E) a^2b^3

14. $a, b \in \mathbb{N}$
 $a^3 = 9^b$

$$\min(a+b) = ?$$

- A) 0 B) 1 C) 3 D) 6 E) 9

15. $(4x-3)^{10} = (x+6)^{10}$

$$\sum (x) = ?$$

- A) 5 B) $\frac{17}{5}$ C) 3 D) 2 E) $\frac{12}{5}$



1. $a, b \in \mathbb{Z}$
 $\left(\frac{1}{a}\right)^{-b} = 64$

$\min(a+b) = ?$

- A) -12 B) -9 C) -8 D) -6 E) -2

2. $n^{m-1} = A$
 $n^{m+1} = B$
 $\frac{A}{B} = ?$

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

3. $\left(\frac{3}{4}\right)^{2x-14} < \left(\frac{16}{9}\right)^{3x-1}$
 $x \in ?$

- A) $x > 1$ B) $x > 2$ C) $x > -2$
D) $x < -2$ E) $x < 2$

4. $(x-3)^{x^2-9} = 1$
 $\sum (x) = ?$

- A) 0 B) 1 C) 3 D) 4 E) 7

5. $x \in \mathbb{Z}$
 $\left(\frac{1}{4}\right)^{x+2} < \left(\frac{1}{8}\right)^{3-x}$

$\min(x) = ?$

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

6. $x = 2^n + 1$
 $y = 2 + 2^{-n}$
 $x = ?$

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

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

- A) $-a^7$ B) $-a^5$ C) $-a^3$ D) a^5 E) a^7

8. $2^x = 9$
 $2^y = 12$
 $\frac{x+4}{y} = ?$

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



9. $(8)^3 \cdot (125)^{12} = 2^a \cdot 5^b$

$a + b = ?$

- A) 15 B) 28 C) 36 D) 39 E) 45

10. $a = 3^{-20}$

$b = 5^{-40}$

$c = 2^{-120}$

$? < ? < ?$

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

11. $\frac{0,04 \cdot 10^{-2} + 0,004}{(0,2)(0,2)} = ?$

- A) 0,11 B) 1,1 C) 11 D) 110 E) 1100

12. $25^5 \cdot \frac{20}{100} = ?$

- A) 5^{11} B) 5^{10} C) 5^9 D) 5^8 E) 5^7

13. $\frac{5 \cdot 10^{-3} - 0,5 \cdot 10^{-4}}{0,05 \cdot 10^{-5} - 0,005 \cdot 10^{-6}} = ?$

- A) 10^{-4} B) 10^{-3} C) 1 D) 10^3 E) 10^4

14. $\frac{\left(\frac{1}{x}\right)^{-1} \cdot (-x) \cdot (-x^{-1})^{-2}}{(-x^0)^{-1}} = ?$

- A) $-x^4$ B) $-x^3$ C) 1 D) x^3 E) x^4

15. $(x+3)^{x+6} = 1$

$\sum (x) = ?$

- A) -3 B) -5 C) -8 D) -10 E) -12



1. $\frac{m^2 + m^2 + m^2 + m^2}{m \cdot m} = ?$

- A) 2 B) 2m C) $2m^2$ D) 4 E) 4m

2. $(27)^8 \cdot (3^4)^{-3} \cdot \left(\frac{1}{9}\right)^5 = ?$

- A) $\frac{1}{27}$ B) $\frac{1}{9}$ C) $\frac{1}{3}$ D) 3 E) 9

3. $2^x - 1 = 3$

$4^{x+1} = ?$

- A) 152 B) 144 C) 108 D) 72 E) 36

4. $3 \cdot 2^x + 5^x = 2^{x+3} - 5^{x+1}$

$\left(\frac{5}{2}\right)^x = ?$

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

5. $x \in \mathbb{Z}$

$(0,001)^{2x-3} \geq \frac{1}{10^{2x+1}}$

$\max(x) = ?$

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

6. $3 \cdot 2^x = 2^{x-1} + 10$

$x = ?$

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

7. $x \cdot 3^{n+2} - 3^n = x \cdot 3^n + 3^{n+1}$

$x = ?$

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

8. $\frac{2^{8-x} + 2^8 - 2^{-x} - 1}{2^8 - 1} = 17$

$x = ?$

- A) -8 B) -4 C) -1 D) 2 E) 4



9. $a^{x+2} - a^{x+1} - 6a^x = a^3 - 3a^2 - 4a + 12$

$a^x - a = ?$

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

10. $(3-x)^{6-x} = 1$

$\sum x = ?$

- A) -4 B) -2 C) 6 D) 8 E) 12

11. $\frac{2^x \cdot 2^x}{2^x + 2^x + 2^x + 2^x} = ?$

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

12. $\left(\frac{5}{6}\right) < \left(\frac{5}{6}\right)^{x-3}$

$SS = ?$

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

13. $\left(\frac{1}{5}\right)^x < 0,008$

$SS = ?$

- A) $x < -3$ B) $x > 3$ C) $x \geq 3$
D) $x < -\frac{1}{3}$ E) $x > \frac{1}{3}$

14. $0,000125 = 12,5 \cdot 10^{-n}$

$0,00000623 = 6230 \cdot 10^m$

$m + n = ?$

- A) -14 B) -4 C) 4 D) 6 E) 14

15. $2^x = 25$
 $3^y = 30$
 $4^z = 52$

$? < ? < ?$

- A) $z < x < y$ B) $x < y < z$ C) $z < y < x$
D) $y < x < z$ E) $y < z < x$



1. $\left(\frac{81}{16}\right)^{-\frac{3}{4}} = ?$

- A) $\frac{3}{2}$ B) $\frac{4}{9}$ C) $\frac{9}{4}$ D) $\frac{27}{8}$ E) $\frac{8}{27}$

(YÖS - 1985)

2. $\frac{1-2x^3}{x^m} + \frac{2-3x}{x^{m-3}} + \frac{3}{x^{m-4}} = ?$

- A) $\frac{1}{x^m}$ B) $\frac{2}{x^m}$ C) $\frac{3}{x^m}$
D) $\frac{4}{x^m}$ E) $\frac{5}{x^m}$

(YÖS - 1987)

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

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

(YÖS - 1988)

4. $\frac{a^{m+2} \cdot a^{n-1}}{a^{m+n}} = ?$

- A) a B) a^m C) a^n
D) a^{m-n} E) a^{m+n}

(YÖS - 1989)

5. $12^{x+1} = 72$

$12^{x-1} = ?$

- A) $\frac{1}{2}$ B) 1 C) 6

D) 12 E) 36

(YÖS - 1991)

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

- A) 4 B) 2 C) 2^{-1} D) 2^x E) 2^{-x}

(YÖS - 1991)

7. $2^x = a$

$2^{2(x+2)} = ?$

- A) $\frac{1}{4^a}$ B) $\frac{1}{2^a}$ C) 2^a

D) 2^{2a} E) 2^{4a}

(YÖS - 1992)

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

- A) -17 B) -15 C) -2 D) -1 E) 15

(YÖS - 1993)



9. $3^{2x-1} = 12$

$3^{x-1} = ?$

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

(YÖS - 1993)

10. $3^{x-1} = a$

$\frac{27^x}{9} = ?$

- A) a^2 B) a^3 C) $3a^3$ D) $9a^3$ E) $27a^3$

(YÖS - 1993)

11. $\frac{4,7 \cdot 10^{-6}}{0,047} = 10^x$

$x = ?$

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

(YÖS - 1995)

12. $\frac{(xy)^{n-4}}{(xy)^n} = 2$

$\frac{1}{x^2 y^2} = ?$

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

(YÖS - 1995)

13. $\frac{1}{3^{-x}} = 5$

$9^{x+1} = ?$

- A) 144 B) 169 C) 175

- D) 200 E) 225

(YÖS - 1997)

14. $32^{x-3} = 243$

$2^{x+1} = ?$

- A) 16 B) 29 C) 36 D) 48 E) 64

(YÖS - 1998)

15. $(3a^{2n})^{-3} = \frac{a^{-5n}}{3}$

$a^n = ?$

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

(YÖS - 1999)

16. $\frac{3,7 \cdot 10^{-5}}{0,0037} = 10^{x+1}$

$x = ?$

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

(YÖS - 1999)



17. $3^a \cdot 4^{-b} = 4$

$$3^{-b} \cdot 4^a = 36$$

$$a - b = ?$$

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

(YÖS - 2001)

18. $2^{x+4} + 2^{x+1} + 2^x = 304$

$$x = ?$$

- A) 3 B) 4 C) 5 D) 6 E) 7

(YÖS - 2002)

19. $15^{12} \cdot 625^x = 3^{12}$

$$x = ?$$

- A) -6 B) -5 C) -3 D) -2 E) -1

(YÖS - 2004)

20. $2^{-4}(2^5 + 2^6) = ?$

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

(YÖS - 2005)

21. $\frac{3^x + 3^x + 3^x}{3^x \cdot 3^x \cdot 3^x} = \frac{1}{27}$

$$x = ?$$

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

(YÖS - 2005)

22. $a \neq 0$

$$\left(\frac{-1}{a}\right)^2 \cdot (-a^3)^{-4} \cdot \left(\frac{-1}{a^2}\right)^{-7} = ?$$

- A) -1 B) 1 C) -a D) a E) $-a^2$

(YÖS - 2006)

23. $x \neq 0$

$$\left(\frac{4x^a}{x^{b+1}}\right)^2 \cdot \left(\frac{x^b}{2x^{a-1}}\right)^2 = ?$$

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

(YÖS - 2006)



24. $5^{x+1} = 10^x$
 $4^x \cdot 5^x = ?$

- A) 5 B) 10 C) 25 D) 50 E) 100

(YÖS - 2007)

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

- A) 2 B) 4 C) 5 D) 10 E) 20

(YÖS - 2008)

26. $2^{-a+1} = \sqrt{3}$
 $2^{2a} = ?$

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

(YÖS - 2009)



$$1. \left(\frac{81}{16}\right)^{-\frac{3}{4}} = \left(\frac{3^4}{2^4}\right)^{-\frac{3}{4}} = \left(\frac{3}{2}\right)^{-3} \\ = \frac{2^3}{3^3} = \frac{8}{27}$$

Yanıt – Answer: E

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

Yanıt – Answer: A

$$3. \frac{x^4 - 2a^2x^3 + a^4x^2}{a^4 - 2a^2x + x^2} = \\ = \frac{x^2(x^2 - 2a^2x + a^4)}{a^4 - 2a^2x + x^2} = x^2$$

Yanıt – Answer: C

$$4. \frac{a^{m+2} \cdot a^{n-1}}{a^{m+n}} = a^{m+2+n-1-m-n} \\ = a^1 \\ = a$$

Yanıt – Answer: A

$$5. 12^{x+1} = 72 \Rightarrow 12^x \cdot 12 = 72$$

$$12^x = 6 \\ 12^{x-1} = 12^x \cdot 12^{-1} \\ = 6 \cdot \frac{1}{12} = \frac{1}{2}$$

Yanıt – Answer: A

$$6. \frac{2^{x+1} + 4}{2^x + 2} = \frac{2^x \cdot 2 + 2^2}{2^x + 2} = \frac{2(2^x + 2)}{2^x + 2} \\ = 2$$

Yanıt – Answer: B

$$7. 2^x = a \\ 2^{2(x+2)} = 2^{2x} \cdot 2^2 = 2^{4+2x} = 2^4 \cdot a$$

Yanıt – Answer: E

$$8. -(3)^2 + (-2)^3 + (-4)^2 = -9 - 8 + 16 = -1$$

Yanıt – Answer: D



$$9. \quad 3^{2x-1} = 12 \Rightarrow 3^{2x} \cdot 3^{-1} = 12 \\ (3^x)^2 = 36 \\ 3^x = 6$$

$$3^{x-1} = 3^x \cdot \frac{1}{3} = 6 \cdot \frac{1}{3} = 2$$

Yanıt – Answer: A

$$10. \quad 3^{x-1} = a \Rightarrow 3^x \cdot \frac{1}{3} = a \Rightarrow 3^x = 3a$$

$$\frac{27^x}{9} = \frac{(3^3)^x}{9} = \frac{(3a)^3}{9} = \frac{27a^3}{9} = 3a^3$$

Yanıt – Answer: C

$$11. \quad \frac{4,7 \cdot 10^{-6}}{0,047} = 10^x$$

$$\frac{4,7 \cdot 10^{-6}}{4,7 \cdot 10^{-2}} = 10^x \Rightarrow 10^{-4} = 10^x \Rightarrow x = -4$$

Yanıt – Answer: A

$$12. \quad \frac{(xy)^{n-4}}{(xy)^n} = 2 \Rightarrow (xy)^{n-4-n} = 2$$

$$(xy)^{-4} = 2$$

$$\frac{1}{(xy)^4} = 2$$

$$\frac{1}{x^4 y^4} = 2 \Rightarrow \frac{1}{x^2 y^2} = \sqrt{2}$$

Yanıt – Answer: D

$$13. \quad \frac{1}{3^{-x}} = 5 \Rightarrow 3^x = 5$$

$$9^{x+1} = (3^2)^{x+1} \\ = 3^{2x+2} \\ = 3^{2x} \cdot 3^2 \\ = (3^x)^2 \cdot 9 = 5^2 \cdot 9 = 225$$

Yanıt – Answer: E

$$14. \quad 32^{x-3} = 243$$

$$(2^5)^{x-3} = 3^5$$

$$(2^{x-3})^5 = 3^5$$

$$2^{x-3} = 3$$

$$\frac{2^x}{2^3} = 3$$

$$2^x = 24$$

$$2^{x+1} = 2^x \cdot 2 = 24 \cdot 2 = 48$$

Yanıt – Answer: D

$$15. \quad (3a^{2n})^{-3} = \frac{a^{-5n}}{3}$$

$$3^{-3} \cdot a^{-6n} = \frac{a^{-5n}}{3} \Rightarrow 3^{-3} \cdot 3 = \frac{a^{-5n}}{a^{-6n}}$$

$$3^{-2} = a^n \Rightarrow a^n = \frac{1}{9}$$

Yanıt – Answer: A



16. $\frac{3,7 \cdot 10^{-5}}{0,0037} = 10^{x+1}$

$\frac{\cancel{37} \cdot 10^{-6}}{\cancel{37} \cdot 10^{-4}} = 10^{x+1}$

$10^{-2} = 10^{x+1} \Rightarrow x+1 = -2$
 $x = -3$

Yanıt – Answer: B

17. $3^a \cdot 4^{-b} = 4$
 $\times 3^{-b} \cdot 4^a = 36$
 $3^{a-b} \cdot 4^{a-b} = 4 \cdot 36$
 $(12)^{a-b} = 144$
 $(12)^{a-b} = 12^2$
 $a-b = 2$

Yanıt – Answer: D

18. $2^{x+4} + 2^{x+1} + 2^x = 304$
 $2^x (2^4 + 2 + 1) = 304$
 $2^x \cdot 19 = 304$
 $2^x = 16 = 2^4 \Rightarrow x = 4$

Yanıt – Answer: B

19. $15^{12} \cdot 625^x = 3^{12}$
 $(3 \cdot 5)^{12} \cdot (5^4)^x = 3^{12}$
 $3^{12} \cdot 5^{12+4x} = 3^{12}$
 $5^{12+4x} = 1$
 $12+4x = 0$
 $4x = -12$
 $x = -3$

Yanıt – Answer: C

20. $2^{-4} (2^5 + 2^6) = ?$

$2^1 + 2^2 = 2 + 4 = 6$

Yanıt – Answer: C

21. $\frac{3^x + 3^x + 3^x}{3^x \cdot 3^x \cdot 3^x} = \frac{1}{27}$

$\Rightarrow \frac{3 \cdot 3^x}{3^{3x}} = 3^{-3}$

$\Rightarrow \frac{3^{x+1}}{3^{3x}} = 3^{-3}$

$\Rightarrow 3^{-2x+1} = 3^{-3}$

$\Rightarrow -2x+1 = -3$

$4 = 2x \Rightarrow x = 2$

Yanıt – Answer: D

22. $a \neq 0$

$\left(\frac{-1}{a}\right)^2 \cdot \left(-a^3\right)^{-4} \cdot \left(\frac{-1}{a^2}\right)^{-7} = ?$

$a^{-2} \cdot a^{-12} \cdot (-a^{+14}) = -a^0 = -1$

Yanıt – Answer: A

23. $x \neq 0$

$\left(\frac{4x^a}{x^{b+1}}\right)^2 \cdot \left(\frac{x^b}{2x^{a-1}}\right)^2 = ?$

$\Rightarrow \frac{4^2 \cdot x^{2a}}{x^{2b+2}} \cdot \frac{x^{2b}}{4^2 \cdot x^{2a-2}} =$

$\Rightarrow \frac{4}{x^2} \cdot \frac{1}{x^{-2}} = \frac{4}{x^0} = 4$

Yanıt – Answer: B



24. $5^{x+1} = 10^x$

$$5^x \cdot 5 = 5^x \cdot 2^x$$

$$\begin{array}{l} 5 = 2^x \\ \swarrow \quad \searrow \\ (2^x)^2 = 5^2 \quad 5^{\frac{1}{x}} = (2^x)^{\frac{1}{x}} \\ 4^x = 25 \quad 5^{\frac{1}{x}} = 2 \end{array}$$

$$4^x \cdot 5^{\frac{1}{x}} = 25 \cdot 2 = 50$$

Yanıt – Answer : D

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

$$\frac{5^3}{2^3} \cdot \frac{4^2}{5^2} = 5 \cdot 2 = 10$$

Yanıt – Answer : D

26. $2^{-a+1} = \sqrt{3}$

$$2^{-a} \cdot 2^1 = \sqrt{3}$$

$$2^{-a} = \frac{\sqrt{3}}{2} \Rightarrow 2^a = \frac{2}{\sqrt{3}}$$

$$\Rightarrow 2^{2a} = \left(\frac{2}{\sqrt{3}}\right)^2 = \frac{4}{3}$$

Yanıt – Answer : C

4. BÖLÜM

KÖKLÜ SAYILAR







1. $\sqrt{75} + \sqrt{27} - \sqrt{147} = ?$

- A) $\sqrt{3}$ B) $2\sqrt{3}$ C) $3\sqrt{3}$
D) $4\sqrt{3}$ E) $5\sqrt{3}$

2. $\frac{\sqrt{108} - 4\sqrt{3} + \sqrt{75}}{\sqrt{27}} = ?$

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

3. $\frac{\sqrt{0,04} + \sqrt{0,09}}{\sqrt{0,36} - \sqrt{0,25}} = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

4. $\frac{\sqrt[3]{0,027} + \sqrt[4]{0,0016}}{\sqrt[3]{0,064} + \sqrt{0,01}} = ?$

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

5. $(\sqrt{24} + \sqrt{96}) : 2\sqrt{3} = ?$

- A) 2 B) $2\sqrt{3}$ C) $\sqrt{10}$ D) $3\sqrt{2}$ E) $4\sqrt{3}$

6. $\sqrt{62 + \sqrt[3]{5 + \sqrt{5 + \sqrt{16}}}} = ?$

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

7. $\frac{\sqrt{1,6} + \sqrt{0,4}}{\frac{\sqrt{10}}{10}} = ?$

- A) $\sqrt{10}$ B) $\frac{1}{10}$ C) 6 D) $6\sqrt{10}$ E) $\frac{6}{\sqrt{10}}$

8. $x = \sqrt{2} + 1$

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

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



9. $\sqrt{9^2} + \sqrt{(-4)^2} - (\sqrt{4})^2 = ?$

- A) 3 B) 6 C) 9 D) 17 E) 20

10. $\sqrt{0,01} + \sqrt{0,16} - \sqrt[3]{0,125} = ?$

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

11. $\frac{2}{\sqrt{7} + \sqrt{5}} + \frac{1}{\sqrt{5} + 2} - \frac{7}{\sqrt{7}} = ?$

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

12. $\frac{\sqrt{60} + \sqrt{20}}{\sqrt{2} + \sqrt{6}} = ?$

- A) $\sqrt{2}$ B) $\sqrt{5}$ C) $\sqrt{10}$ D) $\sqrt{13}$ E) $2\sqrt{5}$

13. $\frac{4}{\sqrt{5} - \sqrt{3}} + \frac{2}{\sqrt{5} + \sqrt{3}} - \sqrt{3} = ?$

- A) $6\sqrt{5}$ B) $5\sqrt{5}$ C) $4\sqrt{5}$
D) $3\sqrt{5}$ E) $2\sqrt{5}$

14. $\sqrt{7,6 + 8,3} = ?$

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

15. $\frac{2 - \sqrt{2}}{2 + \sqrt{2}} : \frac{2 + \sqrt{2}}{2 - \sqrt{2}} = ?$

- A) 1 B) $17 - 12\sqrt{2}$ C) $15 + 9\sqrt{2}$
D) $3\sqrt{2}$ E) $4\sqrt{2} - 4$



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

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

2. $\sqrt{\frac{1}{9} - \frac{2}{7} + \frac{9}{49}} = ?$

- A) $\frac{1}{12}$ B) $\frac{2}{12}$ C) $\frac{3}{7}$ D) $\frac{2}{21}$ E) $\frac{2}{3}$

3. $\sqrt{6+2\sqrt{5}} + \sqrt{6-2\sqrt{5}} = ?$

- A) $\sqrt{6}$ B) $2\sqrt{6}$ C) $\sqrt{5}$ D) $2\sqrt{5}$ E) 2

4. $\frac{\sqrt{10} + \sqrt{6}}{\sqrt{8+2\sqrt{15}}} = ?$

- A) $\sqrt{2}$ B) $\sqrt{2} + \sqrt{3}$ C) $\sqrt{3}$
D) $2 + \sqrt{3}$ E) $2\sqrt{3}$

5. $x = \sqrt[3]{3}$ $y = \sqrt[4]{4}$ $z = \sqrt[6]{6}$

$? < ? < ?$

- A) $x < y < z$ B) $y < z < x$ C) $z < y < x$
D) $y < x < z$ E) $z < x < y$

6. $\sqrt{\sqrt{9-\sqrt{56}} \cdot \sqrt{9+\sqrt{56}}} = ?$

- A) $\sqrt{3}$ B) 2 C) $\sqrt{5}$ D) 3 E) 5

7. $A = \sqrt{5} - \sqrt{2}$

$\sqrt{5} + \sqrt{2} = ?$

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

8. $\frac{\sqrt{5}+1}{\sqrt{3}+1} = x$

$\frac{\sqrt{5}-1}{\sqrt{3}-1} = ?$

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



9. $\frac{\sqrt{30 + \sqrt{30 + \sqrt{30 \dots}}}}{\sqrt{42 - \sqrt{42 - \sqrt{42 \dots}}}} = ?$

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

10. $\frac{1}{\sqrt{3 - \sqrt{8}}} = ?$

- A) $\sqrt{2} - 1$ B) $\sqrt{2} + 2$ C) $\sqrt{2} + 1$
D) $\sqrt{2} - \sqrt{3}$ E) $\sqrt{3} - 1$

11. $\sqrt{7 + \sqrt{13}} - \sqrt{7 - \sqrt{13}} = ?$

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

12. $x = \sqrt{3}$ $y = \sqrt[3]{4}$ $z = \sqrt[6]{6}$

? < ? < ?

- A) $z < x < y$ B) $y < z < x$ C) $x < z < y$
D) $x < y < z$ E) $z < y < x$

13. $\sqrt[5]{(32 \cdot 10^{-5})^{2x-1}} = 125^x$

$x = ?$

- A) -1 B) 0 C) $\frac{1}{16}$ D) $\frac{1}{8}$ E) $\frac{1}{5}$

14. $\frac{\frac{\sqrt{2}}{\sqrt{2} - \frac{1}{\sqrt{2}}}}{\frac{1}{\sqrt{2}} - \sqrt{2}} = ?$

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

15. $\sqrt{x + \sqrt{x + \sqrt{x + \dots}}} = \sqrt[3]{4 \cdot \sqrt[3]{4 \cdot \sqrt[3]{4 \dots}}}$

$x = ?$

- A) 1 B) 2 C) 3 D) 4 E) 8



1. $\sqrt{(2003)(2007)+4} = ?$

- A) 2004 B) 2005 C) 2006
D) 2007 E) 2008

2. $a = \sqrt{15} + 3$

$\sqrt{6} + \sqrt{10} = ?$

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

3. $\sqrt[3]{2} \cdot \sqrt[6]{2} \cdot \sqrt{2} = ?$

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

4. $\sqrt{7-\sqrt{48}} + \sqrt{3} = ?$

- A) 4 B) $2\sqrt{5}$ C) $2+\sqrt{3}$
D) 2 E) $2-\sqrt{3}$

5. $\sqrt[4]{3\sqrt{3\sqrt[3]{3}}} = 3^a$

$a = ?$

- A) $\frac{5}{12}$ B) $\frac{4}{11}$ C) $\frac{5}{24}$ D) $\frac{1}{8}$ E) $\frac{1}{3}$

6. $\sqrt[3]{16\sqrt[3]{16\sqrt[3]{16}}} + \sqrt[6]{32\sqrt[6]{32\sqrt[6]{32}}} = ?$

- A) 2 B) 4 C) 6 D) 8 E) 12

7. $(\sqrt{2+\sqrt{3}}) \cdot (\sqrt{3}-1) = ?$

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

8. $\frac{3\sqrt{3}-\sqrt{6}}{3-\sqrt{2}} = ?$

- A) $\sqrt{2}$ B) $\sqrt{3}$ C) $3-\sqrt{2}$
D) 1 E) $\sqrt{2}+3$



9. $\sqrt[4]{\frac{1}{2}} \cdot \sqrt[4]{\frac{2}{3}} \cdot \sqrt[4]{\frac{3}{5}} \cdot \sqrt[4]{\frac{5}{4}} = ?$

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

10. $\frac{\sqrt{15} + \sqrt{20} + \sqrt{21} + \sqrt{28}}{\sqrt{7} + \sqrt{5}} = ?$

- A) $2 + \sqrt{5}$ B) $2 + \sqrt{3}$ C) $\sqrt{5} + \sqrt{7}$
D) $\sqrt{7} - 2$ E) $\sqrt{7} - \sqrt{5}$

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

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

12. $\frac{\sqrt{2 + \sqrt{3}} \cdot \sqrt{2 - \sqrt{3}}}{\sqrt{(3 - 2\sqrt{2})(3 + 2\sqrt{2})}} = ?$

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

13. $\frac{(\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2})}{\sqrt{3}} = ?$

- A) 1 B) $\sqrt{3}$ C) 3 D) $\sqrt{3} + \sqrt{2}$ E) $\sqrt{5} + 2$

14. $x\sqrt{x} = 8$

$x^2 \cdot \sqrt{x} = ?$

- A) $4\sqrt{2}$ B) 32 C) $16\sqrt[3]{2}$ D) 16 E) $16\sqrt{2}$

15. $\sqrt[4]{2^{16} + 2^{19}} = ?$

- A) 16 B) $16\sqrt{2}$ C) $4\sqrt{2}$ D) 48 E) $16\sqrt{3}$



1. $\frac{\sqrt{6,4} \cdot \sqrt{0,12} \cdot \sqrt{10}}{\sqrt{1,6} \cdot \sqrt{0,4}} = ?$

- A) 1 B) $\sqrt{3}$ C) $2\sqrt{3}$ D) $\sqrt{10}$ E) $2\sqrt{10}$

2. $x = \sqrt{4+2\sqrt{3}}$

$y = \sqrt{4-2\sqrt{3}}$

$\frac{1}{x} - \frac{1}{y} = ?$

- A) $-2\sqrt{3}$ D) $\sqrt{3}$

B) -1

C) 1

E) $2\sqrt{3}$

3. $\sqrt{5-2\sqrt{6}} - \sqrt{5+2\sqrt{6}} = ?$

- A) $-4\sqrt{3}$ B) $-2\sqrt{3}$ C) $\sqrt{3}$
D) $-2\sqrt{2}$ E) $4\sqrt{2}$

4. $\sqrt{9-\sqrt{32}} + \sqrt{9+\sqrt{32}} = ?$

- A) 5 B) $4\sqrt{2}$ C) 4 D) $3\sqrt{2}$ E) 2

5. $\sqrt{4+\sqrt{7}} - \sqrt{4-\sqrt{7}} = ?$

- A) $2\sqrt{7}$ B) 8 C) $\sqrt{7}$
D) $2\sqrt{2}$ E) $\sqrt{2}$

6. $x = \sqrt{2}$

$y = \sqrt{3}$

$6\sqrt{3} = ?$

- A) xy B) x^2y^2 C) x^2y^3 D) x^4y^2 E) x^4y^4

7. $a = \sqrt{2}$

$b = \sqrt{3}$

$c = \sqrt{5}$

$12\sqrt{10} = ?$

- A) a^2b^2c B) a^4b^2c C) a^5b^2c
D) $a^4b^3c^2$ E) a^5b^4c

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

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



9. $(2\sqrt{3} - \sqrt{5})^2 + 4\sqrt{15} - 3 = ?$

- A) 17 B) 16 C) 15 D) 14 E) 13

10. $x\sqrt{yz} = 4\sqrt{3}$
 $y\sqrt{xz} = 3\sqrt{3}$
 $z\sqrt{yx} = 4$
 $x \cdot y \cdot z = ?$

- A) 24 B) 18 C) 16 D) 12 E) 8

11. $\sqrt{\frac{1}{25} - \frac{1}{10} + \frac{1}{16}} = ?$

- A) $\frac{1}{50}$ B) $\frac{1}{25}$ C) $\frac{3}{25}$ D) $\frac{1}{20}$ E) $\frac{4}{5}$

12. $\left(\frac{5\sqrt{2} + 2\sqrt{5}}{\sqrt{2} + \sqrt{5}}\right)^2 = ?$

- A) 15 B) 12 C) 10 D) 8 E) 5

13. $\frac{64^{\frac{1}{3}} + 9^{\frac{1}{2}}}{\sqrt{7}} = ?$

- A) $\sqrt{7}$ B) 3 C) $\sqrt{14}$ D) 4 E) $\sqrt{21}$

14. $\sqrt[3]{\frac{\sqrt{a^5}}{a}} = 2$
 $a = ?$

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

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

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



1. $a = \sqrt{2} + \sqrt{3}$

$$b = \sqrt{2} - \sqrt{3}$$

$$\left(\frac{a+b}{a-b}\right)^2 = ?$$

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

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

- A) $-2\sqrt{3}$ B) $-\sqrt{3}$ C) 0 D) 3 E) $2\sqrt{3}$

3. $(2 - \sqrt{3}) \cdot (10 + 6\sqrt{3}) \cdot (\sqrt{12} - 2) = ?$

- A) 6 B) 7 C) 8 D) 9 E) 10

4. $\frac{2}{\sqrt{5}-1} - \frac{2}{\sqrt{5}+1} = ?$

- A) 1 B) 2 C) $\sqrt{5}$ D) $2\sqrt{5}$ E) 5

5. $\left(\frac{8}{\sqrt[3]{4}} - \sqrt[3]{2}\right) : \sqrt[3]{2} = ?$

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

6. $x = \sqrt{3} - 3$

$$y = \sqrt{3} + 3$$

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

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

7. $\frac{\sqrt{5}-1}{\sqrt{3}+1} = A$

$$\frac{\sqrt{5}+1}{\sqrt{3}-1} = ?$$

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

8. $\sqrt{3} + 1 = x$

$$\sqrt{12} = ?$$

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



9. $x\sqrt{3} - 4x + 13 = 0$

$x = ?$

- A) $4 - \sqrt{3}$ B) 4 C) $4 + \sqrt{3}$
D) $4\sqrt{3}$ E) 6

10. $\frac{16}{\sqrt{2}} - \frac{3\sqrt{6} + 6\sqrt{2}}{\sqrt{3} + 2} = ?$

- A) $5\sqrt{2}$ B) $4\sqrt{2}$ C) $3\sqrt{2}$
D) $2\sqrt{2}$ E) $\sqrt{2}$

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

- A) $\sqrt{2} - \sqrt{3}$ B) $\sqrt{3} + \sqrt{2}$ C) $\sqrt{5} + \sqrt{3}$
D) $2\sqrt{3}$ E) $2\sqrt{5}$

12. $\frac{\sqrt{7} - \sqrt{3}}{\sqrt{7} + \sqrt{3}} - \frac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}} = ?$

- A) $-2\sqrt{7}$ B) $-\sqrt{21}$ C) -4
D) $2\sqrt{7}$ E) $\sqrt{21}$

13. $\frac{\sqrt{6}}{\sqrt{10} - 2} - \frac{\sqrt{6}}{\sqrt{10} + 2} = ?$

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

14. $x = \sqrt{3} - 2$

$\frac{\sqrt{3}}{2\sqrt{3} - 3} = ?$

- A) $x - 2$ B) x C) $x + 2$ D) $x + 4$ E) $x + 5$

15. $a = \sqrt{2}$

$b = \sqrt[3]{4}$

$c = \sqrt[6]{3}$

$? < ? < ?$

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



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

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

(YÖS - 1985)

2. $\frac{4^{\frac{3}{2}}}{\sqrt{8}} = ?$

- A) $\frac{\sqrt{2}}{2}$ B) $\sqrt{2}$ C) $2\sqrt{2}$
D) $4\sqrt{2}$ E) $8\sqrt{2}$

(YÖS - 1987)

3. $\frac{\sqrt{20} + \sqrt{45}}{\sqrt{8} + \sqrt{18}} = ?$

- A) $\frac{3\sqrt{5}}{2}$ B) $2\sqrt{5}$ C) $\frac{\sqrt{10}}{2}$
D) $2\sqrt{10}$ E) $\frac{2\sqrt{10}}{3}$

(YÖS - 1988)

4. $\frac{2\sqrt{3}}{\sqrt{2}} + \frac{3\sqrt{2}}{\sqrt{3}} = ?$

- A) $2\sqrt{2}$ B) $2\sqrt{3}$ C) $3\sqrt{2}$
D) $2\sqrt{6}$ E) $3\sqrt{6}$

(YÖS - 1989)

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

- A) -6 B) 0 C) 3 D) 6 E) 12

(YÖS - 1990)

6. $\frac{2^{1-n} \cdot \sqrt{8^n}}{\sqrt{2^{-n}}} = ?$

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

(YÖS - 1990)

7. $\sqrt{2^2} \cdot \sqrt{(-3)^2} - \sqrt{(-3)^2} - \sqrt{2^2} = ?$

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

(YÖS - 1991)



8. $\sqrt{(-8)^2} - \sqrt[3]{(-8)^3} = ?$

- A) -16 B) -8 C) 0 D) 8 E) 16

(YÖS - 1992)

9. $a = \sqrt{5} - 1$

$b = \sqrt{5} + 1$

$\left(\frac{1}{a} - \frac{1}{b}\right)^{\frac{1}{2}} = ?$

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

(YÖS - 1994)

10. $\frac{3}{\sqrt{7} - \sqrt{5}} - \frac{3}{\sqrt{7} + \sqrt{5}} = 3p$

$p = ?$

- A) 3 B) 2 C) $\sqrt{2}$
D) $\sqrt{3}$ E) $\sqrt{5}$

(YÖS - 1995)

11. $\frac{\sqrt{0,81} + \sqrt{0,49}}{\sqrt{2,56} - \sqrt{1,44}} = ?$

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

(YÖS - 1997)

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

- A) $2\sqrt{3}$ B) $\sqrt{3}$ C) $\sqrt{2}$ D) 3 E) 2

(YÖS - 1997)

13. $\sqrt{72} - \sqrt{50} + \sqrt{27} = a\sqrt{2} + b\sqrt{3}$

$7a - b = ?$

- A) -3 B) -2 C) 4 D) $2\sqrt{2}$ E) $3\sqrt{3}$

(YÖS - 1998)

14. $\sqrt[3]{2} \cdot \left(3\sqrt[3]{32} - \sqrt[3]{108} + \frac{6}{\sqrt[3]{54}}\right) = ?$

- A) $\sqrt[3]{4}$ B) $2\sqrt[3]{2}$ C) 4 D) 6 E) 8

(YÖS - 1998)

15. $\frac{\sqrt{1 + \frac{17}{64}}}{\sqrt{1 - \frac{27}{36}}} = ?$

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

(YÖS - 2000)



KÖKLÜ SAYILAR

ÇIKMIŞ SORULAR

16. $\sqrt[4]{a} = 2$

$\sqrt[3]{b} = 3$

$a + b = ?$

- A) 51 B) 49 C) 47 D) 45 E) 43

(YÖS - 2000)

17. $\frac{\sqrt[3]{8^{3x+1}}}{\sqrt{2^{6x+8y}}} = 32$

$y = ?$

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

(YÖS - 2000)

18. $\frac{\sqrt{36}}{\sqrt[4]{81}} = ?$

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

(YÖS - 2001)

19. $\frac{\sqrt[3]{128} + \sqrt[3]{16}}{\sqrt[3]{2}} = ?$

- A) $\sqrt[3]{2}$ B) $2\sqrt[3]{2}$ C) $3\sqrt[3]{2}$ D) 3 E) 6

(YÖS - 2002)

20. $\frac{\sqrt[3]{0,064}}{\sqrt{0,04}} = ?$

- A) 1 B) 2 C) 4 D) 6 E) 8

(YÖS - 2003)

21. $x^a = \sqrt{5}$
 $x^{-4a} = ?$

- A) $\frac{1}{125}$ B) $\frac{1}{25}$ C) $\frac{1}{5}$ D) 5 E) 25

(YÖS - 2003)

22. $\sqrt{-x+2\sqrt{x-1}} + \sqrt{y-\sqrt{2y-1}} = 0$

$x + y = ?$

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

(YÖS - 2003)

23. $\frac{\sqrt{10}}{\sqrt{2} + \sqrt{6}} + \frac{\sqrt{10}}{\sqrt{6} - \sqrt{2}} = ?$

- A) $\sqrt{2}$ B) $\sqrt{3}$ C) $\sqrt{5}$

- D) $\sqrt{15}$ E) $2\sqrt{15}$

(YÖS - 2004)



24. $x = \sqrt{5} + 2$

$y = \sqrt{5} - 2$

$\frac{x}{y} + \frac{y}{x} = ?$

- A) 12 B) 14 C) 16 D) 18 E) 20

(YÖS - 2005)

25. $a = 1 + \sqrt{2}$

$b = 1 - \sqrt{2}$

$\sqrt{(a-b)^2} = ?$

A) $\sqrt{2}$

B) $2\sqrt{2}$

C) $3\sqrt{2}$

D) 1

E) 2

(YÖS - 2006)

26. $\sqrt[5]{\frac{4^4 + 4^4 + 4^4 + 4^4}{3^9 + 3^9 + 3^9}} = ?$

A) $\frac{2}{3}$

B) $\frac{2}{9}$

C) $\frac{4}{3}$

D) $\frac{4}{9}$

E) $\frac{16}{27}$

(YÖS - 2006)

27. $\sqrt{1,21} - \sqrt{1,44} + \sqrt{1,69} = ?$

A) 0

B) 1

C) 1,1

D) 1,2

E) 1,3

(YÖS - 2007)

28. $\sqrt{5 + 2\sqrt{6}} - \sqrt{2} = ?$

A) $\sqrt{2}$

B) $\sqrt{3}$

C) $\sqrt{5}$

D) 2

E) 3

(YÖS - 2007)

29. $(\sqrt{\sqrt{5} + \sqrt{3}} - \sqrt{\sqrt{5} - \sqrt{3}})^2 = ?$

A) $2(1 + \sqrt{5})$

B) $2(\sqrt{5} + \sqrt{3})$

C) $2(\sqrt{5} - \sqrt{2})$

D) $5(2 - \sqrt{3})$

E) $5(\sqrt{2} - 1)$

(YÖS - 2008)

30. $\frac{\sqrt{0,09} - 0,09}{\sqrt{0,01} - 0,01} = ?$

A) $\frac{5}{2}$

B) $\frac{7}{3}$

C) $\frac{9}{4}$

D) 1

E) 3

(YÖS - 2009)

31. $a = \sqrt{(1 - \sqrt{5})^2}$

$b = \sqrt{(\sqrt{5} - \sqrt{20})^2}$

$a + b = ?$

A) $2\sqrt{5} - 1$

B) $2\sqrt{5} + 1$

C) $4\sqrt{5} - 1$

D) $4\sqrt{5} + 1$

E) $5\sqrt{5} - 1$

(YÖS - 2009)



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

$$\frac{1}{\sqrt{3}-1} = \frac{1}{\sqrt{3}-1} \cdot \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{\sqrt{3}+1}{3-1} = \frac{\sqrt{3}+1}{2}$$

$$\frac{1}{\sqrt{3}+1} = \frac{1}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{\sqrt{3}-1}{3-1} = \frac{\sqrt{3}-1}{2}$$

$$\frac{1}{\sqrt{3}-1} - \frac{1}{\sqrt{3}+1} = \frac{\sqrt{3}+1}{2} - \frac{\sqrt{3}-1}{2}$$

$$\frac{\sqrt{3}+1-\sqrt{3}+1}{2} = \frac{2}{2} = 1$$

Yanıt – Answer: D

2. $\frac{4^{\frac{3}{2}}}{\sqrt{8}} = \frac{2^{\frac{3}{2} \cdot 2}}{2^{\frac{3}{2}}} = \frac{2^3}{2^{\frac{3}{2}}} = 2^{3-\frac{3}{2}} = 2^{\frac{3}{2}}$

$$= \sqrt{8} = 2\sqrt{2}$$

Yanıt – Answer: C

3. $\frac{\sqrt{20} + \sqrt{45}}{\sqrt{8} + \sqrt{18}} = \frac{2\sqrt{5} + 3\sqrt{5}}{2\sqrt{2} + 3\sqrt{2}} = \frac{5\sqrt{5}}{5\sqrt{2}}$

$$= \frac{\sqrt{5}}{\sqrt{2}} = \frac{\sqrt{10}}{2}$$

$(\sqrt{2})$

Yanıt – Answer: C

4. $\frac{2\sqrt{3}}{\sqrt{2}} + \frac{3\sqrt{2}}{\sqrt{3}} = ?$

$$\frac{2\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{6}}{2} = \sqrt{6}$$

$$\frac{3\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{6}}{3} = \sqrt{6}$$

$$\frac{2\sqrt{3}}{\sqrt{2}} + \frac{3\sqrt{2}}{\sqrt{3}} = \sqrt{6} + \sqrt{6} = 2\sqrt{6}$$

Yanıt – Answer: D

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

$$\sqrt{3^2} = 3$$

$$\sqrt{(-3)^2} = |-3| = 3$$

$$\begin{aligned} \sqrt{3^2} - \sqrt{(-3)^2} - (-2)(-3) \\ = 3 - 3 - 6 \\ = -6 \end{aligned}$$

Yanıt – Answer: A

6. $\frac{2^{1-n} \cdot \sqrt{8^n}}{\sqrt{2^{-n}}} = \frac{2^{1-n} \cdot \sqrt{2^{3n}}}{2^{-\frac{n}{2}}} = \frac{2^{1-n} \cdot 2^{\frac{3n}{2}}}{2^{-\frac{n}{2}}}$

$$= 2^{1-n+\frac{3n}{2}+\frac{n}{2}} = 2^{n+1}$$

Yanıt – Answer: B

7. $\sqrt{2^2} \cdot \sqrt{(-3)^2} - \sqrt{(-3)^2} - \sqrt{2^2} = ?$

Önce çarpma işlemleri yapılır!
(Multiplication first!)

$$\sqrt{2^2} = 2,$$

$$\sqrt{(-3)^2} = |-3| = 3$$

$$\begin{aligned} \sqrt{2^2} \cdot \sqrt{(-3)^2} - \sqrt{(-3)^2} - \sqrt{2^2} &= 2 \cdot 3 - 3 - 2 \\ &= 6 - 5 \\ &= 1 \end{aligned}$$

Yanıt – Answer: D



8. $\sqrt{(-8)^2} - \sqrt[3]{(-8)^3} = ?$

$$\sqrt{(-8)^2} = |-8| = 8$$

$$\sqrt[3]{(-8)^3} = -8$$

$$\begin{aligned}\sqrt{(-8)^2} - \sqrt[3]{(-8)^3} &= 8 - (-8) \\ &= 8 + 8 \\ &= 16\end{aligned}$$

Yanıt – Answer: E

9. $\left(\frac{1}{a} - \frac{1}{b}\right)^{\frac{1}{2}} = \left(\frac{1}{\sqrt{5}-1} - \frac{1}{\sqrt{5}+1}\right)^{\frac{1}{2}}$

$$\frac{1}{\sqrt{5}-1} = \frac{1}{\sqrt{5}-1} \cdot \frac{\sqrt{5}+1}{\sqrt{5}+1} = \frac{\sqrt{5}+1}{5-1} = \frac{\sqrt{5}+1}{4}$$

$$\frac{1}{\sqrt{5}+1} = \frac{1}{\sqrt{5}+1} \cdot \frac{\sqrt{5}-1}{\sqrt{5}-1} = \frac{\sqrt{5}-1}{5-1} = \frac{\sqrt{5}-1}{4}$$

$$\left(\frac{1}{\sqrt{5}-1} - \frac{1}{\sqrt{5}+1}\right)^{\frac{1}{2}} = \left(\frac{\sqrt{5}+1}{4} - \frac{\sqrt{5}-1}{4}\right)^{\frac{1}{2}}$$

$$= \left(\frac{\sqrt{5}+1-\sqrt{5}+1}{4}\right)^{\frac{1}{2}} = \left(\frac{2}{4}\right)^{\frac{1}{2}} = \sqrt{\frac{1}{2}}$$

$$= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

($\sqrt{2}$)

Yanıt – Answer: A

10. $\frac{3}{\sqrt{7}-\sqrt{5}} - \frac{3}{\sqrt{7}+\sqrt{5}} = 3p$

$$\frac{3}{\sqrt{7}-\sqrt{5}} = \frac{3}{\sqrt{7}-\sqrt{5}} \cdot \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}+\sqrt{5}}$$

$$\frac{3\sqrt{7}+3\sqrt{5}}{7-5} = \frac{3\sqrt{7}+\sqrt{5}}{2}$$

$$\frac{3}{\sqrt{7}+\sqrt{5}} = \frac{3}{\sqrt{7}+\sqrt{5}} \cdot \frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}-\sqrt{5}}$$

$$\frac{3\sqrt{7}-3\sqrt{5}}{7-5} = \frac{3\sqrt{7}-3\sqrt{5}}{2}$$

$$\frac{3}{\sqrt{7}-\sqrt{5}} - \frac{3}{\sqrt{7}+\sqrt{5}} =$$

$$\frac{3\sqrt{7}+3\sqrt{5}}{2} - \frac{3\sqrt{7}-3\sqrt{5}}{2}$$

$$\frac{3\sqrt{7}+3\sqrt{5}-3\sqrt{7}+3\sqrt{5}}{2}$$

$$\frac{6\sqrt{5}}{2} = 3\sqrt{5} = 3p \Rightarrow p = \sqrt{5}$$

Yanıt – Answer: E

11. $\frac{\sqrt{0,81} + \sqrt{0,49}}{\sqrt{2,56} - \sqrt{1,44}} = \frac{0,9+0,7}{1,6-1,2} = \frac{1,6}{0,4} = 4$

Yanıt – Answer: E

12. $\sqrt{3+2\sqrt{2}} - \sqrt{3-2\sqrt{2}}$

$$= \sqrt{(\sqrt{2}+1)^2} - \sqrt{(\sqrt{2}-1)^2}$$

$$= \sqrt{2}+1 - (\sqrt{2}-1)$$

$$= \cancel{\sqrt{2}}+1 - \cancel{\sqrt{2}}+1$$

$$= 2$$

Yanıt – Answer: E



13. $\sqrt{72} - \sqrt{50} + \sqrt{27} = a\sqrt{2} + b\sqrt{3}$
 $6\sqrt{2} - 5\sqrt{2} + 3\sqrt{3} = a\sqrt{2} + b\sqrt{3}$
 $\sqrt{2} + 3\sqrt{3} = a\sqrt{2} + b\sqrt{3}$
 $a=1$
 $b=3$
 $7a - b = 7 - 3 = 4$

Yanıt – Answer: C

14. $\sqrt[3]{2} \cdot \left(3\sqrt[3]{32} - \sqrt[3]{108} + \frac{6}{\sqrt[3]{54}} \right)$
 $= \sqrt[3]{2} \cdot \left(3 \cdot 2\sqrt[3]{4} - 3\sqrt[3]{4} + \frac{6}{3\sqrt[3]{2}} \right)$
 $\left(\sqrt[3]{2^2} \right)$
 $\sqrt[3]{2} \cdot \left(6\sqrt[3]{4} - 3\sqrt[3]{4} + \frac{2\sqrt[3]{4}}{2} \right)$
 $\sqrt[3]{2} \cdot 4\sqrt[3]{4} = 4\sqrt[3]{8}$
 $= 4 \cdot 2$
 $= 8$

Yanıt – Answer: E

15. $\frac{\sqrt{1 + \frac{17}{64}}}{\sqrt{1 - \frac{27}{36}}} = \frac{\sqrt{\frac{81}{64}}}{\sqrt{\frac{9}{36}}} = \frac{\frac{9}{8}}{\frac{3}{6}} = \frac{9}{8} \cdot \frac{6}{3} = \frac{9}{4}$

Yanıt – Answer: C

16. $\left. \begin{array}{l} \sqrt[4]{a} = 2 \Rightarrow a = 2^4 = 16 \\ \sqrt[3]{b} = 3 \Rightarrow b = 3^3 = 27 \end{array} \right\} \Rightarrow a + b = 43$

Yanıt – Answer: C

17. $\frac{\sqrt[3]{2^3(3x+1)}}{\sqrt{2^{6x+8y}}} = 2^5$

$$\frac{2^{3x+1}}{2^{3x+4y}} = 2^5$$

$$2^{3x+1-3x-4y} = 2^5$$

$$2^{1-4y} = 2^5 \Rightarrow 1-4y = 5$$
$$-4y = 4$$
$$y = -1$$

Yanıt – Answer: A

18. $\frac{\sqrt{36}}{\sqrt[4]{81}} = \frac{6}{3} = 2$

Yanıt – Answer: D

19. $\frac{\sqrt[3]{128} + \sqrt[3]{16}}{\sqrt[3]{2}} = \frac{\sqrt[3]{2^6 \cdot 2} + \sqrt[3]{2^3 \cdot 2}}{\sqrt[3]{2}}$
 $\frac{2^2 \cdot \sqrt[3]{2} + 2 \cdot \sqrt[3]{2}}{\sqrt[3]{2}} = \frac{\sqrt[3]{2} (4 + 2)}{\sqrt[3]{2}} = 6$

Yanıt – Answer: E

20. $\frac{\sqrt[3]{0,064}}{\sqrt{0,04}} = \frac{\sqrt[3]{\frac{64}{1000}}}{\sqrt{\frac{4}{100}}} = \frac{\frac{4}{10}}{\frac{2}{10}} = \frac{4}{10} \cdot \frac{10}{2} = 2$

Yanıt – Answer: B

21. $x^a = \sqrt{5} \Rightarrow x^a = 5^{1/2}$
 $\Rightarrow (x^a)^{-4} = (5^{1/2})^{-4}$
 $\Rightarrow x^{-4a} = 5^{-2}$
 $\Rightarrow x^{-4a} = \frac{1}{25}$

Yanıt – Answer: B



$$22. \sqrt{-x+2\sqrt{x-1}} = 0$$

$$-x+2\sqrt{x-1} = 0$$

$$(2\sqrt{x-1})^2 = (x)^2$$

$$4(x-1) = x^2$$

$$x^2 - 4x + 4 = 0$$

$$(x-2)^2 = 0$$

$$x = 2$$

$$\sqrt{y-\sqrt{2y-1}} = 0$$

$$y-\sqrt{2y-1} = 0$$

$$(y)^2 = (\sqrt{2y-1})^2$$

$$y^2 = 2y-1$$

$$y^2 - 2y + 1 = 0$$

$$(y-1)^2 = 0$$

$$y = 1$$

$$x+y=2+1=3$$

Yanıt – Answer: B

$$23. \frac{\sqrt{10}}{\sqrt{2}+\sqrt{6}} + \frac{\sqrt{10}}{\sqrt{6}-\sqrt{2}} =$$

$$\sqrt{10} \left(\frac{1}{\sqrt{6}+\sqrt{2}} + \frac{1}{\sqrt{6}-\sqrt{2}} \right) =$$

$$\frac{1}{\sqrt{2}+\sqrt{6}} \cdot \frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}-\sqrt{2}} = \frac{\sqrt{6}-\sqrt{2}}{4} =$$

$$\frac{1}{\sqrt{6}-\sqrt{2}} \cdot \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}+\sqrt{2}} = \frac{\sqrt{6}+\sqrt{2}}{4} =$$

$$\sqrt{10} \cdot \frac{\sqrt{6}-\sqrt{2}+\sqrt{6}+\sqrt{2}}{4} = \sqrt{10} \cdot \frac{2\sqrt{6}}{4} =$$

$$\frac{\sqrt{60}}{2} = \frac{2\sqrt{15}}{2} = \sqrt{15}$$

Yanıt – Answer: D

$$24. x = \sqrt{5} + 2$$

$$y = \sqrt{5} - 2$$

$$\frac{x}{y} + \frac{y}{x} = ?$$

$$\frac{\sqrt{5}+2}{\sqrt{5}-2} + \frac{\sqrt{5}-2}{\sqrt{5}+2} =$$

$$= \frac{5+4\sqrt{5}+4}{5-4} + \frac{5-4\sqrt{5}+4}{5-4}$$

$$= 9+4\sqrt{5}+9-4\sqrt{5} = 18$$

Yanıt – Answer: D

$$25. a = 1 + \sqrt{2}$$

$$b = 1 - \sqrt{2}$$

$$\sqrt{(a-b)^2} = |a-b|$$

$$\Rightarrow |1+\sqrt{2}-1+\sqrt{2}| = 2\sqrt{2}$$

Yanıt – Answer: B

$$26. \sqrt[5]{\frac{4^4+4^4+4^4+4^4}{3^9+3^9+3^9}} = ?$$

$$= \sqrt[5]{\frac{4 \cdot 4^4}{3 \cdot 3^9}} \Rightarrow \sqrt[5]{\frac{4^5}{3^{10}}} = \frac{4}{9}$$

Yanıt – Answer: D



$$\begin{aligned} 27. \quad & \sqrt{1,21} - \sqrt{1,44} + \sqrt{1,69} \\ &= \sqrt{\frac{121}{100}} - \sqrt{\frac{144}{100}} + \sqrt{\frac{169}{100}} \\ &= \frac{11}{10} - \frac{12}{10} + \frac{13}{10} \\ &= \frac{12}{10} \\ &= 1,2 \end{aligned}$$

Yanıt – Answer : D

$$\begin{aligned} 30. \quad & \frac{\sqrt{0,09} - 0,09}{\sqrt{0,01} - 0,01} = \frac{\sqrt{\frac{9}{100}} - \frac{9}{100}}{\sqrt{\frac{1}{100}} - \frac{1}{100}} \\ &= \frac{\frac{3}{10} - \frac{9}{100}}{\frac{1}{10} - \frac{1}{100}} = \frac{\frac{30}{100} - \frac{9}{100}}{\frac{10}{100} - \frac{1}{100}} \\ &= \frac{\frac{21}{100}}{\frac{9}{100}} = \frac{21}{9} = \frac{7}{3} \end{aligned}$$

Yanıt – Answer : B

$$\begin{aligned} 28. \quad & \sqrt{5+2\sqrt{6}} - \sqrt{2} \\ & \quad \quad \quad \swarrow \quad \searrow \\ & \quad \quad \quad 3 \quad \quad 2 \\ &= \sqrt{3} + \cancel{\sqrt{2}} - \cancel{\sqrt{2}} \\ &= \sqrt{3} \end{aligned}$$

Yanıt – Answer : B

$$\begin{aligned} 31. \quad & a = \sqrt{(1-\sqrt{5})^2} = |1-\sqrt{5}| = \sqrt{5}-1 \\ & b = \sqrt{(\sqrt{5}-\sqrt{20})^2} = |\sqrt{5}-\sqrt{20}| = \sqrt{20}-\sqrt{5} \\ & a+b = \sqrt{5}-1 + \sqrt{20}-\sqrt{5} \\ &= \sqrt{20}-1 \\ &= 2\sqrt{5}-1 \end{aligned}$$

Yanıt – Answer : A

$$\begin{aligned} 29. \quad & (\sqrt{\sqrt{5}+\sqrt{3}} - \sqrt{\sqrt{5}-\sqrt{3}})^2 \\ &= \sqrt{5} + \cancel{\sqrt{3}} - 2 \cdot \underbrace{\sqrt{(\sqrt{5}+\sqrt{3})(\sqrt{5}-\sqrt{3})}}_{\sqrt{2}} + \sqrt{5} - \cancel{\sqrt{3}} \\ &= 2\sqrt{5} - 2\sqrt{2} = 2(\sqrt{5}-\sqrt{2}) \end{aligned}$$

Yanıt – Answer : C



5. BÖLÜM

BİRİNCİ DERECE DENKLEMLER







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

$x = ?$

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

2. $\frac{1-x}{2} - \frac{3-x}{5} = 1$

$x = ?$

- A) -3 B) $-\frac{11}{7}$ C) $-\frac{11}{3}$ D) $-\frac{1}{10}$ E) 0

3. $5(3x-1) = 8$

$x = ?$

- A) $\frac{5}{8}$ B) $\frac{13}{15}$ C) $\frac{12}{17}$ D) $\frac{8}{15}$ E) $\frac{7}{9}$

4. $(2x+8) - (3x-1) = 10$

$x = ?$

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

5. $3[(2x-3) + (7-x)] = 14$

$x = ?$

- A) $\frac{2}{3}$ B) 0 C) 1 D) $\frac{3}{2}$ E) $\frac{5}{3}$

6. $(3x-5) - (4-3x) = 15$

$x = ?$

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

7. $8x - [(4-x) + 3x] = 14$

$x = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

8. $\frac{x}{4} + \frac{x}{5} = \frac{39}{10}$

$x = ?$

- A) 8 B) 6 C) 5 D) 4 E) 3



9. $3x - 7 = \frac{x}{2} + 8$

$x = ?$

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

10. $\frac{x}{6} + 45 = \frac{x}{4}$

$x = ?$

- A) 540 B) 560 C) 580 D) 600 E) 620

11. $\frac{x}{3} + 9 = \frac{2x + 4}{5}$

$x = ?$

- A) 120 B) 121 C) 123 D) 124 E) 125

12. $4(x - 2) - (x - 3) = 8 - (1 + x)$

$x = ?$

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

13. $\frac{8}{5 - \frac{x-2}{x+1}} = 4$

$x = ?$

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

14. $3 - \frac{4-x}{3} = 2x - \frac{x+2}{2}$

$x = ?$

- A) $\frac{13}{9}$ B) $\frac{16}{7}$ C) $\frac{15}{8}$ D) $\frac{12}{5}$ E) $\frac{11}{9}$

15. $2 - \frac{1}{3 + \frac{1}{x + \frac{1}{2}}} = \frac{29}{17}$

$x = ?$

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



1. $4x - 3(2 + x) = 0$

SS = ?

- A) {2} B) {4} C) {6} D) {8} E) {10}

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

x = ?

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

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

x = ?

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

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

x = ?

- A) $\frac{10}{9}$ B) $\frac{11}{9}$ C) $\frac{4}{3}$ D) $\frac{13}{9}$ E) $\frac{14}{9}$

5. $3(x-2) + (x-3) = 4(x-1) - 2$

SS = ?

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

6. $(x-2)^2 + (2y+8)^2 = 0$

x + y = ?

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

7. $\frac{x}{2} + \frac{x}{3} + \frac{x}{4} = 39$

x = ?

- A) 24 B) 28 C) 32 D) 36 E) 38

8. $3 + \frac{28}{4 - \frac{x+2}{1 - \frac{x+2}{3}}} = 4$

x = ?

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



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

x = ?

- A) 7 B) $\frac{23}{3}$ C) $\frac{25}{3}$ D) $-\frac{23}{3}$ E) -7

10. $2 + \frac{6}{3 - \frac{2x-4}{2}} = 4$

x = ?

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

11. $\frac{4x-2}{3} + \frac{2x}{5} = 3+x$

x = ?

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

12. $\frac{1 - \frac{1}{2x+1}}{3 - \frac{1}{2x+1}} = \frac{1}{4}$

SS = ?

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

13. $\frac{4}{2-x} + \frac{4}{x-2} = 0$

SS = ?

- A) $\mathbb{R} - \{2\}$ B) $\{0\}$ C) $\{1\}$ D) $\mathbb{R}$ E) $\emptyset$

14. $3x+4y=3$
 $4x+3y=11$
 $\frac{x-y}{x+y} = ?$

- A) 3 B) 4 C) 6 D) 7 E) 8

15. $x, y \in \mathbb{R}^+$
 $(2a+3b-10)x + (3a+2b-5)y = 0$
a+b = ?

- A) 2 B) 3 C) 4 D) 5 E) 7



1.
$$\begin{cases} ax + 3y = 2 \\ 2x + by = 5 \end{cases} \quad SS = \emptyset$$

a.b = ?

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

2.
$$\begin{cases} 2ax - 4y + 3 = 0 \\ 5x + by + 6 = 0 \end{cases} \quad SS = \infty$$

a.b = ?

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

3.
$$\begin{aligned} a &\in \mathbb{R}^+ \\ 2x + ay &= 6 \\ ax - 3y &= 4 \\ SS &= \{2, k\} \end{aligned}$$

k = ?

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

4.
$$\begin{cases} 2x + y - 10 = 0 \\ 2x - y + 2 = 0 \end{cases}$$

x.y = ?

- A) 4 B) 8 C) 10 D) 12 E) 18

5.
$$\begin{aligned} x + y &= 12 \\ y - z &= 8 \\ x - z &= 6 \end{aligned}$$

x = ?

- A) 5 B) 6 C) 7 D) 8 E) 9

6.
$$\begin{aligned} 2x - 2y + z &= 6 \\ 3x - 5y + z &= 4 \end{aligned}$$

x + y + z = ?

- A) -6 B) -2 C) 0 D) 6 E) 8

7.
$$\begin{aligned} a - 2b + 3c &= 15 \\ 2a + 3b + 6c &= 44 \end{aligned}$$

a + 3c = ?

- A) 17 B) 19 C) 20 D) 23 E) 29

8.
$$\begin{aligned} 4a + 5b + 6c &= 19 \\ a + 2b + 3c &= 7 \end{aligned}$$

a + b + c = ?

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



9. $3a + \frac{1}{b} = 12$

$$\frac{2}{a} + 6b = 8$$

$$\frac{a}{b} = ?$$

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

10. $(a+1)x + b - 3 = 6x + 2b + 1$
 $SS = \infty$

$$a + b = ?$$

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

11. $3x + y - 2z = 57$
 $x + y + 3z = 63$
 $x + 3y + 4z = 15$

$$x + y + z = ?$$

- A) 24 B) 25 C) 26 D) 27 E) 28

12. $x \cdot y = 36$
 $x + z = 15$
 $y \cdot z = 24$

$$x \cdot z + y = ?$$

- A) 13 B) 27 C) 44 D) 51 E) 58

13. $\frac{3}{a} + \frac{2}{b} = \frac{17}{3}$

$$\frac{2}{a} - \frac{3}{b} = 11$$

$$a \cdot b = ?$$

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

14. $x + y = 3$
 $y + z = 4$
 $x + z = 5$

$$z = ?$$

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

15. $x + y = 1$
 $y - z = -2$
 $2x + 3y + 2z = 24$

$$z = ?$$

- A) 5 B) 6 C) 7 D) 8 E) 9



1. $\frac{1}{x} + \frac{1}{y} = \frac{5}{6}$

$$\frac{1}{y} + \frac{2}{3} = \frac{2}{x}$$

$x = ?$, $y = ?$

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

(YÖS – 1981)

2. $f(x) = \frac{2}{x-2} - \frac{1}{3}$, $f(x_1) = 0$

$x_1 = ?$

- A) 8 B) 6 C) 4 D) 3 E) 1

(YÖS – 1982)

3. $5 - x = y$, $2x - 6y = 2$

$x = ?$, $y = ?$

- A) (-3, 8) B) (-3, 1) C) (4, 1)
D) (4, 8) E) (9, -4)

(YÖS – 1982)

4. $\frac{3}{b} = \frac{5}{d}$, $\frac{3}{4}d = \frac{5}{4}b + c - 1$

$c = ?$

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

(YÖS – 1982)

5. $2x + y = z$

$$x + y + z = 12$$

$$x + z = 3y$$

$z = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

(YÖS – 1987)

6. $K + 2L + M = 6$

$$2K - L + 2M = 7$$

$K + L + M = ?$

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

(YÖS – 1987)

7. $f(x) = ax + b$

$$f(1) = -2, \quad f(2) = 1$$

$f(3) = ?$

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

(YÖS – 1987)

8. $a + b = 2$, $b + c = \frac{5}{4}$, $a + c = \frac{9}{4}$

$\frac{c}{a} = ?$

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

(YÖS – 1989)

**BİRİNCİ DERECE DENKLEMLER****ÇIKMIŞ SORULAR**

9. $x > 0$

$$\frac{\frac{1}{x}}{3} + \frac{\frac{1}{3}}{x} = \frac{x}{6}$$

$x = ?$

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

(YÖS – 1989)

10. $\frac{2}{\frac{1}{x}} - \frac{1}{\frac{2}{x}} = 6$

$x = ?$

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

(YÖS – 1990)

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

$x = ?$

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

(YÖS – 1990)

12. $0 < a \quad 0 < b \quad 0 < c$

$$\frac{b}{a} = \frac{1}{3} \quad \frac{a}{c} = \frac{2}{3} \quad a + b + c = 34$$

$a = ?$

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

(YÖS – 1993)

13. $x - 0,2y = 0,2$

$$2x - y = -20$$

$x + y = ?$

- A) 21 B) 29 C) 41 D) 48 E) 51

(YÖS – 1995)

14. $k > 0 \quad x = 2k \quad y = 3k \quad z = 4k$

$$x + y + z = 360$$

$z = ?$

- A) 180 B) 160 C) 120 D) 80 E) 60

(YÖS – 1995)

15. $2a + b = 10$

$$a + 2c = 14$$

$$b + c = 7$$

$? < ? < ?$

- A) $b < a < c$ B) $b < c < a$ C) $a < b < c$

- D) $a < c < b$ E) $c < a < b$

(YÖS – 1997)



16. $a.b = \frac{12}{35}$

$$b.c = \frac{28}{45}$$

$$a.c = \frac{1}{3}$$

$$|a| = ?$$

- A) $\frac{7}{9}$ B) $\frac{3}{5}$ C) $\frac{4}{5}$ D) $\frac{1}{7}$ E) $\frac{3}{7}$

(YÖS – 2003)

17. $5 - \frac{5}{x-5} = 10$

$$x = ?$$

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

(YÖS – 2004)

18. $\frac{1}{x+1} + \frac{1}{x^2 + 2x + 1} = 0$

$$x = ?$$

- A) -8 B) -4 C) -2 D) 2 E) 4

(YÖS – 2005)

19. $\frac{1}{x} + \frac{2}{y} = \frac{11}{2}$

$$\frac{3}{x} + \frac{1}{y} = 24$$

$$\frac{1}{x} + \frac{1}{y} = ?$$

- A) 5 B) 6 C) 7 D) 8 E) 9

(YÖS – 2006)

20. $a - 2b = 4$

$$\frac{2^a}{4^{2b}} = 64$$

$$b = ?$$

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

(YÖS – 2007)

21. $\frac{4-x}{3} + \frac{x}{6} + \frac{x+6}{18} = 1$

$$x = ?$$

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

(YÖS – 2008)

22. $x + y - z = 0$

$$3x - y + z = 4$$

$$2x + 2y - z = 6$$

$$y = ?$$

- A) 7 B) 8 C) 9 D) 10 E) 11

(YÖS – 2009)



$$\begin{aligned}
 1. \quad \frac{1}{x} + \frac{1}{y} &= \frac{5}{6} \\
 -1 \cdot \frac{1}{y} - \frac{2}{x} &= -\frac{2}{3} \\
 \hline
 \frac{1}{x} + \frac{1}{y} &= \frac{5}{6} \\
 \frac{1}{y} - \frac{2}{x} &= -\frac{2}{3} \\
 \hline
 \frac{3}{x} &= \frac{5}{6} + \frac{2}{3} \\
 &= \frac{5}{6} + \frac{4}{6} \\
 &= \frac{9}{6} \\
 &= \frac{3}{2} \quad (2)
 \end{aligned}$$

$$\begin{aligned}
 \frac{3}{x} &= \frac{3}{2} \\
 x &= 2 \\
 y &= 3
 \end{aligned}$$

Yanıt – Answer: C

$$\begin{aligned}
 2. \quad f(x) &= \frac{2}{x-2} - \frac{1}{3} \\
 f(x_1) &= \frac{2}{x_1-2} - \frac{1}{3} = 0 \\
 \frac{2}{x_1-2} &= \frac{1}{3} \\
 x_1-2 &= 6 \\
 x_1 &= 8
 \end{aligned}$$

Yanıt – Answer: A

$$\begin{aligned}
 3. \quad 5-x &= y \Rightarrow x+y=5 \\
 2x-6y &= 2 \Rightarrow -1/x-3y=1 \\
 \hline
 x+y &= 5 \\
 -x+3y &= -1 \\
 \hline
 4y &= 4 \\
 y &= 1 \\
 x &= 4 \\
 (x, y) &= (4, 1)
 \end{aligned}$$

Yanıt – Answer: C

$$\begin{aligned}
 4. \quad \frac{3}{b} &= \frac{5}{d} \Rightarrow 3d=5b \Rightarrow 3d-5b=0 \\
 \frac{3}{4}d &= \frac{5}{4}b+c-1 \\
 \frac{3d}{4} - \frac{5b}{4} &= c-1 \\
 \frac{3d-5b}{4} &= c-1 \\
 \frac{0}{4} &= c-1 \\
 0 &= c-1 \\
 c &= 1
 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned}
 5. \quad x+z &= 3y \\
 x+y+z &= 12 \\
 3y+y &= 12 \\
 4y &= 12 \\
 y &= 3 \\
 2x+y &= z \\
 2x+3 &= z \Rightarrow \begin{aligned} 2x-z &= -3 \\ x+z &= 9 \\ \hline 3x &= 6 \\ x &= 2, z=7 \end{aligned}
 \end{aligned}$$

Yanıt – Answer: E

$$\begin{aligned}
 6. \quad -2/ \quad K+2L+M &= 6 \\
 2K-L+2M &= 7 \\
 \hline
 -2K-4L-2M &= -12 \\
 2K-L+2M &= 7 \\
 \hline
 -5L &= -5 \\
 L &= 1 \\
 K+2 \cdot 1+M &= 6 \Rightarrow \begin{aligned} K+M &= 4 \\ K+L+M &= 5 \end{aligned}
 \end{aligned}$$

Yanıt – Answer: E



7. $f(x) = ax + b$

$$f(1) = a + b = -2 \Rightarrow -1/a + b = -2$$

$$f(2) = 2a + b = 1 \Rightarrow \frac{2a + b = 1}{-a + b = 2}$$

$$a = 3$$
$$b = -5$$

$$f(x) = 3x - 5$$

$$f(3) = 3 \cdot 3 - 5$$

$$f(3) = 4$$

Yanıt – Answer: D

8. $a + b = 2$ $b + c = \frac{5}{4}$ $a + c = \frac{9}{4}$

$$a + b = 2$$

$$b + c = \frac{5}{4}$$

$$a + c = \frac{9}{4}$$

$$+$$

$$2(a + b + c) = \frac{11}{2} \Rightarrow (a + b + c) = \frac{11}{4}$$

$$a + b = 2 \Rightarrow c = \frac{3}{4}$$

$$a + c = \frac{9}{4} \Rightarrow a = \frac{3}{2}$$

$$\frac{c}{a} = \frac{1}{2}$$

Yanıt – Answer: E

9. $\frac{1}{3x} + \frac{1}{3x} = \frac{x}{6}$

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

$$3x^2 = 12$$

$$x^2 = 4 \Rightarrow x = \pm 2$$

$$(x > 0)$$

Yanıt – Answer: B

10. $\frac{2}{\frac{1}{x}} - \frac{1}{\frac{2}{x}} = 6$

$$\frac{2x}{1} - \frac{x}{2} = 6$$

$$(2)$$

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

$$3x = 12$$

$$x = 4$$

Yanıt – Answer: C

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

$$\frac{2x - x + 1}{4} = 1$$

$$\frac{x+1}{4} = 1 \Rightarrow x+1 = 4$$

$$x = 3$$

Yanıt – Answer: C

12. $\frac{b}{a} = \frac{1}{3} \Rightarrow b = \frac{a}{3}$

$$\frac{a}{c} = \frac{2}{3} \Rightarrow c = \frac{3a}{2}$$

$$a + b + c = 34$$

$$\frac{a}{1} + \frac{a}{3} + \frac{3a}{2} = 34$$

$$(6) \quad (2) \quad (3)$$

$$\frac{6a}{6} + \frac{2a}{6} + \frac{9a}{6} = 34$$

$$\frac{17a}{6} = 34$$

$$17a = 34 \cdot 6$$

$$a = 12$$

Yanıt – Answer: C



13. $-5/x - 0,2y = 0,2$
 $2x - y = -20$
 $-5x + y = -1$
 $2x - y = -20$
 $-3x = -21$
 $x = 7$
 $y = 34$
 $x + y = 7 + 34 = 41$

Yanıt – Answer: C

14. $x = 2k, \quad y = 3k, \quad z = 4k$
 $x + y + z = 360$
 $2k + 3k + 4k = 360$
 $9k = 360$
 $k = 40$
 $z = 4.k \Rightarrow 4.40 = 160$

Yanıt – Answer: B

15. $-1/ \quad b + c = 7 \Rightarrow -b - c = -7$
 $+ \quad 2a + b = 10$
 $2a - c = 3$
 $2/ \quad 2a - c = 3 \Rightarrow 4a - 2c = 6$
 $a + 2c = 14$
 $5a = 20$
 $a = 4 \Rightarrow 2a + b = 10 \Rightarrow b = 2$
 $\downarrow$
 $4 \quad c = 5$
 $b < a < c$

Yanıt – Answer: A

16. $a.b = \frac{12}{35}$
 $b.c = \frac{28}{45}$
 $a.c = \frac{1}{3}$
 $x \quad (a.b.c)^2 = \frac{16}{225} \Rightarrow a.b.c = \frac{4}{15}$
 $a.\frac{28}{45} = \frac{4}{15} \Rightarrow a = \frac{3}{7}$

Yanıt – Answer: E

17. $5 - 10 = \frac{5}{x-5} \Rightarrow -5 = \frac{5}{x-5} \Rightarrow -5.(x-5) = 5$
 $(x-5) = -1 \Rightarrow x = 4$

Yanıt – Answer: D

18. $\frac{1}{x+1} + \frac{1}{x^2+2x+1} = 0$
 $(x+1)$
 $\frac{x+1}{x^2+2x+1} + \frac{1}{x^2+2x+1} = 0$
 $x+2=0$
 $x=-2$

Yanıt – Answer: C

**19.**

$$\begin{aligned} -1/\frac{1}{x} + \frac{2}{y} &= \frac{11}{2} \\ 2/\frac{3}{x} + \frac{1}{y} &= 24 \\ \hline -\frac{1}{x} - \frac{2}{y} &= -\frac{11}{2} \\ \frac{6}{x} + \frac{2}{y} &= 48 \\ \hline \frac{5}{x} = \frac{85}{2} \Rightarrow \frac{1}{x} &= \frac{17}{2} \\ \frac{17}{2} + \frac{2}{y} &= \frac{11}{2} \\ \frac{2}{y} &= -\frac{6}{2} \Rightarrow \frac{2}{y} = -3 \Rightarrow \frac{1}{y} = -\frac{3}{2} \\ \Rightarrow \frac{1}{x} + \frac{1}{y} &= \frac{17}{2} - \frac{3}{2} = \frac{14}{2} = 7 \end{aligned}$$

Yanıt – Answer : C

20. $a - 2b = 4 \Rightarrow a = 4 + 2b$

$$\frac{2^a}{4^{2b}} = 64$$

$$\frac{2^a}{2^{4b}} = 2^6$$

$$2^{a-4b} = 2^6 \Rightarrow a - 4b = 6$$

$$4 + 2b - 4b = 6$$

$$-2b = 2$$

$$b = -1$$

Yanıt – Answer : A**21.**

$$\frac{4-x}{3} + \frac{x}{6} + \frac{x+6}{18} = 1$$

(6) (3) (1)

$$\frac{24 - 6x + 3x + x + 6}{18} = 1$$

$$\frac{30 - 2x}{18} = 1$$

$$\Rightarrow 30 - 2x = 18$$

$$\Rightarrow 30 - 18 = 2x \Rightarrow x = 6$$

Yanıt – Answer : E

22. $x + y - z = 0$

$$3x - y + z = 4$$

$$2x + 2y - z = 9$$

$$-2/x + y - z = 0$$

$$+ 2x + 2y - z = 9$$

$$z = 9$$

$$x + y - 9 = 0$$

$$+ 3x - y + 9 = 4$$

$$4x = 4$$

$$x = 1$$

$$x + y - z = 0 \Rightarrow 1 + y - 9 = 0$$

$$y = 8$$

Yanıt – Answer : B



6. BÖLÜM

ORAN – ORANTI







1. $a, b, c \in \mathbb{R}^+$

$$\frac{a}{b} = \frac{2}{3}, \quad \frac{a}{c} = \frac{4}{3}$$

$$? < ? < ?$$

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

2. $a, b, c \in \mathbb{R}^+$

$$2a = 3b, \quad 3c = 4b$$

$$? < ? < ?$$

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

3. $a, b, c \in \mathbb{R}^+$

$$a.b = 3, \quad b.c = 4, \quad a.c = 2$$

$$? < ? < ?$$

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

4. $a, b, c \in \mathbb{R}^-$

$$\frac{a}{b} = \frac{2}{3}, \quad \frac{a}{c} = \frac{5}{3}$$

$$? < ? < ?$$

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

5. $a, b, c \in \mathbb{R}^-$

$$a.b = 6, \quad b.c = 2, \quad a.c = 5$$

$$? < ? < ?$$

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

6. $a, b, c \in \mathbb{Z}^+$

$$\frac{a}{b} = \frac{2}{3}, \quad \frac{3.c}{b} = \frac{4}{1}$$

$$\min(a + b + c) = ?$$

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

7. $a, b, c \in \mathbb{Z}^-$

$$9a = 2b, \quad \frac{a}{4c} = \frac{1}{3}$$

$$\max(a + b + c) = ?$$

- A) -35 B) -30 C) -25 D) -20 E) -15

8. $a, b, c \in \mathbb{R}^+$

$$\frac{2a}{3} = \frac{b}{2} = 2c$$

$$? < ? < ?$$

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



9. $x, y, z \in \mathbb{Z}^-$

$$\frac{x}{3} = \frac{2}{y} = z$$

$$\max(x + y + z) = ?$$

- A) -10 B) -9 C) -8 D) -6 E) -4

10. $a, b, c \in \mathbb{Z}^+$

$$\frac{a \cdot b}{2} = \frac{b \cdot c}{3} = \frac{a \cdot c}{4}$$

$$\min(a + b + c) = ?$$

- A) 10 B) 11 C) 13 D) 15 E) 18

11. $a, b, c \in \mathbb{Z}^+$

$$\frac{a}{b} = \frac{2}{5} \quad \frac{b}{c} = \frac{4}{3}$$

$$\min(a + b + c) = ?$$

- A) 21 B) 22 C) 23 D) 43 E) 48

12. $\frac{a+b}{b} = \frac{3}{2}$

$$\frac{a+b}{a} = ?$$

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

13. $\frac{a}{b} = \frac{2}{3}, \quad \frac{b}{c} = \frac{9}{20}$

$$\frac{a+c}{c} = ?$$

- A)
- $\frac{13}{10}$
- B) 2 C)
- $\frac{1}{2}$
- D)
- $\frac{1}{4}$
- E)
- $\frac{1}{8}$

14. $\frac{a}{2} = \frac{b}{3} = \frac{c}{4}$

$$\frac{a+c}{b} = ?$$

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

15. $\frac{a-2b}{a+2b} = \frac{3}{4}$

$$\frac{a}{b} = ?$$

- A) 13 B) 14 C) 15 D) 16 E) 17



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

$$\frac{a+b}{b} \cdot \frac{d-c}{c} = ?$$

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

2. $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$

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

- A) $\frac{3}{8}$ B) $\frac{5}{8}$ C) 1 D) $\frac{8}{5}$ E) $\frac{7}{3}$

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

$$a+b+c = 40$$

$$c = ?$$

- A) 20 B) 18 C) 12 D) 8 E) 6

4. $\frac{a}{3} = \frac{b}{2}$

$$3a+2b = 130$$

$$a = ?$$

- A) 30 B) 20 C) 10 D) 4 E) 2

5. $\frac{a}{0,5} = \frac{b}{0,25}$

$$\frac{a+b}{a} = ?$$

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

6. $\frac{a-b}{a+b} = \frac{2}{3}$

$$\frac{a^2+b^2}{a^2-b^2} = ?$$

- A) $\frac{3}{2}$ B) $\frac{9}{7}$ C) $\frac{12}{11}$ D) $\frac{13}{12}$ E) $\frac{15}{14}$

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

$$\frac{a}{c} = ?$$

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

8. $\frac{a}{b} = \frac{c}{d} = \frac{2}{3}$

$$\frac{3a+5c}{3b+5d} = ?$$

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



9. $\frac{a+7b}{a-b} = 3$

$\frac{a+b}{b} = ?$

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

10. $\frac{a+b}{9} = \frac{b+c}{11} = \frac{a+c}{8}$, $\frac{a+c}{2} = 4$

$b = ?$

- A) 2 B) 3 C) 4 D) 6 E) 8

11. $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{3}$

$\frac{b \cdot e \cdot d}{c \cdot f \cdot a} = ?$

- A) $\frac{8}{27}$ B) $\frac{4}{9}$ C) $\frac{2}{3}$ D) $\frac{3}{2}$ E) $\frac{27}{8}$

12. $x, y, z \in \mathbb{N}$

$3x = y$, $\frac{y}{z} = \frac{6}{5}$, $x + y + z = 91$

$x = ?$

- A) 14 B) 18 C) 22 D) 26 E) 32

13. $\frac{a}{2} = \frac{b}{5} = \frac{c}{7}$

$2a - 3b + 4c = 51$

$a = ?$

- A) 3 B) 6 C) 14 D) 15 E) 21

14. $\frac{2x}{3} = \frac{y}{4} = \frac{z}{5}$

$x - y + 2z = 45$

$x + y + z = ?$

- A) 98 B) 88 C) 83 D) 75 E) 63

15. $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{1}{4}$

$a - c + 3e = 9$

$b + 3f = 23$

$d = ?$

- A) -14 B) -13 C) 13 D) 14 E) 23



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

$$\frac{a-b}{a+b} = ?$$

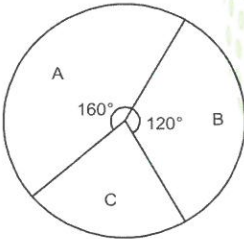
- A) $-\frac{2}{5}$ B) $-\frac{1}{5}$ C) $-\frac{3}{4}$ D) $\frac{1}{2}$ E) $\frac{3}{4}$

2. $\frac{a}{3} = \frac{b}{4} = \frac{c}{6}$
 $a + 2b - c = 250$

$$b = ?$$

- A) 125 B) 150 C) 175 D) 200 E) 225

3.



$$A + B + C = 90$$

$$C = ?$$

- A) 20 B) 18 C) 15 D) 10 E) 9

4. $\frac{a}{b} \cdot \frac{c}{d} \cdot \frac{e}{f} = \frac{1}{8}$
 $\frac{b}{e} = 4, \frac{a}{f} = 1$

$$\frac{d}{c} = ?$$

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

5. $\frac{x+2}{y-1} = \frac{z+3}{x+2} = \frac{y}{z+1} = 4$

$$x + y + z = ?$$

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

6. $a \cdot x = b \cdot y = c \cdot z = 3$
 $x + y + z = 6$

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = ?$$

- A) $\frac{1}{2}$ B) 2 C) 12 D) 18 E) 24

7. $x + \frac{3}{y} = 2$

$$y + \frac{3}{x} = 3$$

$$\frac{x-y}{x+y} = ?$$

- A) -1 B) $-\frac{1}{3}$ C) $-\frac{1}{5}$ D) $-\frac{1}{7}$ E) $-\frac{1}{9}$

8. $\frac{a(b-1)}{c} = k$

$$a = 2, b = 3 \Rightarrow c = \frac{1}{2}$$

$$c = 1, a = 4 \Rightarrow b = ?$$

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



9. $a + ab = \frac{1}{3}$

$$b + b^2 = \frac{4}{5}$$

$$\frac{a}{b} = ?$$

A) $\frac{1}{6}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$ D) $\frac{5}{12}$ E) $\frac{2}{3}$

10. $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = 2$

$$\frac{a \cdot e + c \cdot e + a \cdot c}{d \cdot b + b \cdot f + d \cdot f} = ?$$

A) 16 B) 8 C) 4 D) $\frac{1}{4}$ E) $\frac{1}{8}$

11. $a, b, c \in \mathbb{Z}^+$

$$\frac{a}{0,2} = \frac{b}{0,3} = \frac{c}{0,4}$$

$$? < ? < ?$$

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

12. $a \cdot x = b \cdot y = c \cdot z = 15$

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

$$a + b + c = ?$$

A) $\frac{1}{5}$ B) 5 C) 15 D) 30 E) 45

13. $x : \frac{3}{4} : y = 3 : z : 2$

$$z(x + y) = ?$$

A) $\frac{3}{2}$ B) $\frac{9}{4}$ C) 3 D) $\frac{15}{4}$ E) 4

14. $\frac{x-y}{x+y} = \frac{z+2}{z-2}$

$$\frac{y \cdot z}{x} = ?$$

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

15. $\frac{a \cdot b}{c} = 6$

$$\frac{b \cdot c}{a} = 4$$

$$\frac{a \cdot c}{b} = 8$$

$$a^2 - b^2 + c^2 = ?$$

A) 36 B) 48 C) 56 D) 72 E) 104

16. $a, b \in \mathbb{R}, a > b$

$$\frac{11}{a-b} = \frac{a}{14} = \frac{b}{3}$$

$$a - b = ?$$

A) 6 B) 7 C) 8 D) 10 E) 11



1. $\frac{a}{3} = \frac{b}{4} = \frac{c}{6}$, $a+b-c=5$

$b = ?$

- A) 10 B) 15 C) 20 D) 25 E) 30

2. $4a = 5b = 6c$, $a-b+c=26$

$a = ?$

- A) 60 B) 50 C) 40 D) 30 E) 20

3. $a, b, c \in \mathbb{Z}^+$

$\frac{a}{2} = \frac{b}{3} = \frac{c}{4}$, $a^2 + b^2 + c^2 = 261$

$a+b+c = ?$

- A) 24 B) 27 C) 30 D) 36 E) 40

4. $\frac{A}{2} = \frac{B}{3} = 4C$, $A+B+C=168$

$B = ?$

- A) 32 B) 64 C) 72 D) 84 E) 96

5. $x, y \in \mathbb{R}^+$

$\frac{x}{6} = \frac{y}{3} = \frac{4}{x+y}$

$x+y = ?$

- A) 6 B) 7 C) 9 D) 10 E) 12

6. $\frac{1}{ab} = \frac{2}{bc} = \frac{3}{ac}$, $a+b+c=55$

$a = ?$

- A) 10 B) 15 C) 20 D) 35 E) 40

7. $\frac{x}{y} = \frac{y}{z} = \frac{z}{k}$

$\left(\frac{x+y}{y}\right) \cdot \left(\frac{z+k}{k}\right) \cdot \left(\frac{y+z}{z}\right) = 125$

$\frac{x}{k} = ?$

- A) $\frac{1}{4}$ B) 4 C) $\frac{1}{64}$ D) 16 E) 64

8. $\frac{4x-y}{2} = \frac{y-2z}{3} = \frac{z-x}{5} = 1$

$2x+y-2z = ?$

- A) 15 B) 18 C) 25 D) 28 E) 29



9. $\frac{c-b+a}{5} = \frac{a-c}{4} = \frac{2a+b}{19}$
 $\frac{b}{a} = ?$

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

10. $\frac{a}{b} = \frac{c}{d} = k$, $\frac{m.a+3}{m.b+n.d} = k$
 $n = ?$

- A) 3 B) 3c C) $\frac{3}{c}$ D) $\frac{c}{3}$ E) c

11. $\frac{a}{b} = \frac{c}{d} = k$, $\frac{9a+12}{9b+2d} = k$
 $c = ?$

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

12. $\frac{3a+b}{b+c} = \frac{2b+c}{a} = \frac{c}{3}$
 $a+b+c=12$
 $c = ?$

- A) 2 B) 3 C) 4 D) 6 E) 9

13. $\frac{a+b}{2} = 17$, $a.x = 81$, $\sqrt{b.x} = 15$
 $x = ?$

- A) 9 B) 12 C) 18 D) 36 E) 45

14. $\sqrt{a.b} = 4$, $a.c = 81$, $\sqrt{b.c} = 12$
 $a^2 = ?$

- A) 1 B) 4 C) 9 D) 16 E) 36

15. $2a = 3b$
 $5c = 2b$
 $3a - 2b - 4c = 18$
 $a = ?$

- A) 20 B) 24 C) 30 D) 36 E) 48



1. $a > 0$

$$ab = 3 \quad bc = \frac{2}{3} \quad ac = \frac{4}{3}$$

$$? > ? > ?$$

A) $a > b > c$ B) $a > c > b$ C) $b > a > c$

D) $b > c > a$ E) $c > a > b$

(YÖS - 1989)

2. $b > 0 \quad \frac{a}{b} = -\frac{4}{3} \quad a + b = c$

$$? < ? < ?$$

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

D) $b < a < c$ E) $c < a < b$

(YÖS - 1990)

3. $a < 0 \quad \frac{ab}{1} = \frac{bc}{-2} = \frac{ca}{9}$

$$? < ? < ?$$

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

D) $a < c < b$ E) $a < b < c$

(YÖS - 1991)

4. $\frac{x}{y} = \frac{a}{b}$
 $\frac{b-y}{b+y} = ?$

A) $\frac{a+x}{a-x}$ B) $\frac{-a-x}{a-x}$ C) $\frac{a-x}{a+x}$

D) $\frac{-a-x}{a+x}$ E) $\frac{a-x}{-a-x}$

(YÖS - 1992)

5. $\frac{a}{2} = -\frac{b}{3} \quad a + b = 2$

$$ab = ?$$

A) -24 B) -21 C) -18 D) -15 E) -12

(YÖS - 1992)

6. $0 < a \quad 0 < b \quad 0 < c$

$$\frac{b}{a} = \frac{1}{3} \quad \frac{a}{c} = \frac{2}{3} \quad a + b + c = 34$$

$$a = ?$$

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

(YÖS - 1993)



7. $0 < a$ $0 < b$

$$\frac{a}{4} = \frac{b}{3} \quad a^2 + b^2 = 100$$

$$a - b = ?$$

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

(YÖS - 1993)

10. $k > 0$

$$x = 2k \quad y = 3k \quad z = 4k$$

$$x + y + z = 360$$

$$z = ?$$

- A) 180 B) 160 C) 120 D) 80 E) 60

(YÖS - 1995)

8. $a > 0$ $b > 0$ $c > 0$

$$ab = \frac{1}{4} \quad ac = \frac{1}{5} \quad bc = \frac{2}{3}$$

$$? < ? < ?$$

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

(YÖS - 1994)

11. $\frac{a}{b^2} = \frac{3}{16}$
 $\frac{a+b}{b} = ?$

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

(YÖS - 1997)

9. $\frac{a}{4} = \frac{b}{5} = \frac{c}{7}$

$$2a + 4b - 3c = 49$$

$$b = ?$$

- A) 14 B) 21 C) 28 D) 35 E) 42

(YÖS - 1994)

12. $a, b, c \in \mathbb{R}^+$

$$\frac{3a+b}{b} = 2 \quad \frac{b+2c}{c} = 4$$

$$? < ? < ?$$

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

(YÖS - 1998)



13. $A, B, C \in \mathbb{Z}^+$

$$A + B + C = 380 \quad \frac{A}{B} = \frac{B}{C} = \frac{2}{3}$$

$$C - B = ?$$

- A) 50 B) 60 C) 70 D) 80 E) 90

(YÖS - 1998)

16. $a + b + c = 80$

$$\frac{a}{2} = \frac{b}{3} = \frac{c}{5}$$

$$b + a - c = ?$$

- A) -6 B) -4 C) 0 D) 6 E) 12

(YÖS - 2000)

14. $\frac{x}{5} = \frac{y}{6} = \frac{z}{8} = k$

$$x + y + z = 1900$$

$$y = ?$$

- A) 900 B) 800 C) 700 D) 600 E) 500

(YÖS - 1999)

17. $a + \frac{1}{b} = 3$

$$b + \frac{1}{a} = 8$$

$$\frac{a+b}{b-a} = ?$$

- A)
- $\frac{8}{3}$
- B)
- $\frac{9}{4}$
- C)
- $\frac{11}{5}$
- D)
- $\frac{12}{7}$
- E)
- $\frac{13}{8}$

(YÖS - 2005)

15. $\frac{a}{b} = \frac{c}{d} = 3$

$$\frac{\left(\frac{a+b}{b}\right) \cdot \left(\frac{c+d}{c}\right)}{\left(\frac{a-b}{a}\right)} = ?$$

- A)
- $\frac{8}{3}$
- B)
- $\frac{4}{3}$
- C) 16 D) 12 E) 8

(YÖS - 1999)



$$1. \quad \frac{ab}{bc} = \frac{3}{2} = \frac{9}{2} \Rightarrow a > c$$

$$\frac{ab}{ac} = \frac{3}{4} = \frac{9}{4} \Rightarrow b > c$$

$$\frac{bc}{ac} = \frac{2}{4} = \frac{1}{2} \Rightarrow a > b$$

$$a > b > c$$

Yanıt - Answer : A

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

Yanıt - Answer : A

$$3. \quad \frac{ab}{1} = \frac{bc}{-2} = \frac{ca}{9} = k$$
$$ab = k$$
$$bc = -2k$$
$$ca = 9k$$
$$\frac{ab}{bc} = \frac{k}{-2k} \Rightarrow \frac{a}{c} = -\frac{1}{2} \quad a < c$$
$$\frac{ab}{ca} = \frac{k}{9k} \Rightarrow \frac{b}{c} = \frac{1}{9} \quad b < c$$
$$b > 0$$
$$a < b < c$$

Yanıt - Answer : E

$$4. \quad \frac{x}{y} = \frac{a}{b} \Rightarrow b = \frac{ay}{x}$$

$$\frac{b-y}{b+y} = \frac{\frac{ay}{x} - y}{\frac{ay}{x} + y} = \frac{\frac{ay - xy}{x}}{\frac{ay + xy}{x}} = \frac{ay - xy}{ay + xy} = \frac{y(a-x)}{y(a+x)} = \frac{a-x}{a+x}$$

Yanıt - Answer : C

$$5. \quad \frac{a}{2} = -\frac{b}{3} \Rightarrow 2b = -3a$$

$$b = -\frac{3a}{2}$$

$$a + b = 2$$

$$a - \frac{3a}{2} = -\frac{a}{2} = 2 \Rightarrow a = -4$$

$$b = 6$$
$$a \cdot b = -24$$

Yanıt - Answer : A

$$6. \quad 0 < a \quad 0 < b$$

$$\frac{b}{a} = \frac{1}{3} \Rightarrow a = 3b \Rightarrow b = \frac{a}{3}$$

$$\frac{a}{c} = \frac{2}{3} \Rightarrow 2c = 3a \Rightarrow c = \frac{3a}{2}$$

$$a + \frac{a}{3} + \frac{3a}{2} = 34$$

$$\frac{17a}{6} = 34 \Rightarrow a = 12$$

Yanıt - Answer : C



7. $0 < a$ $0 < b$

$$\frac{a}{4} = \frac{b}{3} = k$$

$$a = 4k \quad b = 3k$$

$$a^2 + b^2 = 100$$

$$16k^2 + 9k^2 = 100$$

$$25k^2 = 100$$

$$k^2 = 4$$

$$k = 2$$

$$a = 8 \quad b = 6$$

$$a - b = 8 - 6$$

$$= 2$$

Yanıt - Answer : A

8. $ab = \frac{1}{4}$ $ac = \frac{1}{5}$ $bc = \frac{2}{3}$

$$\frac{ab}{ac} = \frac{\frac{1}{4}}{\frac{1}{5}} \Rightarrow \frac{b}{c} = \frac{5}{4}$$

$$\frac{ab}{bc} = \frac{\frac{1}{4}}{\frac{2}{3}} \Rightarrow \frac{a}{c} = \frac{3}{8}$$

$$a < c < b$$

Yanıt - Answer : B

9. $\frac{a}{4} = \frac{b}{5} = \frac{c}{7} = k$

$$a = 4k \quad b = 5k \quad c = 7k$$

$$2a + 4b - 3c = 2.4k + 4.5k - 3.7k = 49$$

$$8k + 20k - 21k = 49$$

$$7k = 49$$

$$k = 7$$

$$b = 5k$$

$$b = 5.7$$

$$b = 35$$

Yanıt - Answer : D

10. $k > 0$
 $x = 2k$
 $y = 3k$
 $z = 4k$

$$x + y + z = 2k + 3k + 4k = 360$$

$$9k = 360$$

$$k = 40$$

$$z = 4k = 4.40 = 160$$

Yanıt - Answer : B

11. $\frac{a}{b^2} = \frac{3}{16}$

$$a = 3$$

$$b^2 = 16$$

$$b = 4$$

$$\frac{a+b}{b} = \frac{3+4}{4} = \frac{7}{4}$$

Yanıt - Answer : C

12. $3a + b = 2b \Rightarrow$
 $b + 2c = 4c \Rightarrow$

$$3a = b$$

$$b = 2c$$

$$3a = 2c$$

$$a < b$$

$$c < b$$

$$a < c$$

$$a < c < b$$

Yanıt - Answer : A



$$13. \quad \frac{A}{B} = \frac{2}{3} \Rightarrow 3A = 2B$$

$$A = \frac{2B}{3}$$

$$\frac{B}{C} = \frac{2}{3} \Rightarrow 2C = 3B$$

$$C = \frac{3B}{2}$$

$$A + B + C = \frac{2B}{3} + B + \frac{3B}{2} = 380$$

$$\frac{19B}{6} = 380 \Rightarrow B = 120$$

$$C = \frac{3 \cdot 120}{2} = 180$$

$$C - B = 180 - 120 = 60$$

Yanıt - Answer : B

$$14. \quad \frac{x}{5} = \frac{y}{6} = \frac{z}{8} = k$$

$$\left. \begin{array}{l} x = 5k \\ y = 6k \\ z = 8k \end{array} \right\}$$

$$x + y + z = 1900$$

$$5k + 6k + 8k = 1900$$

$$19k = 1900$$

$$k = 100 \quad y = 6k \Rightarrow y = 6 \cdot 100$$

$$y = 600$$

Yanıt - Answer : D

$$15. \quad \frac{a}{b} = \frac{c}{d} = 3$$

$$\frac{\left(\frac{a+b}{b}\right) \cdot \left(\frac{c+d}{c}\right)}{\left(\frac{a-b}{a}\right)} = \frac{\left(\frac{a}{b} + 1\right) \cdot \left(1 + \frac{d}{c}\right)}{\left(1 - \frac{b}{a}\right)}$$

$$= \frac{(3+1) \cdot \left(1 + \frac{1}{3}\right)}{\left(1 - \frac{1}{3}\right)} = \frac{\cancel{16} \cdot \cancel{2}}{\cancel{2}} = 8$$

Yanıt - Answer : E

$$16. \quad \frac{a}{2} = \frac{b}{3} = \frac{c}{5} = k \Rightarrow a = 2k, \quad b = 3k, \quad c = 5k$$

$$a + b + c = 80 \Rightarrow 2k + 3k + 5k = 80$$

$$10k = 80$$

$$k = 8$$

$$a = 16$$

$$b = 24$$

$$c = 40$$

$$b + a - c = 24 + 16 - 40 = 0$$

Yanıt - Answer : C

$$17. \quad a + \frac{1}{b} = 3 \Rightarrow \frac{ab+1}{b} = 3 \Rightarrow ab+1 = 3b$$

$$b + \frac{1}{a} = 8 \Rightarrow \frac{ab+1}{a} = 8 \Rightarrow ab+1 = 8a$$

$$3b = 8a$$

$$\downarrow \quad \downarrow$$

$$8k = 3k$$

$$\frac{a+b}{b-a} = \frac{3k+8k}{8k-3k} = \frac{11\cancel{k}}{5\cancel{k}} = \frac{11}{5}$$

Yanıt - Answer : C

7. BÖLÜM

KÜMELER – ARALIKLAR







1. $A = \{1, 2, 3, 4, 5, 6\}$ $B = \{3, 4, 6, 7\}$

$A \cap B = ?$

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

2. $A = \{1, 3, 5, 7, 9\}$ $B = \{x \mid 2 < x \leq 12 \ x \in \mathbb{Z}\}$

$n(A \cup B) = ?$

- A) 17 B) 12 C) 11 D) 10 E) 7

3. $A = \{x \mid x \in \mathbb{Z} \ x^2 \leq 12\}$

$B = \{x \mid x \in \mathbb{Z} \ |x| \leq 5\}$

$B - A = ?$

- A) $\{-1, -2, -3, 1, 2, 3\}$ B) $\{-5, -4\}$
C) $\{-1, -2, -3\}$ D) $\{4, 5\}$
E) $\{-5, -4, 4, 5\}$

4. $A = \{x \mid |x+1| \leq 3 \ x \in \mathbb{Z}\}$

$B = \{x \mid |x-2| < 5 \ x \in \mathbb{Z}\}$

$n(A \cap B) = ?$

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

5. $A \cap B = \emptyset$

$n(A) = 7$

$n(B) = 4$

$n(A \cup B) = ?$

- A) 3 B) 4 C) 7 D) 11 E) 16

6. $A = \{x, y, z, t\}$, $B = \{1, 2, 3, x, t\}$

$A - B = ?$

- A) $\{x, t\}$ B) $\{1, 2, 3\}$ C) $\{y, z\}$
D) $\{1, 2, 3, x, y, z, t\}$ E) $\{1, 2, x\}$

7. $n(A \cap B) = x + 8$

$n(A - B) = 3x - 4$

$n(B - A) = x + 11$

$n(A \cup B) = 40$

$n(A) = ?$

- A) 35 B) 32 C) 30 D) 27 E) 24

8. $n(B \setminus A) = 6$

$n(A \cup B) = 21$

$n(A) = ?$

- A) 8 B) 11 C) 15 D) 18 E) 23



9. $A \cap B = B$

$$n(B) = 8$$

$$n(A - B) = 6$$

$$n(A) = ?$$

- A) 15 B) 14 C) 13 D) 12 E) 11

10. $A \subset B$

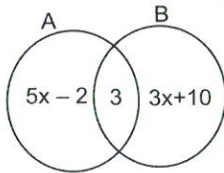
$$n(A \cup B) = 18$$

$$n(B \setminus A) = 7$$

$$n(A) = ?$$

- A) 25 B) 23 C) 18 D) 11 E) 7

11.



$$n(A - B) = 5x - 2$$

$$n(B - A) = 3x + 10$$

$$n(A - B) = n(B - A)$$

$$n(A \cap B) = 3$$

$$n(A \cup B) = ?$$

- A) 60 B) 59 C) 58 D) 57 E) 56

12.

$$4n(A) = 3n(B), \quad \frac{n(A/B)}{n(A \cap B)} = 2$$

$$n(A \cup B) = 24$$

$$n(B - A) = ?$$

- A) 4 B) 8 C) 12 D) 16 E) 20

13. $[-6, 5] \cap [-4, 9] = ?$

A) $[4, 5]$

B) $[-6, -4]$

C) $[-6, 9]$

D) $[-4, 5]$

E) $[5, 9]$

14.

$$A = \{a, b, \{c, d\}, e\},$$

$$B = \{a, c, d, \{e\}, f\}$$

$$B - A = ?$$

A) $\{a, f\}$

B) $\{c, d\{e\}\}$

C) $\{a, b\{c, d\}\}$

D) $\{\{e\}, f\}$

E) $\{c, d\{e\}, f\}$

15.

$$A, B \subset E$$

$$n(B) = 16$$

$$n(B') = 9$$

$$n(A) = 13$$

$$n(A') = ?$$

- A) 10 B) 11 C) 12 D) 13 E) 14

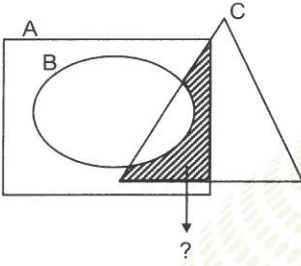


1. $A \cup B = \{a, b, c, d, 1, 2, 3\}$
 $A - B = \{a, b, 1\}$

$n(B) = ?$

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

2.



- A) $B \cap C$ B) $(A \cap B) \setminus C$ C) $B - (A \cap C)$
D) $(A \cap C) \setminus B$ E) $A \setminus (B \cap C)$

3. $B \subset A$
 $n(A - B) = 11$
 $n(A) + n(B) = 25$
 $n(A) = ?$

- A) 7 B) 8 C) 11 D) 14 E) 18

4. $n(A \cap B) = 3$
 $n(A) = 3n(B)$
 $n(A \cup B) = 41$
 $n(B) = ?$

- A) 30 B) 27 C) 19 D) 15 E) 11

5. $A, B \subset E$

$$\left. \begin{array}{l} n(A) + n(B') = 22 \\ n(A') + n(B) = 10 \end{array} \right\} \Rightarrow n(E) = ?$$

- A) 64 B) 32 C) 20 D) 16 E) 12

6. $n(A \cap B) = 2x + 1$
 $n(A - B) = 6 - x$
 $n(B - A) = 3x - 10$
 $n(A) = n(B)$

$n(A \cap B) = ?$

- A) 9 B) 10 C) 11 D) 12 E) 13

7. $A = \{x \mid |2x+1| \leq 7, x \in \mathbb{Z}^+\}$
 $B = \{x \mid |x-2| \leq 1, x \in \mathbb{Z}\}$
 $n(A \cap B) = ?$

- A) 0 B) 1 C) 2 D) 3 E) 5

8. $A = \{x \mid x \in \mathbb{Z}, 1 < x < 64\}$
 $B = \{y \mid y \in \mathbb{Z}, 1 \leq y^2 \leq 64\}$
 $n(A - B) = ?$

- A) 61 B) 60 C) 57 D) 56 E) 55



9. $A \subset B \subset C$

$$n(A) = 5$$

$$n(B) = 12$$

$$n(C) = 18$$

$$n(A \cap C) + n(C - B) = ?$$

- A) 11 B) 15 C) 27 D) 30 E) 35

10. $A = \{x \mid x = 2n, n \in \mathbb{Z}^+, x < 210\}$

$$B = \{x \mid x = 3m, m \in \mathbb{Z}^+, x \leq 120\}$$

$$n(A \cap B) = ?$$

- A) 19 B) 20 C) 21 D) 22 E) 23

11. $(A \setminus B) \setminus C = ?$

A) $A \cap B \cap C$

B) $A \cup B \cup C$

C) $A \setminus (B \cup C)$

D) $(A \cup B) \setminus C$

E) $B \setminus (A \cup C)$

12. $A \Delta B = (A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

$$A = \{1, 2, 3, 4, 5, 6, 7\}$$

$$B = \{1, 3, 5, 9, 11\}$$

$$n(A \Delta B) = ?$$

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

13. $n(A) = 14$

$$n(B) = 19$$

$$n(A \cap B) = 8$$

$$n(A \cup B) = ?$$

- A) 41 B) 33 C) 25 D) 19 E) 11

14. $A \cup B = E$

$$n(A - B) = 11$$

$$n(B) = 18$$

$$n(B \cap A^c) = 10$$

$$n(A) = ?$$

- A) 16 B) 17 C) 18 D) 19 E) 20

15. $B \setminus A \neq \emptyset$

$$n(A \cap B) = 7$$

$$n(A \cup B) = 24$$

$$\max(n(A - B)) = ?$$

- A) 20 B) 19 C) 18 D) 17 E) 16



1. $[(B - A) - A']^I \cap A' = ?$

- A) $\emptyset$ B) A C) B D) A' E) $A \cap B'$

2. $n(A \cap B') = 8$
 $n(B \cap A') = 6$
 $n(A \cup B) = 21$
 $n(A) = ?$

- A) 7 B) 9 C) 11 D) 15 E) 17

3. $n(A) = 2n(B) = 4n(A \cap B)$
 $n(A \cap B') = 12$
 $n(B) = ?$

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

4. $A = [-3, 4)$
 $B = (-6, 2)$
 $C = (-11, 5)$
 $[(A \setminus B) \cap C] = ?$

- A) (2, 4) B) [2, 4) C) (2, 4]
D) [2, 4] E) {4}

5. $A \subset B$
 $n(A) = 2x$
 $n(B - A) = 3x + 11$
 $n(A) + n(B) = 46$

$n(B) = ?$

- A) 18 B) 21 C) 26 D) 30 E) 36

6. $n(A - B) = 4n(A \cap B)$
 $3n(A) = 5n(B)$
 $n(A \cup B) = 42$

$n(B') = ?$

- A) 8 B) 14 C) 20 D) 24 E) 36

7. $s(A \cap B) = 3s(B \setminus A) = 4s(A \setminus B)$
 $s(A \cup B) = 38$

$s(A \setminus B) = ?$

- A) 4 B) 6 C) 8 D) 11 E) 15

8. $K \subset L \subset M \subset E$
 $(K' \cup L) \cup (L' \cap M') = ?$

- A) $\emptyset$ B) K' C) L D) L' E) E



9. $s(M \cap N) \neq \emptyset$
 $s(N) = 3s(M)$
 $s(N \setminus M) = 4s(M \setminus N)$
 $\min(s(N)) = ?$
A) 9 B) 10 C) 11 D) 12 E) 13
10. $A = \{x: 28 \leq x \leq 1350, x = 4n, n \in \mathbb{N}\}$
 $B = \{y: 15 < y < 1170, y = 6k, k \in \mathbb{N}\}$
 $s(A \cap B) = ?$
A) 96 B) 95 C) 94 D) 93 E) 92
11. $A = \{x: 23 \leq x < 150, x = 3n, n \in \mathbb{N}\}$
 $B = \{y: 39 \leq y \leq 161, y = 4k, k \in \mathbb{N}\}$
 $s(A \cap B') = ?$
A) 30 B) 31 C) 32 D) 33 E) 34
12. $A = \{x: |x - 3| < 7, x \in \mathbb{R}\}$
 $B = \{x: |x + 2| > -4, x \in \mathbb{R}\}$
 $A \cap B = ?$
A) $[-6, 10)$ B) $(-\infty, -4]$ C) $[-4, \infty)$
D) $(-2, 4)$ E) $(-4, 10)$
13. $A = \{x \in \mathbb{R}, |x - 2| \geq 1\}$
 $B = \{x \in \mathbb{R}, |x - 4| > 3\}$
 $B' \cap A = ?$
A) $\mathbb{R} - [1, 3]$ B) $(1, 3)$ C) $[3, 7] \cup \{1\}$
D) $[3, 7]$ E) $\mathbb{R} - [1, 7]$
14. $3s(B - A') = s(B) = 2s(A) = \frac{1}{2}s(A' - B)$
 $s(E) = 57$
 $s(A \cap B') = ?$
A) 3 B) 6 C) 9 D) 12 E) 18
15. $A = \{x: 10 < x \leq 120, x = 3 \pmod{4}\}$
 $B = \{y: 25 < y \leq 132, y = 4 \pmod{5}\}$
 $s(A \cap B) = ?$
A) 3 B) 4 C) 5 D) 6 E) 7



1. $P = \{a, b, c, d\}$, $Q = \{d, c, b\}$, $R = \{a, b\}$

$(P \cap R) \cup Q = ?$

- A) $P - Q$ B) $P - R$ C) P D) Q E) R

(YÖS-1984)

2. $(-1, 2] \cup [1, 5) = ?$

- A) $(-1, 5)$ B) $(-1, 5]$ C) $[-1, 5]$

- D) $[-1, 5)$ E) $(-1, 1]$

(YÖS-1984)

3. $A = \{0, 1, 2, 3, 4\}$, $B = \{0, 2, 4, 6, 8\}$

$C = \{1, 5, 6, 7\}$

$n(A \cup B \cup C) = ?$

- A) 5 B) 7 C) 9 D) 12 E) 14

(YÖS-1985)

4. $P \subset Q \subset R$

$n(P) = 3$, $n(Q) = 5$, $n(R) = 9$

$n(P \cup Q) + n(P \cap R) = ?$

- A) 12 B) 9 C) 8 D) 5 E) 3

(YÖS-1986)

5. $(1, 5] \cup [-3, 4) = ?$

- A) $(1, 4]$ B) $(-3, 5]$ C) $[1, 4]$

- D) $[-3, 4]$ E) $[-3, 5]$

(YÖS-1986)

6. $P = \{2, 4, 6, 8, 10\}$, $Q = \{x \mid 1 < x < 10, x \in \mathbb{Z}\}$

$n(P \cap Q) = ?$

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

(YÖS-1986)

7. $n(A \cap B) = K - 2$ $n[A - (A \cap B)] = K$
 $n[B - (A \cap B)] = 2K$ $n(A \cup B) = 54$

$n(A) = ?$

- A) 25 B) 26 C) 27 D) 28 E) 29

(YÖS-1987)

8. $A = \{x \mid 0 < x \leq 10, x \in \mathbb{Z}^+\}$

$B = \{y \mid y = 2.k, 0 < k \leq 10, k \in \mathbb{Z}^+\}$

$n(A \cap B) = ?$

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

(YÖS-1988)



9. $n(A \cup B) = 18$

$$n(A - B) = 5$$

$$n(A) = n(B)$$

$$n(A \cap B) = ?$$

- A) 5 B) 6 C) 7 D) 8 E) 9

(YÖS-1988)

10. $A = \{x \mid x \in \mathbb{Z}, 1 \leq x \leq 50\}$

$$B = \{y \mid y \in \mathbb{Z}, 1 \leq y^2 \leq 50\}$$

$$n(A - B) = ?$$

- A) 0 B) 25 C) 43 D) 47 E) 50

(YÖS-1989)

11. $n(A \cup B) = 17$

$$n(A - B) = 5$$

$$n(A) = 8$$

$$n(B) = ?$$

- A) 6 B) 7 C) 9 D) 12 E) 13

(YÖS-1997)

12. $A = \{x \mid 5 < x \leq 100, x = 2n, n \in \mathbb{N}\}$

$$B = \{y \mid 16 < y \leq 120, y = 3k, k \in \mathbb{N}\}$$

$$s(A \cap B) = ?$$

- A) 10 B) 11 C) 12 D) 13 E) 14

(YÖS-2005)

13. $A \cup B = \{1, 3, 5, 7, 9\}$

$$A \cup C = \{1, 2, 3, 4, 5\}$$

$$s((A \cup (B \cap C))) = ?$$

- A) 2 B) 3 C) 5 D) 8 E) 10

(YÖS-2008)

14. $A = \{x \mid 1 \leq x \leq 150, x \equiv 4 \pmod{5}\}$

$$B = \{y \mid 75 \leq y \leq 200, y \equiv 2 \pmod{3}\}$$

$$s(A \cap B) = ?$$

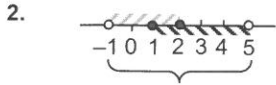
- A) 4 B) 5 C) 6 D) 7 E) 8

(YÖS-2009)



1. $P = \{a, b, c, d\}$, $Q = \{d, c, b\}$, $R = \{a, b\}$
 $(P \cap R) = \{a, b\}$
 $(P \cap R) \cup Q = \{a, b\} \cup \{d, c, b\} = \{a, b, c, d\} = P$

Yanıt - Answer : C



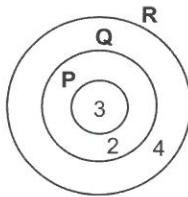
$$(-1, 2] \cup [1, 5) = (-1, 5)$$

Yanıt - Answer : A

3. $A \cup B \cup C = \{0, 1, 2, 3, 4, 5, 6, 7, 8\}$
 $n(A \cup B \cup C) = 9$

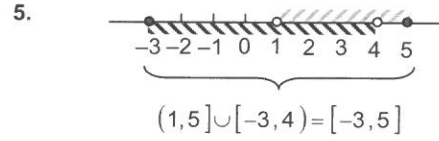
Yanıt - Answer : C

4. $n(P) = 3$
 $n(Q) = 5$
 $n(R) = 9$



$$\begin{aligned} P \cup Q &= Q \\ n(P \cup Q) &= n(Q) = 5 \\ P \cap R &= P \\ n(P \cap R) &= n(P) = 3 \\ n(P \cup Q) + n(P \cap R) &= 5 + 3 \\ &= 8 \end{aligned}$$

Yanıt - Answer : C



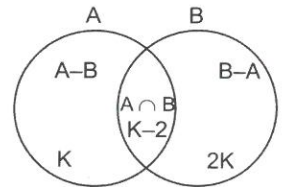
Yanıt - Answer : E

6. $P = \{2, 4, 6, 8, 10\}$ $Q = \{2, 3, 4, 5, 6, 7, 8, 9\}$
 $P \cap Q = \{2, 4, 6, 8\}$
 $n(P \cap Q) = 4$

Yanıt - Answer : E

7. $K + K - 2 + 2K = 54$
 $\frac{4K}{4} = \frac{56}{4}$
 $K = 14$

$$\begin{aligned} n(A) &= K + K - 2 \\ &= 2K - 2 \\ &= 2 \cdot 14 - 2 \\ &= 28 - 2 \\ &= 26 \end{aligned}$$



Yanıt - Answer : B

8. $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 $B = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$
 $A \cap B = \{2, 4, 6, 8, 10\}$
 $n(A \cap B) = 5$

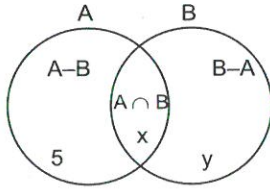
Yanıt - Answer : B



9. $n(A \cup B) = 18$

$$x + y + 5 = 18$$

$$x + y = 13$$



$$n(A) = n(B) \Rightarrow 5 + x = x + y$$

$$5 = y$$

$$x + y = 13$$

$$5 + x = 13$$

$$x = 8$$

Yanıt - Answer : D

10. $A = \{1, 2, 3, 4, 5, 6, \dots, 48, 49, 50\}$

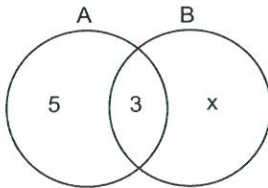
$$B = \{-7, -6, -5, \dots, 5, 6, 7\}$$

$$n(A) = 50, \quad n(B) = 7$$

$$n(A - B) = 43$$

Yanıt - Answer : C

11.



$$5 + 3 + x = 17$$

$$x = 9$$

$$n(B) = 3 + 9$$

$$= 12$$

Yanıt - Answer : D

12. $A = \{x \mid 5 < x \leq 100, x = 2n, n \in \mathbb{N}\}$

$$B = \{y \mid 16 < y \leq 120, y = 3k, k \in \mathbb{N}\}$$

$$s(A \cap B) = ?$$

$$A = \{6, 8, 10, \dots, 100\}$$

$$B = \{18, 21, 24, \dots, 120\}$$

$$(A \cap B) = \{z \mid 16 < z \leq 100, z = 6t, t \in \mathbb{N}\}$$

$$(A \cap B) = \{18, 24, 30, \dots, 96\}$$

$$s(A \cap B) = 14$$

Yanıt - Answer : E

13. $S((A \cup (B \cap C))) = S((A \cup B) \cap (A \cup C)) = 3$

Yanıt - Answer : B

14.

$$x = 5k + 4, \quad k \in \mathbb{Z}$$

$$y = 3t + 2, \quad t \in \mathbb{Z}$$

$$z \in A \cap B \Rightarrow z = 5k + 4 = 3t + 2$$

$$\Rightarrow z + 1 = 15n, \quad n \in \mathbb{Z}$$

$$\Rightarrow z = 15n - 1$$

$$\Rightarrow A \cap B = \{z \mid 75 \leq z \leq 150, z = 15n - 1\}$$

$$n = 6 \Rightarrow z = 89$$

$$n = 7 \Rightarrow z = 104$$

$$n = 8 \Rightarrow z = 119$$

$$n = 9 \Rightarrow z = 134$$

$$n = 10 \Rightarrow z = 149$$

$$s(A \cap B) = 5$$

Yanıt - Answer : B

8. BÖLÜM

BASİT EŞİTSİZLİK – MUTLAK DEĞER







1. $5x - 15 < 0$

$x \in ?$

- A) $x < -5$ B) $x < -3$ C) $x < 3$
D) $x > 5$ E) $x > -5$

2. $\frac{2x-3}{5} - 3 > 2$

$x \in ?$

- A) $x < -14$ B) $x < 14$ C) $x > 14$
D) $x < 7$ E) $x < 11$

3. $\frac{x-4}{4} + 2 < -3 - \frac{x+2}{3}$

$\text{Ç. K} = ?$

- A) $x < -8$ B) $x < -\frac{1}{8}$ C) $x < -\frac{1}{12}$
D) $x < 8$ E) $x < 12$

4. $\frac{3x-2}{8} + \frac{1}{4} > 3 \cdot (x-2) - 1$

$x \in ?$

- A) $x < -\frac{8}{3}$ B) $x < -\frac{3}{8}$ C) $x < \frac{3}{8}$
D) $x < \frac{8}{3}$ E) $x < \frac{16}{3}$

5. $\frac{4}{x-2} > \frac{1}{3}$

$x \in ?$

- A) $-1 < x < 12$ B) $-2 < x < 14$ C) $1 < x < 12$
D) $2 < x < 14$ E) $4 < x < 14$

6. $\frac{8}{3x+4} \leq -\frac{8}{11}$

$? < x < ?$

- A) $5 \leq x \leq \frac{4}{3}$ B) $-5 \leq x \leq \frac{4}{3}$
C) $\frac{4}{3} \leq x \leq 5$ D) $\frac{4}{3} \leq x \leq 15$
E) $-5 \leq x < -\frac{4}{3}$

7. $x < 0 < y$

$\frac{|x-y| - |x| - |y-x|}{|x|} = ?$

- A) -1 B) x C) x - y D) y E) 1

8. $x < 0 < y < z$

$|x-y| + |y-z| - |z-y| = ?$

- A) x - y B) z - y C) y - x
D) x + y E) x - z



9. $z < 0 < y < x$

$$|y-x| - |-x| - |z| + |z-y| = ?$$

- A) $-2x$ B) $2x$ C) 0
D) $2z$ E) $x-z$

13. $-2 < x < 4$

$$|x-6| + |x+2| = ?$$

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

10. $x < 5$

$$|x-5| = 8$$

$$x = ?$$

- A) -5 B) -3 C) 3 D) 5 E) 13

14. $-2 < x < 6$

$$|x-6| + |x+3| - |8-x| = ?$$

- A) $2x-1$ B) $x+1$ C) -11
D) 1 E) $-x-1$

11. $x < 5$

$$|x-5| + 2x = 9$$

$$x = ?$$

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

15. $x < 2$

$$|x-3| + |x-2| - |2-x| = 11$$

$$x = ?$$

- A) -14 B) -11 C) -8 D) 8 E) 11

12. $x > 0$

$$|x+3| + |2x+3| - |x| = 10$$

$$x = ?$$

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



1. $z < y < x < 0$

? < ? < ?

A) $\frac{1}{x} < \frac{1}{y} < \frac{1}{z}$

B) $\frac{1}{y} < \frac{1}{z} < \frac{1}{x}$

C) $\frac{1}{y} < \frac{1}{x} < \frac{1}{z}$

D) $\frac{1}{z} < \frac{1}{x} < \frac{1}{y}$

E) $\frac{1}{z} < \frac{1}{y} < \frac{1}{x}$

2. $0 < \frac{1}{x} < \frac{1}{y} < \frac{1}{z}$

? < ? < ?

A) $x < y < z$

B) $y < x < z$

C) $z < x < y$

D) $z < y < x$

E) $x < z < y$

3. $x, y \in \mathbb{Z}$

$7 < x < 10$

$3 < y < 11$

$\min(3x - 5y) = ?$

A) -39

B) -34

C) -26

D) -18

E) -11

4. $x < y < z < 0$

? < ? < ?

A) $z^3 < y^3 < x^3$

B) $y^3 < z^3 < x^3$

C) $x^3 < y^3 < z^3$

D) $z^3 < x^3 < y^3$

E) $y^3 < x^3 < z^3$

5. $-1 < x < 0$

? < ? < ?

A) $x < x^3 < x^5$

B) $x < x^2 < x^3$

C) $x^4 < x^5 < x^6$

D) $x^5 < x^3 < x$

E) $x^5 < x^3 < x^2$

6. $0 < y < 1$

? < ? < ?

A) $y < y^2 < y^3$

B) $y < \frac{1}{y} < y^2$

C) $\frac{1}{y} < y < y^2$

D) $y^3 < y^2 < y$

E) $y^2 < \frac{1}{y} < y$

7. $0 < x < 1$

? < ? < ?

A) $x < \frac{1}{x} < x^2$

B) $x < \sqrt{x} < \frac{1}{x}$

C) $\sqrt[3]{x} < \sqrt{x} < x$

D) $\sqrt{x} < x < \frac{1}{x}$

E) $\frac{1}{x^3} < \frac{1}{x^2} < \frac{1}{x}$

8. $\frac{1}{2}(x-4) > 3\left(\frac{x}{2}-1\right)$

Ç. K = ?

A) $x < 3$

B) $x < -1$

C) $x < 1$

D) $x < 3$

E) $x < 5$



9. $\frac{2 - \frac{1}{x+1}}{x + \frac{1}{2}} \geq 2$

? < x < ?

- A) $-3 < x \leq -2$ B) $-2 < x \leq -1$ C) $-1 < x \leq 0$
D) $-1 < x < 0$ E) $-2 < x < -1$

10. $-6 < x < 0$
 $|x+6| + |x-4| + 2x = 4$

x = ?

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

11. $0 < x < 3$
 $|x-5| + |x+3| + 4 = ?$

- A) 8 B) 9 C) 10 D) 11 E) 12

12. $-4 < x < 4$
 $|x-4| - |x+5| - 10 = -7$

x = ?

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

13. $x < 1$
 $|2x-6| - |x-3| = 5$

x = ?

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

14. $A = |x-5| + |x-2|$
 $\min(A) = ?$

- A) 7 B) 5 C) 4 D) 3 E) 2

15. $A = |x+5| - |x-8|$
 $\max(A) = ?$

- A) -15 B) -13 C) 0 D) 13 E) 15



1. $4 - 2x < \frac{x}{3} + 11$

$x \in ?$

- A) $x > -3$ B) $x < -3$ C) $x > \frac{1}{3}$
D) $x > -\frac{1}{3}$ E) $x < 3$

2. $4 \cdot \left(2 - \frac{1-x}{8} \right) \leq 3$

$x \in ?$

- A) $x \leq 4$ B) $x \geq -4$ C) $x \leq -9$
D) $x \geq 9$ E) $x \leq -11$

3. $x \in \mathbb{Z}^-$

$|x| + |3-x| + |2x-5| \geq 20$

$\mathbb{C}. K = ?$

- A) $x \leq -3$ B) $x \leq -4$ C) $x \leq -5$
D) $x \leq -6$ E) $x \leq -7$

4. $|x-3| = 5$

$\{x_1, x_2\} = \{?, ?\}$

- A) $\{-2, 5\}$ B) $\{-5, 2\}$ C) $\{-5, -2\}$
D) $\{-2, -8\}$ E) $\{-2, 8\}$

5. $|2x+5| - 3 = 14$

$x_1 \cdot x_2 = ?$

- A) -66 B) -56 C) -48 D) 56 E) 66

6. $5 < x < 6$

$|x-5| + |x-6| + x = ?$

- A) $1-x$ B) $1-2x$ C) x D) $x+1$ E) $x+2$

7. $|x-3| \leq 5$

$? \leq x \leq ?$

- A) $-3 \leq x \leq 3$ B) $-5 \leq x \leq 5$
C) $-8 \leq x \leq 2$ D) $-2 \leq x \leq 8$
E) $-5 \leq x \leq 8$

8. $|11-2x| \leq 5$

$? \leq x \leq ?$

- A) $16 \leq x \leq 6$ B) $3 \leq x \leq 8$
C) $-3 \leq x \leq 8$ D) $-16 \leq x \leq -6$
E) $-16 \leq x \leq 8$



9. $\frac{1}{|x-5|} > \frac{1}{8}$

? < x < ?

- A) $(-2, 12) - \{5\}$ B) $(-13, -3) - \{5\}$
C) $(-3, 13) - \{5\}$ D) $(-3, 13) - \{8\}$
E) $(3, 13) - \{5\}$

10. $\frac{1}{|3x-6|} \leq \frac{1}{12}$

? < x < ?

- A) R B) $R - \{2\}$ C) $R - [-2, 6]$
D) $R - (-2, 6)$ E) $\emptyset$

11. $x < 0 < y$

$|x - 3y| - |-x| - |-2y| = ?$

- A) $-y$ B) $x - y$ C) $2x$ D) $x - 2y$ E) y

12. $c < b < 0 < a$

$|a - 2b| + |2c - a| - |2a - 3b| = ?$

- A) $a - b$ B) $2c + b$ C) $2c - b$
D) $b - 2c$ E) b

13. $x - z > 0$

$3x - y = 6$

$z = t + \frac{y}{3}$

$t \in ?$

- A) $(-\infty, 2)$ B) $(-\infty, -2)$ C) $(-2, \infty)$
D) $R - [-2, 2]$ E) $[-2, 2)$

14. $x = \frac{48}{|a+6| + |a+8|}$

$\max(x) = ?$

- A) 8 B) 12 C) 16 D) 24 E) 48

15. $x < 4$

$|x - 4| + |5 - x| - |x - 8| = ?$

- A) $x + 1$ B) $x - 1$ C) 1 D) $1 - x$ E) $-3x$



1. $\frac{1}{10}(2x+1) < \frac{1}{2} - \frac{x+8}{5}$

Ç. K = ?

- A) $x > -3$ B) $x > 3$ C) $x < -3$
D) $x < 5$ E) $x > 5$

(YÖS - 1981)

2. $x < -5$
 $|x+5| = 3$

x = ?

- A) -2 B) -4 C) -6 D) -7 E) -8

(YÖS-1982)

3. $|x-3|+4=5 \Rightarrow x = ?$

- A) $\{-2, 4\}$ B) $\{-6, 2\}$ C) $\{-4, 4\}$
D) $\{6, 12\}$ E) $\{2, 4\}$

(YÖS - 1983)

4. $-5 < x < -1$
 $|x+1| + |x+5| + a = 7$

a = ?

- A) 1 B) 3 C) 5 D) 7 E) 11

(YÖS - 1983)

5. $|x+1| \leq 5$

? ≤ ? ≤ ?

- A) $-6 \leq x \leq 5$ B) $-6 \leq x \leq 4$
C) $-7 \leq x \leq 5$ D) $-7 \leq x \leq 4$
E) $5 \leq x \leq 6$

(YÖS - 1984)

6. $|3x+4| < 5$

? ≤ ? ≤ ?

- A) $-6 \leq x \leq \frac{1}{3}$ B) $-6 < x < 3$
C) $\frac{1}{3} < x < 3$ D) $-3 < x < \frac{1}{3}$
E) $3 < x < 6$

(YÖS - 1985)



7. $|2x - a| < a, a > 0$

$? < ? < ?$

A) $0 < x < a$

B) $2 < x < a$

C) $a < x < 2a$

D) $\frac{a}{4} < x < \frac{a}{2}$

E) $\frac{a}{2} < x < a$

(YÖS - 1986)

10. $b - c > 0, \quad 2b = a + 1, \quad \frac{a}{2} + x = c$

$x \in ?$

A) $(-2, \infty)$ B) $(-\infty, -\frac{1}{2})$ C) $(\frac{1}{2}, \infty)$

D) $(-\infty, \frac{1}{2})$ E) $(-\infty, 2)$

(YÖS - 1990)

8. $a < 0 < b$

$|2a - b| + |2b - a| = ?$

A) $3(b - a)$

B) $2(a - b)$

C) $b - a$

D) $a - b$

E) $a + b$

(YÖS - 1988)

11. $|x + 7| = 12$

$x_1 + x_2 = ?$

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

(YÖS - 1992)

9. $x, y \in \mathbb{Z}^+, x > y$
 $|y - x| + |y - 1| = 5$

$x = ?$

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

(YÖS - 1989)

12. $x < 0$

$|x - 1| + |2 - x| - |x| = ?$

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

D) $3 - 2x$ E) $3 - 3x$

(YÖS - 1997)



13. $a < 0$
 $a = 2b$
 $b = \frac{c}{3}$

? < ? < ?

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

(YÖS - 2003)

14. $|x - y + 1| + \sqrt{9x^2 - 6xy + y^2} = 0$

$x + y = ?$

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

(YÖS - 2003)

16. $x^{1007} < 0$

$$|x| + |5 - x| + |6 - x| + |7 - x| + |x - 9| = 1007$$

$x = ?$

- A) -201 B) -199 C) -196 D) 176 E) 186

(YÖS - 2007)

17. $a < b < 0$

$$c = \frac{3a - b}{a}$$

? < c < ?

- A) $1 < c < 2$ B) $2 < c < 3$ C) $3 < c < 4$
D) $4 < c < 5$ E) $5 < c < 6$

(YÖS - 2008)

15. $x, y \in \mathbb{Z}$

$$-3 < x < 6$$

$$-5 < y < 1$$

$\max(x + y) = ?$

- A) 11 B) 9 C) 5 D) -2 E) -8

(YÖS - 2005)



$$1. \quad \frac{2x+1}{10} < \frac{1}{2} - \frac{x+8}{5}$$

(5) (2)

$$\frac{2x+1}{10} < \frac{5-2x-16}{10}$$

$$2x+1 < 5-2x-16$$

$$4x < -12$$

$$x < -3$$

Yanıt – Answer: C

$$2. \quad x < -5 \Rightarrow x+5 < 0$$

$$|x+5| = 3$$

$$-x-5 = 3$$

$$-x = 3+5$$

$$-x = 8$$

$$x = -8$$

Yanıt – Answer: E

$$3. \quad |x-3|+4=5 \Rightarrow |x-3|=5-4$$

$$|x-3|=1$$

$$x-3=1 \quad \text{veya (or)} \quad -x+3=1$$

$$x=4 \quad \text{veya (or)} \quad -x=-2$$

$$x=2$$

$$S.S = \{2, 4\}$$

Yanıt – Answer: E

$$4. \quad -5 < x < -1$$

$$|x+1|+|x+5|+a=7$$

$$-x-1+x+5+a=7$$

$$4+a=7$$

$$a=3$$

Yanıt – Answer: B

$$5. \quad |x+1| \leq 5 \Rightarrow -5 \leq x+1 \leq 5$$
$$-6 \leq x \leq 4$$

Yanıt – Answer: B

$$6. \quad |3x+4| < 5 \Rightarrow -5 < 3x+4 < 5$$

$$-9 < 3x < 1$$

$$\frac{-9}{3} < \frac{3x}{3} < \frac{1}{3}$$

$$-3 < x < \frac{1}{3}$$

Yanıt – Answer: D

$$7. \quad |2x-a| < a \Rightarrow -a < 2x-a < a$$

$$0 < 2x < 2a$$

$$\frac{0}{2} < \frac{2x}{2} < \frac{2a}{2}$$

$$0 < x < a$$

Yanıt – Answer: A

$$8. \quad a < 0 < b$$

$$|2a-b|+|2b-a| = -2a+b+2b-a$$

$$= -3a+3b$$

$$= 3.(b-a)$$

Yanıt – Answer: A



BASİT EŞİTSİZLİK – MUTLAK DEĞER ÇIKMIŞ SORULARIN ÇÖZÜMÜ

$$\begin{aligned}
 9. \quad y < x &\Rightarrow y - x < 0 \\
 y \in \mathbb{Z}^+ &\Rightarrow y \geq 1 \Rightarrow y - 1 \geq 0 \\
 |y - x| + |y - 1| &= 5 \\
 -y + x + y - 1 &= 5 \\
 x &= 6
 \end{aligned}$$

Yanıt – Answer: E

$$\begin{aligned}
 11. \quad |x - 7| &= 12 \Rightarrow \\
 x + 7 &= 12 \quad \text{veya (or)} \quad x + 7 = -12 \\
 x_1 &= 5 \quad \text{veya (or)} \quad x_2 = -19 \\
 x_1 + x_2 &= 5 + (-19) \\
 &= -14
 \end{aligned}$$

Yanıt – Answer: B

$$10. \quad b - c > 0, \quad 2b = a + 1, \quad \frac{a}{2} + x = c$$

$$2b = a + 1$$

$$\frac{2b}{2} = \frac{a+1}{2}$$

$$b = \frac{a+1}{2}$$

$$b - c > 0$$

$$\frac{a+1}{2} - \frac{a+2x}{2} > 0$$

$$\frac{a+1-a-2x}{2} > 0$$

$$1 - 2x > 0$$

$$\left(\frac{1}{2} > x \right)$$

$$x < \frac{1}{2} \Rightarrow x \in \left(-\infty, \frac{1}{2} \right)$$

Yanıt – Answer: D

$$\begin{aligned}
 12. \quad x < 0 \\
 |x - 1| + |2 - x| - |x| &= -x + 1 + 2 - x - (-x) \\
 &= -x + 1 + 2 - x + x \\
 &= 3 - x
 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned}
 13. \quad \frac{a}{b} &= \frac{2}{1} \\
 \frac{b}{c} &= \frac{1}{3}
 \end{aligned}$$

$$a < 0 \Rightarrow a = -2$$

$$b = -1$$

$$c = -3 \Rightarrow c < a < b$$

Yanıt – Answer: D



14. $|x-y+1| + \sqrt{9x^2 - 6xy + y^2} = 0$

$$|x-y+1| + \sqrt{(3x-y)^2} = 0$$

$$\underbrace{|x-y+1|}_0 + \underbrace{|3x-y|}_0 = 0$$

$$x-y+1=0$$

$$x-y=-1$$



$$x-3x=-1$$

$$-2x=-1$$

$$x=\frac{1}{2}$$

$$3x-y=0$$

$$3x=y$$

$$\Rightarrow x=\frac{1}{2} \quad y=\frac{3}{2}$$

$$\Rightarrow x+y=2$$

Yanıt – Answer: D

15. $x, y \in \mathbb{Z}$

$$-3 < x < 6$$

$$-5 < y < 1$$

$$\max(x \in \mathbb{Z}) = 5$$

$$\min(y \in \mathbb{Z}) = -4$$

$$\Rightarrow \max(x-y) = 5 - (-4) = 9$$

Yanıt – Answer: B

16. $x^{1007} < 0 \Rightarrow x < 0$

$$\begin{array}{ccccccc} |x| & + & |5-x| & + & |6-x| & + & |7-x| & + & |x-9| & = & 1007 \\ - & + & + & + & + & + & - & & & & \end{array}$$

$$-x+5-x+6-x+7-x-x+9=1007$$

$$-5x+27=1007$$

$$-5x=980$$

$$x=-196$$

Yanıt – Answer: C

17. $c = \frac{3a-b}{a} \Rightarrow c = 3 - \frac{b}{a} \Rightarrow \frac{-b}{a} = c-3$

$$a < b < 0 \Rightarrow \frac{a}{-a} < \frac{b}{-a} < \frac{0}{-a} \Rightarrow -1 < \frac{-b}{a} < 0$$

$$-1 < c-3 < 0 \Rightarrow 2 < c < 3$$

Yanıt – Answer : B

9. BÖLÜM

ÇARPANLARA AYIRMA







1. $\frac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x} + \frac{1}{y}} = ?$

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

2. $25x^2 - 16y^2 = ?$

- A) $(5x - 4y) \cdot (5y - 4x)$ B) $(4x - 5y) \cdot (4x + 5y)$
C) $(5x - 4y) \cdot (5x + 4y)$ D) $(5x + y) \cdot (5x - y)$
E) $(25x - 16y) \cdot (25x + 16y)$

3. $64x^2 - \frac{1}{49} = ?$

- A) $\left(8x - \frac{1}{7}\right) \cdot \left(8x + \frac{1}{7}\right)$
B) $\left(8x - \frac{1}{7}\right) \cdot \left(8x - \frac{1}{7}\right)$
C) $(8x - 7) \cdot (8x + 7)$
D) $\left(\frac{1}{7} - 8x\right) \cdot \left(\frac{1}{7} + 8x\right)$
E) $\left(8x - \frac{1}{49}\right) \cdot \left(8x + \frac{1}{49}\right)$

4. $x^2 - 7x + 12 = (?) \cdot (?)$

- A) $(x - 7) \cdot (x + 12)$ B) $(x - 3) \cdot (x + 4)$
C) $(x - 2) \cdot (x - 6)$ D) $(x - 3) \cdot (x - 4)$
E) $(x + 3) \cdot (x - 4)$

5. $(x + y - z)^2 - (x - y + z)^2 = ?$

- A) $4y(x - z)$ B) $4x(y - z)$ C) $4x(z - y)$
D) $4z(x + y)$ E) $4z(x - y)$

6. $\left(\frac{4a}{3b} - \frac{7c}{5x}\right) : \left(\frac{5}{7c} - \frac{3b}{4ax}\right) = ?$

- A) $21ax$ B) $2abx$ C) $35axc$
D) $\frac{21ax}{35}$ E) $\frac{28ac}{15b}$

7. $\frac{6x^2 + x - 12}{3x - 4} = ?$

- A) $x + 3$ B) $2x - 6$ C) $3 - 2x$
D) $2x - 3$ E) $2x + 3$

8. $\frac{10x^2}{9y} : \frac{20x}{6y^2} : \frac{y}{3x} = ?$

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



9. $\frac{8}{b^2 - a^2} : \frac{16}{a - b} = ?$

A) $-\frac{1}{3(a-b)}$ B) $-\frac{2}{a+b}$ C) $-\frac{1}{2(a+b)}$

D) $\frac{1}{2(a+b)}$ E) $-\frac{1}{2(a-b)}$

10. $a - b - \frac{a^2}{a+b} = ?$

A) $-\frac{b^2}{a+b}$ B) $\frac{b^2}{a+b}$ C) $\frac{2a^2}{a+b}$

D) $\frac{a+b}{b^2}$ E) $\frac{a-b}{a+b}$

11. $\frac{a^2 - b^2}{(a+b)a} - \frac{a^2 - b^2}{(a-b)a} = ?$

A) $\frac{b^2}{a^2}$ B) $-\frac{2b}{a}$ C) $\frac{2a^2}{b^2}$

D) $\frac{2b^2}{a^2}$ E) $\frac{a^2 + b^2}{a-b}$

12. $\frac{9x^2 - 36x + 27}{6x^2 - 12x - 18} : \frac{5x - 5}{2x + 2} = ?$

A) $\frac{x-3}{x-1}$ B) $\frac{3}{5}$ C) $\frac{3(x-1)}{x+1}$

D) $\frac{(x-1)}{5(x+1)}$ E) 1

13. $\frac{\frac{8a^2 - 8ab}{12ab + 12b^2}}{\frac{6a^2 - 6ab}{8a^3 + 16a^2b + 8ab^2}} : \frac{6a^2 - 24ab + 24b^2}{48a^3 + 48a^2b} = ?$

A) $\frac{a-3b}{4a^2b}$ B) $\frac{(a+b)^2}{2ab}$ C) $\frac{(a-2b)^2}{9ab}$

D) $\frac{(a-b)^2}{2(a+b)}$ E) $\frac{(a+2b)^2}{9ab}$

14. $\frac{x^2y^2 - 2xy + 1}{y^2x^2 - 1} \cdot \frac{xy^2 + y}{x^2y - x} = ?$

A) $\frac{x+y}{xy+1}$ B) $\frac{x-y}{xy}$ C) $\frac{x}{y}$

D) $\frac{y}{x}$ E) $\frac{xy+1}{x-y}$

15. $\frac{6a^2 - 294}{a^3 - 64} \cdot \frac{a^2 - a - 12}{2a - 14} : \frac{a^2 + 10a + 21}{a^3 + 4a^2 + 16a} = ?$

A) $a + 3$ B) $3a$ C) $\frac{a+1}{a-3}$

D) $\frac{a-7}{a^2-1}$ E) $\frac{2a-1}{a-4}$



1. $\frac{ab+b-a-1}{a+1} = ?$

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

2. $\frac{x^{-2}-y^{-2}}{x^{-1}-y^{-1}} : \frac{x^2-y^2}{2xy} = ?$

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

3. $\frac{444^2 - 44^2 - 400.486}{5a} = 16$

$a = ?$

- A) 13 B) 12 C) 11 D) 10 E) 9

4. $\frac{x^3 - 2x^2 - 8x}{x - \frac{16}{x}} : \frac{x^3 - 4x}{x^2 + 2x - 8} = ?$

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

5. $a-b=4$

$$\frac{a^2 - 4a - b^2 + 4b}{16 - (a+b)^2} = ?$$

- A) $-\frac{2}{a}$ B) $-\frac{b}{4a^2}$ C) $-\frac{b}{4a}$ D) $\frac{2a}{b}$ E) $\frac{b}{a}$

6. $\frac{2xy - x^2 + 3y^2}{2x - 6y} : \frac{3x^2 + 6xy + 3y^2}{2xy + 2y^2 - 2x - 2y} = ?$

- A) $\frac{2x-y}{x+y}$ B) $\frac{3}{2}$ C) $\frac{1-y}{3}$
D) $\frac{3}{y-1}$ E) $\frac{x+y}{x-2y}$

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

- A) $a+1$ B) a C) 1 D) $-a$ E) -1

8. $\frac{2x^2 - 2}{3x^2 - x - 2} : \frac{5x^2 + 6x + 1}{15x^2 + 13x + 2} = ?$

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



9. $\frac{a^5 - a^3}{a^2 + 3a + 2} : \frac{a^5 - 4a^4 + 3a^3}{a^2 - a - 6} = ?$

- A) 1 B) $\frac{1}{a}$ C) $\frac{a}{a-1}$ D) $\frac{a+1}{a}$ E) $\frac{a-1}{a-3}$

10. $\frac{a^2 - 4(a+b) + ab}{a^2 - b^2} \cdot \frac{ab - b^2}{a-4} = ?$

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

11. $\frac{my^2 + y}{y^2 - y} + \frac{m+y}{1-y} = ?$

- A) $\frac{m}{y-1}$ B) $\frac{m+1}{y}$ C) $\frac{m+1}{y-1}$
D) $\frac{m-1}{y-1}$ E) $m-1$

12. $\frac{1}{1 - \frac{a-b}{a+b}} + \frac{1}{\frac{a+b}{a-b} - 1} = ?$

- A) 1 B) $a+b$ C) $a-b$ D) $\frac{a}{b}$ E) $\frac{b}{a}$

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

- A) $x+y$ B) $3(x-y)$ C) $2x-3y$
D) $y-x$ E) $x-y$

14. $\frac{3x-9}{x^2+x-12} = \frac{A}{x+4} + \frac{B}{x-3}$

A+B = ?

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

15. $\frac{3x^2 - x}{x^3 + 1} = \frac{A}{x+1} + \frac{Bx+C}{x^2 - x + 1}$

$\frac{A \cdot B}{C} = ?$

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



1. $\frac{64^x - 16}{8^x + 4} = 60$

$x = ?$

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

2. $x + \frac{1}{x} = 7$

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

- A) $21\sqrt{5}$ B) $17\sqrt{5}$ C) 7 D) $5\sqrt{5}$ E) $3\sqrt{5}$

3. $2a + 5 - \frac{a^2 + 2a - 8}{a - 2} = ?$

A) $-\frac{a}{a-2}$

B) $a + 1$

C) a

D) $a - 2$

E) 2

4. $\left(4 + a - \frac{2a + 8}{a + 2}\right) : \left(\frac{a + 4}{a^2 + 2a}\right) = ?$

A) $2a^2 + 1$

B) a^2

C) $a^2 - 2$

D) $\frac{a^2 + 1}{a}$

E) $\frac{a^2 - 1}{a}$

5. $\frac{a^3 - b^3}{(a + b)^2 - ab} + \frac{a^2 - b^2}{a - b} = ?$

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

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

A) $-\frac{2}{x + 1}$

B) -1

C) $\frac{2x - 1}{x^2 - 1}$

D) 1

E) $\frac{2}{x + 1}$

7. $\frac{a^2 + 3a}{a^2 - a - 12} + \frac{8 - 4a}{a^2 - 6a + 8} = ?$

A) $\frac{2a}{a - 4}$

B) $\frac{4}{a - 4}$

C) 1

D) a

E) $\frac{a}{4}$

8. $a + \sqrt{a} = 20$

$\sqrt{a} - \frac{20}{\sqrt{a}} = ?$

A) -2

B) -1

C) 0

D) 1

E) 2



9. $\frac{(x-2)^2 + 2 \cdot (x-2) + 1}{x^2 - 1} = ?$

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

10. $x + 3\sqrt{x} = 1$

$x^2 + \frac{1}{x^2} = ?$

- A) 9 B) 81 C) 119 D) 121 E) 241

11. $\frac{x}{y} - \frac{y}{x} = 6$

$\frac{x^4 + y^4}{x^2 y^2} = ?$

- A) 28 B) 36 C) 38 D) 42 E) 47

12. $4^a + 5^a = 3$ $16^a + 25^a = 7$

$20^a = ?$

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

13. $\left(x - \frac{1}{x}\right)^2 - 10\left(x - \frac{1}{x}\right) + 25 = 0$

$x + \frac{1}{x} = ?$

- A) $\sqrt{19}$ B) $2\sqrt{19}$ C) $\sqrt{29}$
D) $\sqrt{31}$ E) $2\sqrt{31}$

14. $x + \frac{2}{x-1} = 5$

$(x-1)^2 + \frac{4}{(x-1)^2} = ?$

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

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

$\frac{9x^4 + 1}{x^2} = ?$

- A) 12 B) 13 C) 14 D) 15 E) 16



1. $\frac{a^2 - b^2 + 2a + 1}{a + 1 + b} = ?$

- A) $a + 3b + 1$ B) $3a - b + 1$ C) $a - b + 1$
D) $a - b + 3$ E) $a + b - 1$

(YÖS - 1981)

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

- A) $\sqrt{x}$ B) $1 + \sqrt{x}$ C) $x\sqrt{x-1}$
D) $x - \sqrt{x}$ E) $-1 - x\sqrt{x}$

(YÖS - 1982)

3. $x > 0, y > 0$

$x^2 + y^2 = 34,$

$2y = \frac{30}{x}$

$(x+y)^2 = ?$

- A) 4 B) $\sqrt{30}$ C) $\sqrt{34}$ D) 49 E) 64

(YÖS - 1982)

4. $\frac{(x+1) \cdot a^x}{a^{x+1}} - \frac{1}{a} = ?$

- A) $\frac{x}{a}$ B) $\frac{a}{x-a}$ C) $\frac{a^x - 1}{a}$
D) $\frac{xa}{a^x}$ E) $\frac{x-1}{a^x}$

(YÖS - 1982)

5. $\frac{2ax^2 + ax}{a^2x^3 - x} \cdot \frac{ax+1}{2x+1} = ?$

- A) $\frac{a}{ax-1}$ B) $\frac{1}{x-1}$ C) $\frac{ax+1}{ax^2+1}$
D) $\frac{2a}{x-1}$ E) $\frac{2+a}{ax-1}$

(YÖS - 1983)

6. $\frac{x^2 - 4}{x^2 + 7x + 10} \cdot \frac{2x+10}{4} = ?$

- A) $\frac{2}{6x+5}$ B) $\frac{x+2}{7x}$ C) $\frac{x-2}{5x+10}$
D) $\frac{x+4}{2}$ E) $\frac{x-2}{2}$

(YÖS - 1983)

7. $\frac{x^2 - 9}{x^2 + x - 12} \cdot \frac{3x+12}{x^2 + 2x - 3} = ?$

- A) $\frac{3}{x}$ B) $\frac{1}{x+1}$ C) $\frac{3}{x-1}$
D) $\frac{x}{x+3}$ E) $\frac{x+3}{x-1}$

(YÖS - 1984)

8. $\frac{x-y}{x+y} \cdot \frac{4x+2y}{2x^2 - xy - y^2} = ?$

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

(YÖS - 1985)



9. $\frac{a^3 - b^3}{a^2b + ab^2 + b^3} \cdot \frac{2b^2 + 2ab}{a^2 - b^2} = ?$

A) $\frac{2b}{a^2 + ab + b^2}$

B) $\frac{2(a+b)}{ab}$

C) $\frac{2}{ab}$

D) $2a$

E) 2

(YÖS - 1986)

10. $\frac{x+3}{3} + \frac{3}{x-3} = ?$

A) $\frac{x+6}{x}$

B) $\frac{x^2}{3x-9}$

C) $\frac{3x}{x-1}$

D) $\frac{x^2+3x}{3x-9}$

E) $\frac{3x}{x+1}$

(YÖS - 1987)

11. $\frac{x^4 - 2a^2x^3 + a^4x^2}{a^4 - 2a^2x + x^2} = ?$

A) 1

B) a

C) x^2

D) x

E) $\frac{1}{2}$

(YÖS - 1988)

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

A) $1 - a^2$

B) $a^2 - 1$

C) $a + 1$

D) $a - 1$

E) $1 - a$

(YÖS - 1991)

13. $\frac{6a^2 + 13ab + 6b^2}{2a + 3b} = ?$

A) $2(3b + a)$

B) $3(a + b)$

C) $3a + 6b$

D) $3a + 2b$

E) $3a - 2b$

(YÖS - 1992)

14. $\frac{a^6 + 64}{a^2 + 4} = ?$

A) $a^4 - 4a^2 + 16$

B) $a^4 + 4a^2 + 16$

C) $a^4 - 8a^2 + 16$

D) $a^4 + 8a^2 + 16$

E) $a^4 + 16$

(YÖS - 1992)

15. $\left(\frac{x-y}{x} + \frac{y-x}{y} \right) : \frac{x-y}{xy} = ?$

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

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

C) $-(x+y)$

D) $x-y$

E) $y-x$

(YÖS - 1992)

16. $\frac{a \cdot (a-2) - a + 2}{a-1} = ?$

A) $a - 1$

B) $a - 2$

C) $a + 1$

D) $1 - a$

E) $2a + 1$

(YÖS - 1993)



17. $a - b = 7, \quad a + c = 14$

$$a^2 - bc - ab + ac = ?$$

- A) 49 B) 63 C) 84 D) 98 E) 105

(YÖS - 1994)

18. $\left[\frac{a}{b} - \left(2 - \frac{b}{a} \right) \right] : \frac{a-b}{ab} = ?$

- A) $-ab$ B) $2ab$ C) $a + b$
D) $b - a$ E) $a - b$

(YÖS - 1994)

19. $x^2 - 3x - 5 = 0$

$$\frac{x^3 + 27}{2x + 6} = ?$$

- A) 5 B) 6 C) 7 D) 8 E) 9

(YÖS - 1994)

20.

$$\frac{8.(x^2 - 4).(x + 2)}{[(x + 2)(x - 1)]^2 - [(x - 3)(x + 2)]^2} = ?$$

- A) 1 B) 2 C) 4
D) $8x$ E) $\frac{2(x-2)}{x-5}$

(YÖS - 1995)

21. $a - \frac{1}{a} = 4$

$$a^2 + \frac{1}{a^2} = ?$$

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

(YÖS - 1997)

22. $x = \frac{3}{8} \quad y = \frac{11}{16}$

$$\frac{x^2 + 2xy + 4y^2}{x^3 - 8y^3} = ?$$

- A) $-\frac{3}{8}$ B) -1 C) $\frac{5}{16}$
D) $\frac{13}{16}$ E) 2

(YÖS - 1998)

23. $\frac{a^3 - ab^2 + b^2 - a^2}{a^3 - a^2b - 2a^2 + 2ab + a - b} = ?$

- A) $\frac{a-b}{a+1}$ B) $\frac{a-b}{a+b}$ C) $\frac{a-1}{a-b}$
D) $\frac{a+b}{a+1}$ E) $\frac{a+b}{a-1}$

(YÖS - 1998)

24. $5003^2 - 4997^2 = ?$

- A) 10^4 B) $3 \cdot 10^4$ C) $6 \cdot 10^4$
D) $3 \cdot 10^5$ E) $6 \cdot 10^5$

(YÖS - 1999)



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

- A) $\frac{24}{a-1}$ B) $\frac{24}{a+1}$ C) $\frac{12}{a-1}$
D) $\frac{12}{a+1}$ E) $24(a-1)$

(YÖS - 1999)

26. $(99)^2 - 4 = ?$

- A) 8097 B) 8797 C) 9097
D) 9797 E) 9977

(YÖS - 2000)

27. $(3x-1)^2 = 9x^2 + 13$

$x = ?$

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

(YÖS - 2000)

28. $x^3 + 2 = 3x^2$

$3x + \frac{6}{x^2} = ?$

- A) 6 B) 9 C) 12 D) 13 E) 16

(YÖS - 2001)

29. $x^2 + y^2 - 2xy - 4 = 0$

$|x - y| = ?$

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

(YÖS - 2002)

30. $\frac{(1,75)^2 - (1,25)^2}{(2,25)^2 - (1,75)^2} = ?$

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

(YÖS - 2003)



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31. $\frac{(x^2 - 2x + 4) \cdot (x^2 - 4)}{x^3 + 8} = ?$

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

(YÖS - 2003)

32. $\frac{(cd-1)^2 - (c-d)^2}{(d^2-1) \cdot (c-1)} = 5$

$c = ?$

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

(YÖS - 2004)

34. $x + \frac{1}{6x} = 3$

$\left(x - \frac{1}{6x}\right)^2 = ?$

- A) $\frac{23}{3}$ B) $\frac{25}{3}$ C) $\frac{28}{3}$
D) $\frac{29}{3}$ E) $\frac{31}{3}$

(YÖS - 2005)

35. $x - \frac{1}{x} = 3$

$3x^2 + \frac{3}{x^2} = ?$

- A) 27 B) 30 C) 33 D) 37 E) 40

(YÖS - 2006)

33. $\frac{x^2 - x - 12}{x^2 - x - 6} \cdot \frac{x^2 + x - 12}{x^2 + x - 6} = ?$

- A) $\frac{x+4}{x-2}$ B) $\frac{x-4}{x+2}$ C) $\frac{x^2-16}{x^2-4}$
D) $\frac{x^2-4x+16}{x^2-9}$ E) $\frac{x^2-4x+16}{x^2-4}$

(YÖS - 2005)

36. $(0,75)^2 - (0,75) \cdot (0,5) - (0,25)^2 = ?$

- A) 0,125 B) 0,25 C) 0,5 D) 0,75 E) 1

(YÖS - 2006)



37. $\frac{2^{24}(3^{44} - 3^{22})}{6^{22}(3^{11} + 1)(3^{11} - 1)} = ?$

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

(YÖS – 2007)

40. $\frac{a^3 - b^3}{(a+b)^2 - ab} = ?$

- A) $a-b$ B) $a+b$ C) $b-a$
D) a^2+b^2 E) a^2-b^2

(YÖS – 2008)

38. $(9, 2 + 4, 2)^2 - 4 \cdot (9, 2) \cdot (4, 2) = ?$

- A) 4 B) 9 C) 16 D) 25 E) 36

(YÖS – 2007)

41. $x + y = 6$
 $x \cdot y = 8$

$x^3 + y^3 = ?$

- A) 48 B) 64 C) 72 D) 80 E) 96

(YÖS – 2008)

39. $\frac{5(a+3)^2 - 10a(a+3) + 5a^2}{5} = ?$

- A) 1 B) 3 C) 6 D) 9 E) 12

(YÖS – 2007)

42. $\left(\frac{1}{3}x - \frac{3}{4}\right)^2 = ?$

- A) $\frac{x^2}{3} - \frac{x}{2} + \frac{9}{16}$ B) $\frac{x^2}{3} - \frac{x}{12} + \frac{3}{4}$
C) $\frac{x^2}{9} + \frac{x}{4} - \frac{9}{16}$ D) $\frac{x^2}{9} - \frac{x}{2} + \frac{9}{16}$
E) $\frac{x^2}{9} - \frac{x}{12} - \frac{9}{18}$

(YÖS – 2008)



43. $a+b=\frac{1}{6}$

$$\frac{(a-b)^2+ab}{3a^3+3b^3}=?$$

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

(YÖS – 2009)

44. $\left(x-\frac{2}{x}\right)^5 = Ax^5 + Bx^3 + Cx + Dx^{-1} + Ex^{-3} + Fx^{-5}$

$C = ?$

- A) -36 B) -20 C) 24 D) 40 E) 64

(YÖS – 2009)

45. $\frac{x^2+5x+6}{x^3+x^2-2x} \cdot \frac{x^3-x}{x^2+6x+5} = ?$

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

(YÖS – 2009)



$$1. \quad \frac{a^2 - b^2 + 2a + 1}{a + 1 + b} = \frac{a^2 + 2a + 1 - b^2}{a + 1 + b}$$

$$= \frac{(a+1)^2 - b^2}{a+1+b}$$

$$= \frac{(a+1-b)(a+1+b)}{a+1+b}$$

$$= a+1-b$$

Yanıt - Answer : C

$$2. \quad \frac{1-x}{1-\sqrt{x}} = \frac{(1-\sqrt{x}) \cdot (1+\sqrt{x})}{1-\sqrt{x}} \\ = 1+\sqrt{x}$$

Yanıt - Answer : B

$$3. \quad 2y = \frac{30}{x} \Rightarrow 2xy = 30 \\ (x+y)^2 = x^2 + 2xy + y^2 \\ = x^2 + y^2 + 2xy \\ = 34 + 30 \\ = 64$$

Yanıt - Answer : E

$$4. \quad \frac{(x+1) \cdot a^x}{a^{x+1}} - \frac{1}{a} = \frac{(x+1) \cdot a^x}{a^x \cdot a} - \frac{1}{a} \\ = \frac{x+1}{a} - \frac{1}{a} \\ = \frac{x+1-1}{a} = \frac{x}{a}$$

Yanıt - Answer : A

$$5. \quad \frac{2ax^2 + ax}{a^2x^3 - x} \cdot \frac{ax+1}{2x+1} = \frac{ax \cdot \cancel{(2x+1)}}{x \cdot (a^2x^2 - 1)} \cdot \frac{ax+1}{\cancel{2x+1}} \\ = \frac{ax \cdot \cancel{(ax+1)}}{x \cdot (ax-1) \cdot \cancel{(ax+1)}} \\ = \frac{a}{ax-1}$$

Yanıt - Answer : A

$$6. \quad \frac{x^2 - 4}{x^2 + 7x + 10} \cdot \frac{2x+10}{4} = \frac{(x-2) \cdot \cancel{(x+2)}}{(x+2) \cdot (x+5)} \cdot \frac{2 \cdot \cancel{(x+5)}}{4} \\ = \frac{x-2}{2}$$

Yanıt - Answer : E

$$7. \quad \frac{x^2 - 9}{x^2 + x - 12} \cdot \frac{3x+12}{x^2 + 2x - 3} \\ = \frac{(x-3) \cdot \cancel{(x+3)}}{(x+4) \cdot \cancel{(x-3)}} \cdot \frac{3 \cdot \cancel{(x+4)}}{(x+3) \cdot (x-1)} \\ = \frac{3}{x-1}$$

Yanıt - Answer : C

$$8. \quad \frac{x-y}{x+y} \cdot \frac{4x+2y}{2x^2 - xy - y^2} = \frac{\cancel{x-y}}{x+y} \cdot \frac{2 \cdot \cancel{(2x+y)}}{(2x+y) \cdot \cancel{(x-y)}} \\ = \frac{2}{x+y}$$

Yanıt - Answer : C



$$9. \frac{a^3 - b^3}{a^2b + ab^2 + b^3} \cdot \frac{2b^2 + 2ab}{a^2 - b^2}$$
$$= \frac{(\cancel{a-b})(\cancel{a^2+ab+b^2})}{\cancel{b(a^2+ab+b^2)}} \cdot \frac{2\cancel{b}(b+a)}{(\cancel{a-b})(a+b)} = 2$$

Yanıt - Answer : E

$$10. \frac{x+3}{3} + \frac{3}{x-3} = \frac{(x+3)(x-3)+9}{3 \cdot (x-3)}$$
$$= \frac{x^2 - 9 + 9}{3x-9}$$
$$= \frac{x^2}{3x-9}$$

Yanıt - Answer : B

$$11. \frac{x^4 - 2a^2x^3 + a^4x^2}{a^4 - 2a^2x + x^2} = \frac{x^2(x^2 - 2a^2x + a^4)}{a^4 - 2a^2x + x^2}$$
$$= x^2$$

Yanıt - Answer : C

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

Yanıt - Answer : E

$$13. \frac{6a^2 + 13ab + 6b^2}{2a+3b} = \frac{(3a+2b)(2a+3b)}{\cancel{2a+3b}}$$
$$= 3a + 2b$$

Yanıt - Answer : D

$$14. \frac{a^6 + 64}{a^2 + 4} = \frac{(a^2)^3 + 4^3}{a^2 + 4}$$
$$= \frac{(\cancel{a^2+4})(a^4 - 4a^2 + 16)}{\cancel{a^2+4}}$$
$$= a^4 - 4a^2 + 16$$

Yanıt - Answer : A

$$15. \left(\frac{x-y}{x} + \frac{y-x}{y} \right) : \frac{x-y}{xy} = \frac{xy-y^2+xy-x^2}{\cancel{xy}} \cdot \frac{\cancel{xy}}{x-y}$$
$$= \frac{-x^2 + 2xy - y^2}{x-y}$$
$$= \frac{-(x^2 - 2xy + y^2)}{x-y}$$
$$= \frac{-(x-y)^2}{x-y} = -(x-y)$$
$$= y-x$$

Yanıt - Answer : E

$$16. \frac{a \cdot (a-2) - a + 2}{a-1} = \frac{a \cdot (a-2) - (a-2)}{a-1}$$
$$= \frac{(a-2) \cdot (\cancel{a-1})}{(\cancel{a-1})}$$
$$= a-2$$

Yanıt - Answer : B



17. $a - b = 7$

$$a + c = 14$$

$$\begin{aligned} a^2 - bc - ab + ac &= a^2 - ab + ac - bc \\ &= a \cdot (a - b) + c \cdot (a - b) \\ &= (a - b)(a + c) \\ &= 7 \cdot 14 \\ &= 98 \end{aligned}$$

Yanıt - Answer : D

18. $\left[\frac{a}{b} - \left(2 - \frac{b}{a} \right) \right] : \frac{a-b}{ab} = \left(\frac{a}{b} - 2 + \frac{b}{a} \right) \cdot \frac{ab}{a-b}$

$$\begin{aligned} &= \frac{a^2 - 2ab + b^2}{ab} \cdot \frac{ab}{a-b} \\ &= \frac{(a-b)^2}{a-b} \\ &= a - b \end{aligned}$$

Yanıt - Answer : E

19. $x^2 - 3x - 5 = 0$

$$\begin{aligned} \frac{x^3 + 27}{2x + 6} &= \frac{x^3 + 3^3}{2 \cdot (x + 3)} \\ &= \frac{(x+3)(x^2 - 3x + 9)}{2 \cdot (x+3)} \\ &= \frac{x^2 - 3x + 9}{2} \\ &= \frac{x^2 - 3x - 5 + 14}{2} = \frac{0 + 14}{2} = 7 \end{aligned}$$

Yanıt - Answer : C

20. $\frac{8 \cdot (x^2 - 4) \cdot (x + 2)}{[(x + 2)(x - 1)]^2 - [(x - 3)(x + 2)]^2}$

$$\begin{aligned} &= \frac{8 \cdot (x^2 - 4) \cdot (x + 2)}{(x + 2)^2 [(x - 1)^2 - (x - 3)^2]} \\ &= \frac{8 \cdot (x^2 - 4) \cdot (x + 2)}{(x + 2)^2 [(x - 1 - x + 3)(x - 1 + x - 3)]} \\ &= \frac{8 \cdot (x - 2) \cdot (x + 2) \cdot (x + 2)}{(x + 2)^2 [2 \cdot (2x - 4)]} \\ &= \frac{8 \cdot (x - 2)}{2 \cdot 2 \cdot (x - 2)} = 2 \end{aligned}$$

Yanıt - Answer : B

21. $\left(a - \frac{1}{a} \right)^2 = 4^2$

$$\begin{aligned} a^2 - 2 \cdot a \cdot \frac{1}{a} + \frac{1}{a^2} &= 16 \\ a^2 + \frac{1}{a^2} &= 16 + 2 \\ a^2 + \frac{1}{a^2} &= 18 \end{aligned}$$

Yanıt - Answer : A



22. $x = \frac{3}{8} \quad y = \frac{11}{16}$

$$\begin{aligned} \frac{x^2 + 2xy + 4y^2}{x^3 - 8y^3} &= \frac{x^2 + 2xy + 4y^2}{x^3 - (2y)^3} \\ &= \frac{\cancel{x^2 + 2xy + 4y^2}}{(x-2y)(\cancel{x^2 + 2xy + 4y^2})} = \frac{1}{x-2y} \\ &= \frac{1}{\frac{3}{8} - 2 \cdot \frac{11}{16}} \\ &= \frac{1}{-\frac{8}{8}} = \frac{1}{-1} = -1 \end{aligned}$$

Yanıt - Answer : B

23. $\frac{a^3 - ab^2 + b^2 - a^2}{a^3 - a^2b - 2a^2 + 2ab + a - b}$

$$\begin{aligned} &= \frac{a(a^2 - b^2) - (a^2 - b^2)}{a^2(a-b) - 2a(a-b) + (a-b)} \\ &= \frac{(a^2 - b^2)(a-1)}{(a-b)(a^2 - 2a + 1)} = \frac{(a-b)(a+b)(a-1)}{(a-b)(a-1)^2} \\ &= \frac{a+b}{a-1} \end{aligned}$$

Yanıt - Answer : E

24. $x^2 - y^2 = (x-y)(x+y)$

$$\begin{aligned} 5003^2 - 4997^2 &= (5003 - 4997)(5003 + 4997) \\ &= 6 \cdot 10000 \\ &= 6 \cdot 10^4 \end{aligned}$$

Yanıt - Answer : C

25. $\frac{(3+5a)^2 - (a+3)^2}{a^3 - a} =$

$$\begin{aligned} &= \frac{(\cancel{3}+5a-a-\cancel{3})(3+5a+a+3)}{a(a^2-1)} \\ &= \frac{4a(6a+6)}{a(a^2-1)} = \frac{4 \cdot \cancel{a} \cdot 6 \cdot (\cancel{a+1})}{\cancel{a}(a-1)(\cancel{a+1})} \\ &= \frac{24}{a-1} \end{aligned}$$

Yanıt - Answer : A

26. $(99)^2 - 4 = (99)^2 - 2^2$

$$\begin{aligned} &= (99-2)(99+2) \\ &= 97 \cdot 101 \\ &= 9797 \end{aligned}$$

Yanıt - Answer : D

27. $(3x-1)^2 = 9x^2 + 13$

$$\begin{aligned} \cancel{9x^2} - 6x + 1 &= \cancel{9x^2} + 13 \\ -6x &= 12 \\ x &= -2 \end{aligned}$$

Yanıt - Answer : D

28. $x^3 + 2 = 3x^2 \Rightarrow \frac{x^3}{x^2} + \frac{2}{x^2} = \frac{3x^2}{x^2}$

$$\begin{aligned} x + \frac{2}{x^2} &= 3 \\ 3x + \frac{6}{x^2} &= 3 \left(x + \frac{2}{x^2} \right) = 3 \cdot 3 = 9 \end{aligned}$$

Yanıt - Answer : B



29. $x^2 + y^2 - 2xy - 4 = 0$

$$(x-y)^2 = 4 \Rightarrow |x-y| = 2$$

Yanıt - Answer : D

30.
$$\frac{(1,75)^2 - (1,25)^2}{(2,25)^2 - (1,75)^2}$$

$$= \frac{(1,75+1,25) \cdot (1,75-1,25)}{(2,25+1,75) \cdot (2,25-1,75)}$$

$$= \frac{3 \cdot (0,5)}{4 \cdot (0,5)} = \frac{3}{4}$$

Yanıt - Answer : A

31.
$$\frac{(x^2 - 2x + 4) \cdot (x^2 - 4)}{x^3 + 8}$$

$$= \frac{(x^2 - 2x + 4) \cdot (x-2) \cdot (x+2)}{(x+2) \cdot (x^2 - 2x + 4)} = x-2$$

Yanıt - Answer : C

32.
$$(cd-1)^2 - (c-d)^2 =$$

$$= (c^2d^2 - 2cd + 1) - (c^2 - 2cd + d^2)$$

$$= c^2d^2 - c^2 - d^2 + 1$$

$$= c^2(d^2 - 1) - (d^2 - 1)$$

$$= (d^2 - 1) \cdot (c^2 - 1)$$

$$\frac{(d^2-1) \cdot (c^2-1)}{(d^2-1) \cdot (c-1)} = \frac{(c-1) \cdot (c+1)}{(c-1)} = 5$$

$$c+1=5 \Rightarrow c=4$$

Yanıt - Answer : C

33.
$$\frac{x^2 - x - 12}{x^2 - x - 6} \cdot \frac{x^2 + x - 12}{x^2 + x - 6}$$

$$= \frac{(x-4)(x+3)}{(x-3)(x+2)} \cdot \frac{(x+4)(x-3)}{(x+3)(x-2)}$$

$$= \frac{(x-4)(x+4)}{(x+2)(x-2)} = \frac{x^2 - 16}{x^2 - 4}$$

Yanıt - Answer : C

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

$$\left(x + \frac{1}{6x}\right)^2 = (3)^2$$

$$x^2 + \frac{1}{3} + \frac{1}{36x^2} = 9$$

$$x^2 + \frac{1}{36x^2} = 9 - \frac{1}{3}$$

$$x^2 + \frac{1}{36x^2} = \frac{26}{3}$$

$$\left(x - \frac{1}{6x}\right)^2$$

$$= x^2 - \frac{1}{3} + \frac{1}{36x^2}$$

$$= x^2 + \frac{1}{36x^2} - \frac{1}{3}$$

$$\frac{26}{3} - \frac{1}{3} = \frac{25}{3}$$

Yanıt - Answer : B



35. $x - \frac{1}{x} = 3$

$$\left(x - \frac{1}{x}\right)^2 = (3)^2$$

$$x^2 + \frac{1}{x^2} - 2 = 9$$

$$x^2 + \frac{1}{x^2} = 11$$

$$3x^2 + \frac{3}{x^2} = 3\left(x^2 + \frac{1}{x^2}\right) = 33$$

Yanıt - Answer : C

36. $(0,75)^2 - (0,75) \cdot (0,5) - (0,25)^2 = ?$

$$0,25 = t \quad 0,5 = 2t \Rightarrow 0,75 = 3t$$

$$= (3t)^2 - (3t) \cdot (2t) - (t)^2$$

$$= 9t^2 - 6t^2 - t^2 = 2t^2$$

$$\Rightarrow 2 \cdot (0,25)^2 = 2 \cdot (0,0625) = 0,125$$

Yanıt - Answer : A

37.
$$\frac{2^{24} \cdot (3^{44} - 3^{22})}{6^{22} \cdot (3^{11} + 1) \cdot (3^{11} - 1)}$$

$$= \frac{2^2 \cdot \cancel{2^{22}} \cdot \cancel{3^{22}} \cdot (3^{22} - 1)}{\cancel{3^{22}} \cdot \cancel{2^{22}} \cdot (3^{22} - 1)} = 4$$

Yanıt - Answer : C

38. $(a+b)^2 - 4ab = a^2 + 2ab + b^2 - 4ab$

$$= a^2 - 2ab + b^2$$

$$= (a-b)^2$$

$$(9,2 + 4,2)^2 - 4 \cdot (9,2) \cdot (4,2)$$

$$= (9,2 - 4,2)^2 = 5^2 = 25$$

Yanıt - Answer : D

39.
$$\frac{5(a+3)^2 - 10a(a+3) + 5a^2}{5}$$

$$= \frac{\cancel{5}((a+3)^2 - 2a(a+3) + a^2)}{\cancel{5}}$$

$$= (\cancel{a} + 3 - \cancel{a})^2$$

$$= 9$$

Yanıt - Answer : D

40.
$$\frac{a^3 - b^3}{(a+b)^2 - ab} = \frac{(a-b)(a^2 + ab + b^2)}{a^2 + 2ab + b^2 - ab}$$

$$= \frac{(a-b) \cdot \cancel{(a^2 + ab + b^2)}}{\cancel{(a^2 + ab + b^2)}} = a - b$$

Yanıt - Answer : A



$$41. \quad x^3 + y^3 = (x + y)^3 - 3xy(x + y) \\ = (6)^3 - 3 \cdot 8(6) = 216 - 144 = 72$$

Yanıt – Answer : C

$$42. \quad \left(\frac{1}{3}x - \frac{3}{4}\right)^2 = \left(\frac{1}{3}x\right)^2 + 2 \cdot \left(\frac{1}{3}x\right) \cdot \left(-\frac{3}{4}\right) + \left(-\frac{3}{4}\right)^2 \\ = \frac{x^2}{9} - \frac{x}{2} + \frac{9}{16}$$

Yanıt – Answer : A

$$43. \quad a + b = \frac{1}{6}$$

$$\frac{(a-b)^2 + ab}{3a^3 + 3b^3} = \frac{a^2 - 2ab + b^2 + ab}{3(a^3 + b^3)} \\ = \frac{a^2 - ab + b^2}{3(a+b) \cdot (a^2 - ab + b^2)} \\ = \frac{1}{3(a+b)} = \frac{6}{3} = 2$$

Yanıt – Answer : B

$$44. \quad \begin{array}{ccccccc} & & & & 1 & & \\ & & & & 1 & & 1 \\ & & & 1 & 2 & 1 & \\ & & 1 & 3 & 3 & 1 & \\ & 1 & 4 & 6 & 4 & 1 & \\ 1 & 5 & 10 & 10 & 5 & 1 & \end{array}$$

$$(x-y)^5 = x^5 - 5x^4y + 10x^3y^2 - 10x^2y^3 + 5xy^4 - y^5$$

$$\left(x - \frac{2}{x}\right)^5 = x^5 - 5x^4 \cdot \frac{2}{x} + 10x^3 \cdot \left(\frac{2}{x}\right)^2 - 10x^2 \cdot \left(\frac{2}{x}\right)^3 \\ + 5x \cdot \left(\frac{2}{x}\right)^4 - \left(\frac{2}{x}\right)^5$$

$$= x^5 - 10x^3 + \frac{40}{C}x - 80x^{-1} + 80x^{-3} + 32 \cdot x^{-5}$$

$$C = 40$$

Yanıt – Answer : D

$$45. \quad \frac{x^2 + 5x + 6}{x^3 + x^2 - 2x} \cdot \frac{x^3 - x}{x^2 + 6x + 5} \\ = \frac{(x+2)(x+3)}{x(x^2 + x - 2)} \cdot \frac{x(x^2 - 1)}{(x+1)(x+5)} \\ = \frac{(x+2) \cdot (x+3) \cdot \cancel{x} \cdot \cancel{(x-1)} \cdot (x+1)}{\cancel{x} \cdot \cancel{(x+2)} \cdot \cancel{(x-1)} \cdot \cancel{(x+1)} \cdot (x+5)} \\ = \frac{x+3}{x+5}$$

Yanıt – Answer : E

10. BÖLÜM

POLİNOMLAR







1. $P(x) = x^{\frac{9}{n-2}} + x^{n-5} - x^{n-6} + 3$

$d[P(x)] = ?$

- A) 11 B) 9 C) 6 D) 5 E) 3

2. $P(x) = x^{n-7} - 3x^{11-n} + 14$

$\max(d[P(x)]) = ?$

- A) 11 B) 9 C) 7 D) 4 E) 2

3. $P(x) = x^{\frac{5}{n-2}} + 5x^{n-1} - x^3 + 8$

$\max(d[P(x)]) = ?$

- A) 7 B) 6 C) 5 D) 4 E) 3

4. $d[P(x) \cdot Q(x)] = 8$

$d\left[\frac{P(x^3)}{Q(x)}\right] = 16$

$d[Q(x)] = ?$

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

5. $d[P(x^2) \cdot Q^3(x)] = 21$

$d\left[\frac{P^3(x)}{Q(x)}\right] = 4$

$d[Q(x)] = ?$

- A) 7 B) 6 C) 5 D) 4 E) 3

6. $d[P(x) + Q(x)] = 6$

$d[P(x^2) \cdot Q^3(x)] = 22$

$d[Q(x)] = ?$

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

7. $P(x) = 3x^3 - 3x^2 + 5$

$Q(x) = x^2 + 5x - 7$

$P(x) + Q(x) = ?$

- A) $3x^3 - x^2 + 5x + 2$ B) $3x^3 + 3x^2 + 5x - 12$
C) $3x^3 - 4x^2 - 5x - 2$ D) $3x^3 - 2x^2 - 12$
E) $3x^3 - 2x^2 + 5x - 2$

8. $P(x) = 3x - 2$

$Q(x) = x^2 + 1$

$x^2 \cdot P(x) + 2 \cdot Q(x) = ?$

- A) $3x^3 - 4x^2 + 2$ B) $3x^3 - 2x^2 + 2x + 2$
C) $3x^3 + 2$ D) $3x^3 + 4x^2 + 2$
E) $3x^3 + 2x^2 + 2x + 2$



9. $P(x) = 3x - 5$

$Q(x) = x - 4$

$(4x - 1) \cdot P(x) - 12x \cdot Q(x) = ?$

- A) $20x - 5$ B) $16x^2 - 20x + 5$
C) $20x^2 - 16x - 5$ D) $25x + 5$
E) $25x - 5$

10. $P(x) = x^2 - 10x + 16$

$P(x + 2) = ?$

- A) $x^2 - 6x$ B) $x^2 - 8x$ C) $x^2 - 8x - 10$
D) $x^2 - 4x$ E) $x^2 + 8x$

11. $P(x^2 - 1) = (x^2 - 1)^2 - 4x^2 + 8$

$P(x + 2) = ?$

- A) $x^2 + 1$ B) $x^2 - 4x - 9$ C) $x^2 - 6x + 9$
D) x^2 E) $x^2 - 16$

12. $P(2\sqrt{x}) = 5x - 7$

$P(8) = ?$

- A) 73 B) 71 C) 69 D) 55 E) 48

13. $P(\sqrt[8]{x}) = 3\sqrt[4]{x} - 2\sqrt[8]{x} - 5$

$P(x - 1) = ?$

- A) $3x^2 - 8x + 2$ B) $3x^2 + 8x - 5$
C) $3x^2 + 6x + 3$ D) $3x^2 - 8x$
E) $3x^2 + 8x$

14. $P(x^2 - 1) = 3(x^2 - 1)^2 + 6x^2 - 11$

$P(-3) = ?$

- A) -24 B) -9 C) -4 D) 4 E) 9

15. $P(x^2 - 6x + 9) = -3x^2 + 18x - 13$

$P(x - 3) = ?$

- A) $3x^2 - 14$ B) $-3x^2 - 17$ C) $-3x + 49$
D) $5x^2 - 3x - 14$ E) $-3x + 23$



1. $P(x+3) = 3x^2 - 28$

$P(x-3) = ?$

- A) $3x^2 - 24x + 76$ B) $3x^2 + 24x + 20$
C) $3x^2 - 28x + 28$ D) $3x^2 - 36x + 80$
E) $3x^2 - 24x + 48$

2. $P(3x+1) = 6x - 4$

$P(x-2) = ?$

- A) $2x - 12$ B) $3x + 12$ C) $2x - 10$
D) $2x + 10$ E) $3x + 10$

3. $P(x) = x^2 + 3x + 5$

$Q(x) = x - 4$

$P[Q(3)] + Q[P(-2)] = ?$

- A) 12 B) 9 C) 7 D) 5 E) 2

4. $P(x-3) = 2x^3 + 8x^2 - 3x + 2m - 1$

$P(-2) = 10$

$m = ?$

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

5. $P(3x) = 9x^2 + 6x - 3m + 5$

$P(-2) = 14$

$m = ?$

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

6. $P(x) = 5x^3 - 3x^2 + a - 2$

$Q(x) = (m+1)x^4 - (n-2)x^3 - 3x^2 + (t+2)x - 6$

$P(x) = Q(x)$

$m.n+a.t = ?$

- A) 15 B) 14 C) 11 D) 9 E) 7

7. $\frac{Q(x+3)+2}{P(x-4)} = x^2 + 5x - 7$

$Q(5) = 12$

$P(-2) = ?$

- A) 7 B) 5 C) 3 D) 2 E) 1

8. $P(3x-2) = (x^2 - 4) \cdot Q(x+1) + 2x - 1$

$P(-11) = 23$

$Q(-2) = ?$

- A) 30 B) 24 C) 18 D) 12 E) 6



9. $x.P(x+1) = 2x^3 - 2x^2 + 3x + a - 2$

$P(3) = ?$

- A) 10 B) 9 C) 8 D) 7 E) 6

10. $P(x) = 3x + 15$ $Q(x) = x^2 - (m+1)x + n$

$P(x) + Q(x) = x^2 - 5x + 9$

$m.n = ?$

- A) -54 B) -42 C) -36 D) 42 E) 54

11. $(x-2).P(x+2) = 3x^4 - (m+1)x^2 - mx - 2$

$P(1) = ?$

- A) -7 B) -3 C) 0 D) 3 E) 7

12. $P(x+2) = 3x^2 + 2mx + n$

$P(1) = 3$

$P(0) = -2$

$m+n = ?$

- A) 13 B) 15 C) 17 D) 19 E) 21

13. $\frac{P(x)}{2x-1} = (x-2).Q(x-4)$

$Q(-1) = 4$

$P(3) = ?$

- A) 24 B) 20 C) 15 D) 10 E) 5

14. $\frac{3x+1}{x^2-x-6} = \frac{A}{x-3} + \frac{B}{x+2}$

$A.B = ?$

- A) $\frac{20}{9}$ B) 2 C) 1 D) $\frac{8}{9}$ E) -1

15. $P(x) = 3x + m$

$(x-3).P(x) = 3x^2 - 7x + n$

$m.n = ?$

- A) -12 B) -8 C) 6 D) 8 E) 12



1. $P(x) = 5x - 2$

$$Q(x) = 3 - x$$

$$x^2 \cdot P(x) - x \cdot Q(x) = ?$$

A) $5x^3 - 3x^2 - 3x$

B) $5x^3 - 2x^2 - 3x$

C) $5x^3 - x^2 - 3x$

D) $5x^3 + x^2 - 3x$

E) $5x^3 + 2x^2 + 3x$

2. $P(x) = x^3 - 3x^2 - 5x + 2$

$$Q(x) = 2x^2 - x - 8$$

$$P[Q(-2)] = ?$$

A) -16

B) -10

C) -12

D) 10

E) 12

3. $P(x^4) = 3x^{12} - x^8 + 2x^4 - 1$

$$Q(\sqrt{x}) = 2x - 1$$

$$Q[P(1)] - P[Q(1)] = ?$$

A) 15

B) 14

C) 13

D) 11

E) 10

4. $d[p(x^2) \cdot Q^2(x)] = 16$

$$d\left[\frac{P^3(x)}{Q(x^3)}\right] = 6$$

$$d[P(x) + (Q(x))] = ?$$

A) 13

B) 11

C) 9

D) 7

E) 5

5. $d[P(x) \cdot Q(x)] = 8$

$$d[P^4(x)] = 24$$

$$d[Q(x^2)] = ?$$

A) 10

B) 6

C) 8

D) 4

E) 2

6. $P(x+1) - P(x) = x^2 + x$

$$P(5) - P(1) = ?$$

A) 40

B) 36

C) 28

D) 24

E) 20

7. $P(x) + P(x+1) = 3 - 6x$

$$P(2) = ?$$

A) -14

B) -7

C) -3

D) 7

E) 14

8. $P(x+1) = x \cdot P(x+2) + x^2 - 4x - 8$

$$P(3) = 18$$

$$P(2) = ?$$

A) 10

B) 9

C) 8

D) 7

E) 6



9. $P(x-2) = x^3 - 8x - 4$

$$\begin{array}{r} P(x) \mid x+2 \\ \hline \end{array}$$

$m = ?$

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

10. $P(x+2) + P(x-2) = 10x - 16$

$P(x) = ?$

- A) $5x - 8$ B) $10x - 6$ C) $10x + 6$
D) $5x + 8$ E) $10x + 16$

11. $P(x) = ax^2 + bx + c$

$$\begin{array}{r} P(x) \mid x-1 \\ \hline 0 \end{array}, \quad \begin{array}{r} P(x) \mid x+2 \\ \hline 0 \end{array}$$

$\frac{b}{a} = ?$

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

12. $a, b \in \mathbb{R}$

$$9x^2 - 12x + b = (3x - a)^2$$

$a + b = ?$

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

13. $\frac{Q(x+3)}{P(x-1)} = x^2 - x - 5$

$$\begin{array}{r} Q(x) \mid x-7 \\ \hline 21 \end{array}$$

$$\begin{array}{r} P(x) \mid x-3 \\ \hline m \end{array}$$

$m = ?$

- A) 14 B) 9 C) 7 D) 6 E) 3

14. $(x-3) \cdot P(x) = x^3 - 8x + 5 - a$

$$\begin{array}{r} P(x+1) \mid x-1 \\ \hline m \end{array}$$

$m = ?$

- A) 15 B) 14 C) 13 D) 12 E) 11

15. $\frac{P(x)}{3x+5} \mid (x-2)^4$

$$\begin{array}{r} P(x) \mid x-2 \\ \hline n \end{array}$$

$n = ?$

- A) 15 B) 14 C) 13 D) 12 E) 11



1. $P(x) = x^3 + 3x^2 + x$, $Q(x) = 5x^2 + bx + 1$

$$P(x) + Q(x) = x^3 + 8x^2 + 5x + 1$$

$$b = ?$$

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

(YÖS - 1983)

4. $P(x) = ax^2 + bx + c$

$$P(1) = 0$$

$$P(2) = 0$$

$$\frac{b}{a} = ?$$

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

(YÖS - 1986)

2. $P(x) = x + 1$, $Q(x) = x^2 + x$

$$P(x) + Q(x) = ?$$

A) $x^2 - 2x$

B) $x^2 + 2x$

C) $(x-1)(x+1)$

D) $(x+1)^2$

E) $(x-1)^2$

(YÖS - 1983)

5. $x^3 + ax^2 + bx + c = (x+2) \cdot (x-3) \cdot (x-1)$

$$\frac{c}{a} = ?$$

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

(YÖS - 1988)

3. $P(x) = x^2 + 5x - 3$, $Q(x) = x + 1$

$$P[Q(-1)] + Q[P(2)] = ?$$

- A) 14 B) 11 C) 9 D) -6 E) -4

(YÖS - 1985)

6. $a, b \in \mathbb{R}$

$$4x^2 - 5x + b = (2x - a)^2$$

$$a + b = ?$$

- A) $\frac{5}{4}$ B) $\frac{25}{8}$ C) $\frac{25}{16}$ D) $\frac{35}{8}$ E) $\frac{45}{16}$

(YÖS - 1989)



7.
$$\begin{array}{r} 3x^3 - 2mx^2 - nx - 2 \\ \underline{\hspace{1.5cm}} \\ 0 \end{array} \quad \begin{array}{l} x^2 - x - 2 \\ Q(x) \end{array}$$

$$8m - n = ?$$

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

(YÖS - 1999)

8. $a \in \mathbb{N}$

$$\begin{array}{r} 5x^2 + 14x - 1 \\ \underline{\hspace{1.5cm}} \\ 2 \end{array} \quad \begin{array}{l} x + a \end{array}$$

$$a = ?$$

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

(YÖS - 2005)

9. $P(x) = (x+1)(x^2 + cx) + x - 6$

$$Q(x) = x^3 - ax^2 + 4x + b$$

$$P(x) = Q(x)$$

$$a + b + c = ?$$

- A) -8 B) -7 C) -6 D) 6 E) 7

(YÖS - 2007)

10. $P(x+1) = x^2 - 2x + 1$

$$P\left(\frac{2x-1}{2}\right) = ?$$

A) $x^2 - 5x + \frac{25}{4}$

B) $x^2 - 2x - \frac{1}{2}$

C) $x^2 + 3x - \frac{5}{4}$

D) $x^2 + 2x + \frac{1}{4}$

E) $x^2 - 4x + \frac{15}{4}$

(YÖS - 2008)

11. $(x^2 + 1)P(x) = ax^3 + (b-2)x + a - 1$

$$a \cdot b = ?$$

- A) -6 B) -4 C) 3 D) 6 E) 8

(YÖS - 2009)



1. $P(x) + Q(x) = x^3 + 3x^2 + x + 5x^2 + bx + 1$
 $= x^3 + 8x^2 + bx + x + 1$
 $= x^3 + 8x^2 + (b+1)x + 1$
 $x^3 + 8x^2 + 5x + 1 = x^3 + 8x^2 + (b+1)x + 1$
 $5 = b+1 \Rightarrow b = 4$

Yanıt – Answer: D

2. $P(x) = x+1$
 $Q(x) = x^2 + x$
 $P(x) + Q(x) = x+1+x^2+x$
 $= x^2 + 2x + 1$
 $= (x+1)^2$

Yanıt – Answer: D

3. $P(x) = x^2 + 5x - 3$, $Q(x) = x+1$
 $Q(-1) = -1+1=0$, $P(2) = 2^2 + 5 \cdot 2 - 3$
 $P(2) = 4 + 10 - 3$
 $P(2) = 11$
 $P[Q(-1)] + Q[P(2)] = P(0) + Q(11)$
 $= 0^2 + 5 \cdot 0 - 3 + 11 + 1$
 $= -3 + 12 = 9$

Yanıt – Answer: C

4. $P(1) = a \cdot 1^2 + b \cdot 1 + c = 0 \Rightarrow -1/a + b + c = 0$
 $P(2) = a \cdot 2^2 + b \cdot 2 + c = 0 \Rightarrow \begin{array}{r} 4a + 2b + c = 0 \\ -a - b - c = 0 \\ + \quad 4a + 2b + c = 0 \\ \hline 3a + b = 0 \\ b = -3a \\ \frac{b}{a} = -3 \end{array}$

Yanıt – Answer: E

5. $x^3 + ax^2 + bx + c = (x+2) \cdot (x-3) \cdot (x-1)$
 $= (x^2 - 3x + 2x - 6)(x-1)$
 $= (x^2 - x - 6)(x-1)$
 $= x^3 - x^2 - x^2 + x - 6x + 6$
 $x^3 + ax^2 + bx + c = x^3 - 2x^2 - 5x + 6$
 $a = -2$, $c = 6$, $\frac{c}{a} = \frac{6}{-2} = -3$

Yanıt – Answer: E

6. $4x^2 - 5x + b = (2x-a)^2$
 $4x^2 - 5x + b = 4x^2 - 4ax + a^2$
 $-5 = -4a$ $b = a^2$
 $a = \frac{5}{4}$ $b = \left(\frac{5}{4}\right)^2$
 $b = \frac{25}{16}$
 $a+b = \frac{5}{4} + \frac{25}{16} = \frac{20}{16} + \frac{25}{16} = \frac{45}{16}$
(4)

Yanıt – Answer: E



$$7. \quad \begin{array}{r|l} 3x^3 - 2mx^2 - nx - 2 & x^2 - x - 2 \\ \hline & Q(x) \\ \hline & 0 \end{array}$$

$$3x^3 - 2mx^2 - nx - 2 = (x-2) \cdot (x+1) \cdot Q(x)$$

$$x_1 = 2 \Rightarrow 3 \cdot (2)^3 - 2 \cdot m \cdot (2)^2 - n \cdot (2) - 2 = 0$$
$$24 - 8m - 2n - 2 = 0$$

$$4m + n = 11 \quad \dots I$$

$$x_2 = -1 \Rightarrow 3 \cdot (-1)^3 - 2 \cdot m \cdot (-1)^2 - n \cdot (-1) - 2 = 0$$
$$-3 - 2m + n - 2 = 0$$

$$n - 2m = 5 \quad \dots II$$

$$\begin{array}{r} 4m + n = 11 \dots I \\ -2/n - 2m = 5 \dots II \\ \hline \end{array}$$

$$\begin{array}{r} 4m + n = 11 \\ -2n + 4m = -10 \\ \hline \end{array}$$

$$8m - n = 1$$

Yanıt – Answer: D

$$8. \quad a \in \mathbb{N}$$

$$\begin{array}{r|l} 5x^2 + 14x - 1 & x + a \\ \hline & 2 \\ \hline \end{array}$$

$$a = ?$$

$$5x^2 + 14x - 1 = (x + a) + 2$$

$$x = -a \Rightarrow 5a^2 - 14a - 1 = 2$$

$$5a^2 - 14a - 3 = 0$$

$$(5a_1 + 1)(a_2 - 3) = 0$$

$$a_1 = -\frac{1}{5} \notin \mathbb{N}$$

$$a_2 = 3$$

Yanıt – Answer: D



$$9. \quad P(x) = (x+1) \cdot (x^2 + cx) + x - 6$$

$$= x^3 + (c+1) \cdot x^2 + (c+1) \cdot x - 6$$

$$= x^3 + (c+1) \cdot x^2 + (c+1)x - 6$$

$$Q(x) = x^3 - ax^2 + 4x + b$$

$$P(x) = Q(x)$$

$$x^3 + (c+1)x^2 + (c+1)x - 6 = x^3 - ax^2 + 4x + b$$

$$c+1 = -a \quad c+1 = 4 \quad -6 = b$$

$$3+1 = -a \quad c = 3$$

$$-4 = a$$

$$a+b+c = (-4) + (-6) + 3$$

$$= -7$$

Yanıt – Answer : B

$$11. \quad (x^2+1) \cdot P(x) = a \cdot \frac{x^2}{-1} \cdot x + (b-2)x + a-1$$

$$\left. \begin{array}{l} x^2+1=0 \\ x^2=-1 \end{array} \right\} \Rightarrow$$

$$(-1+1) \cdot P(x) = -ax + (b-2)x + a-1$$

$$0 = (b-a-2)x + a-1$$

$$a-1=0 \Rightarrow a=1$$

$$b-a-2=0 \Rightarrow b-3=0 \Rightarrow b=3$$

$$a \cdot b = 1 \cdot 3 = 3$$

Yanıt – Answer : C

$$10. \quad P(x+1) = (x-1)^2$$

$$x+1 \rightarrow \frac{2x-1}{2} \Rightarrow x \rightarrow \frac{2x-1}{2} - 1 \Rightarrow x \rightarrow \frac{2x-3}{2}$$

$$P\left(\frac{2x-1}{2}\right) = \left(\frac{2x-3}{2} - 1\right)^2 = \left(\frac{2x-5}{2}\right)^2$$

$$= \left(x - \frac{5}{2}\right)^2$$

$$= x^2 - 5x + \frac{25}{4}$$

Yanıt – Answer : A



11. BÖLÜM

FONKSİYONLAR







1. $f(3x-1) = 6x+2$
 $f(x) = ?$
A) $2x-1$ B) $2x+4$ C) $2x-5$
D) $3x+3$ E) $3x-7$
2. $f\left(\frac{x+2}{x-1}\right) = \frac{3x-1}{2x+1}$
 $f(x) = ?$
A) $\frac{-4x-7}{x-3}$ B) $\frac{x-7}{x+3}$ C) $\frac{4x-7}{x-3}$
D) $\frac{2x+7}{3x+3}$ E) $\frac{2x+1}{3x-1}$
3. $f(x) = \frac{x+1}{x-2}$
 $f[f(3)] = ?$
A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) 1 D) $\frac{5}{2}$ E) 5
4. $f(\sqrt{x}) = \frac{x-3}{3}$ $g(x^3-1) = \frac{x^3+2}{x^3-1}$
 $g(f(x)) = ?$
A) $\frac{x^2-6}{x^2-3}$ B) $\frac{x^2+6}{x^2-3}$ C) $\frac{x^2-6}{x^2+3}$
D) $\frac{x^2+3}{x^2-6}$ E) $\frac{x^2-3}{x^2+3}$
5. $f(x) = 2x+4$ $g(x) = 5x-2$
 $f[g(x)] = ?$
A) $10x-4$ B) $10x-8$ C) $10x+8$
D) $10x$ E) $10x-2$
6. $f(x^2+2) = \frac{4x^2+6}{x^2-2}$
 $f(3) = ?$
A) -10 B) -6 C) 4 D) 6 E) 10
7. $f(x) = \frac{-5x-4}{3x+1}$
 $f^{-1}(x) = ?$
A) $\frac{x+4}{3x+5}$ B) $\frac{-x+4}{3x-5}$ C) $\frac{5x+4}{3x-1}$
D) $\frac{x-4}{3x-5}$ E) $-\frac{x+4}{3x+5}$
8. $f(x) = \frac{5-3x}{2x+1}$
 $f^{-1}(x) = ?$
A) $\frac{-x-5}{2x-3}$ B) $\frac{x+5}{2x-3}$ C) $\frac{-x-2}{2x-3}$
D) $\frac{5-x}{2x+3}$ E) $\frac{5-x}{2x-3}$



9. $f\left(\frac{ax+b}{cx+d}\right) = \frac{cx+d}{ax+b}$

$$f^{-1}\left(\frac{\sqrt{3}}{3}\right) = ?$$

A) $\frac{\sqrt{3}+3}{3}$ B) $\frac{2\sqrt{3}}{3}$ C) $\sqrt{3}$

D) $2\sqrt{3}$ E) $\frac{5\sqrt{3}}{3}$

10. $f: \mathbb{R} - \{3\} \rightarrow \mathbb{R} - \{7\}$

$$x = \frac{3f(x)+5}{f(x)-7}$$

$$f^{-1}(x) = ?$$

A) $\frac{3x+5}{x-7}$ B) $\frac{3x+5}{x+7}$ C) $\frac{3x-5}{x-7}$

D) $\frac{7x-5}{x-3}$ E) $\frac{5-7x}{x-3}$

11. $f\left(\frac{x-3}{2x-4}\right) = x-2$

$$f^{-1}(x) = ?$$

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

D) $\frac{2x-1}{x}$ E) $\frac{2x-2}{x-2}$

12. $f(x) = ax+b$, $f(2x+3) = 4x+9$

$$a+b = ?$$

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

13. $f\left(\frac{x+2}{x-1}\right) = 2x-5$

$$f^{-1}(x) = ?$$

A) $1 - \frac{2}{x+3}$ B) $1 - \frac{6}{x+3}$ C) $1 + \frac{6}{x+3}$

D) $2 - \frac{3}{x+3}$ E) $2 + \frac{3}{x+3}$

14. $f\left(\frac{x-2}{x+3}\right) = 2x-5 \Rightarrow f^{-1}(3) = ?$

A) $\frac{1}{7}$ B) $\frac{2}{7}$ C) $\frac{5}{7}$ D) 1 E) $\frac{8}{7}$

15. $f\left(\frac{2x-1}{4x+3}\right) = x$

$$f^{-1}(f^{-1}(-1)) = ?$$

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



1. $f(x) = ax + b$, $f(1) = 5$, $f^{-1}(9) = 2$
 $f(3) = ?$

- A) 13 B) 12 C) 11 D) 10 E) 9

2. $f(x) = 3x - 2$, $g(x) = 4$
 $(f \circ g)(-2) = ?$

- A) 12 B) 11 C) 10 D) 9 E) 8

3. $f(x) = 3x - 4$, $f(3x + 2) = mx + n$
 $m + n = ?$

- A) 7 B) 9 C) 11 D) 13 E) 15

4. $f(x) = ax + b$
 $g(x) = 3x + 2$
 $(f \circ g)(x) = (g \circ f)(x)$

$a = ?$

- A) $b - 2$ B) $b + 1$ C) $2b - 1$
D) $2b + 2$ E) $b - 1$

5. $(f \circ g)(x) = \frac{2g(x)}{g(x) + 3}$

$f(-2) = ?$

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

6. $f(x) = 2x^3 - 6x^2 + 6x - 2$

$f(x+1) = ?$

- A) x^3 B) $2x^3$ C) $(x+1)^3$
D) $(x-2)^3$ E) $2(x-1)^3$

7. $f(x^2 + 2x) = 3x^2 + 6x - 5$

$f(x) = ?$

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

8. $f(x) = 2x - 4$, $(f \circ g)(x) = -5x + 7$

$g(1) = ?$

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



9. $f(x) = 3x - 4$
 $g(x) = ax + b$
 $(f \circ g)(x) = 8 - 6x$

a.b = ?

- A) -12 B) -8 C) -4 D) 8 E) 12

10. $f(3) = 5$
 $g^{-1}(5) = -2$
 $(f^{-1} \circ g)(-2) = ?$

- A) 11 B) 8 C) 5 D) 3 E) 1

11. $f(x+3) = 2x - m$
 $g(x-2) = x + 5$
 $(f \circ g)(3) = 9$

m = ?

- A) 14 B) 9 C) 7 D) 5 E) 2

12. $a > 0$
 $f(x) = ax + b$ $(f \circ f)(x) = 4x + 15$
 $f\left(\frac{3}{2}\right) = ?$

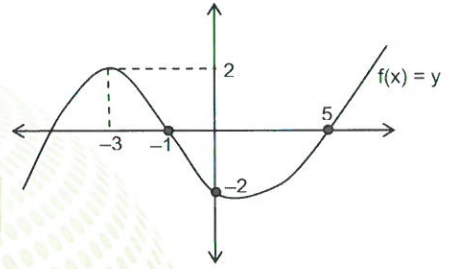
- A) 8 B) 11 C) 12 D) 15 E) 17

13. $f(x) = mx + n$
 $f(2x) + f(2x-1) = 12 - 8x$

m - n = ?

- A) -14 B) -10 C) -8 D) -7 E) -6

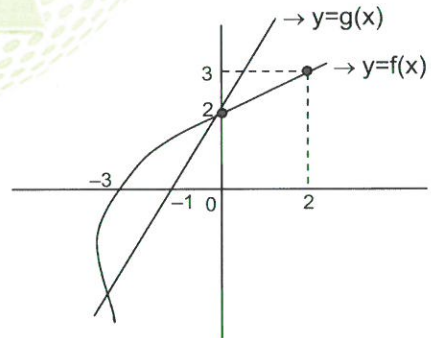
14.



$\frac{f(-3) + f(-1)}{f^{-1}(2) + f^{-1}(-2)} = ?$

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

15.



$\frac{f(2) + f(0) + g(-1)}{f^{-1}(0) + g^{-1}(0)} = ?$

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



1. $f(x) = ax + b$, $f(x-2) = 5x + 4$

$a - b = ?$

- A) -9 B) -4 C) 3 D) 4 E) 9

2. $f\left(\frac{5}{x}\right) = x$

$f^{-1}\left(\frac{1}{5}\right) = ?$

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

3. $(f \circ g)(x) = 2x - 5$

$g(-2) = 3$

$f^{-1}(-9) + f(3) = ?$

- A) -12 B) -9 C) -6 D) 9 E) 12

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

$f^{-1}(-1) = ?$

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

5. $f(x) = 3x - 8$, $g(x) = 5x + 2$

$f(g(0)) = ?$

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

6. $f(x) = x$

$g(x) = 3x$

$h(x) = -2x$

$(f \circ g \circ h)(x) = m \cdot h(x)$

$m = ?$

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

7. $f: \mathbb{R} - \left\{\frac{1}{3}\right\} \rightarrow \mathbb{R} - \left\{\frac{1}{3}\right\}$

$f(x) = \frac{3-x}{1-3x}$

$(f \circ f)(x) = ?$

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

8. $f(x-2) = 5x + 9$

$f^{-1}(a) = -4$

$a = ?$

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



9. $f(x) = \frac{x+3-3 \cdot f(x)}{2x-3}$

$f^{-1}(2) = ?$

- A) 1 B) 3 C) 6 D) 8 E) 11

10. $f(x) = 3x - 2$

$(g \circ f)(x) = 6x - 1$

$g(2) = ?$

- A) 15 B) 11 C) 7 D) 4 E) 1

11. $f\left(\frac{2x+3}{x-3}\right) = 2x - 7$

$f^{-1}(-3) = ?$

- A) -9 B) -7 C) 0 D) 7 E) 9

12. $a > 0$

$f(x) = ax + b$

$f(x) = f^{-1}(x) + 6$

$f(3) = ?$

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

13. $(g \circ f)(x) = 3x^2 + 9x - 5$

$f(x) = x^2 + 3x + 2$

$g^{-1}(10) = ?$

- A) 13 B) 11 C) 9 D) 7 E) 5

14. $f(x) = 2^{x+3}$

$g(x) = x - 2$

$(f \circ g)(x) = f[g(x)] = ?$

A) $\frac{f^2(x)}{2}$ B) $\frac{f(x)}{4}$ C) $\frac{f^2(x)}{4}$

D) $4f^2(x)$ E) $8f(x)$

15. $f(x) = \begin{cases} x-3 & x > 2 \\ 2x+5 & x \leq 2 \end{cases}$

$f(f(f(0))) = ?$

- A) 11 B) 10 C) 9 D) 8 E) 7



1. $f(x) = 3x - 5$, $g(x) = 3x + 5$

$(f \circ g)(x) = f(g(x)) = ?$

A) $6x - 10$ B) $3x$ C) $9x^2 - 25$

D) $6x$ E) $9x + 10$

(YÖS - 1981)

2. $g(x) = 2x - 1$ $(g \circ f)(x) = 2x + 1$

$f(x) = ?$

A) $x + 1$ B) $x - 1$ C) $x + 2$

D) $x - 2$ E) $2x + 2$

(YÖS - 1983)

3. $f(x) = 2x^2$ $g(x) = x + 7$

$(f \circ g)(-4) = f(g(-4)) = ?$

A) 9 B) 18 C) 21 D) 36 E) 96

(YÖS - 1983)

4. $f(x) = 3x + 1$ $g(x) = x^2 - 1$

$(f \circ g)(x) = ?$

A) $3x^2 + 1$ B) $3x^2 - 2$ C) $2x^2 - 2$

D) $2x^2 + 1$ E) $x^2 + 3$

(YÖS - 1984)

5. $a \neq b$

$f(x) = x + 1$ $g(x) = x^2 - 1$

$(g \circ f)(a) = (g \circ f)(b) = 35$

$a + b = ?$

A) 7 B) 5 C) 2 D) -2 E) -5

(YÖS - 1984)

6. $xy - 2x - 3y + 5 = 0$

$y = f(x) = ?$

A) $\frac{-2x-5}{x+3}$ B) $\frac{-2x-5}{x-3}$ C) $\frac{2x+5}{x+3}$

D) $\frac{-2x+5}{x+3}$ E) $\frac{2x-5}{x-3}$

(YÖS - 1984)

7. $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = \frac{(x-3)^3}{4}$

$f^{-1}(0) = ?$

A) 0 B) 1 C) 3 D) 4 E) 9

(YÖS - 1986)

8. $f(x) = \frac{2x}{x+1}$

$f^{-1}(3) = ?$

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

(YÖS - 1987)



9. $f(x) = \frac{3x-2}{x+1}$

$f^{-1}(x) = ?$

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

(YÖS - 1988)

10. $f(x) = x-1$, $g(x) = 2x+x^2$

$(g \circ f)(x) = ?$

- A) $(x+1)^2$ B) $(x-1)^2$ C) x^2+1
D) x^2-1 E) x^2+2x-1

(YÖS - 1988)

11. $g(x) = 2x+1$, $(g \circ f)(x) = x-1$

$f(4) = ?$

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

(YÖS - 1988)

12. $f(x) = \begin{cases} x^2+2 & x < 3 \\ 2x-1 & x \geq 3 \end{cases}$

$f(f(2)) = ?$

- A) 9 B) 10 C) 11 D) 12 E) 13

(YÖS - 1989)

13. $f(x) = ax-1$, $g(x) = x^2-1$
 $h(x) = \frac{x}{2}+1$, $(f \circ g \circ h)(2) = 14$

$a = ?$

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

(YÖS - 1989)

14. $f(x) = \frac{x\sqrt{2}-3}{\sqrt{3}}$

$f^{-1}(x) = ?$

- A) $\frac{x\sqrt{3}+3}{\sqrt{2}}$ B) $\frac{x\sqrt{2}-\sqrt{3}}{\sqrt{2}}$ C) $\frac{3-x\sqrt{3}}{\sqrt{2}}$
D) $\frac{2-x\sqrt{3}}{\sqrt{2}}$ E) $\frac{3-x\sqrt{2}}{\sqrt{3}}$

(YÖS - 1989)

15. $f(x) = \frac{x\sqrt{3}-a}{a}$, $f^{-1}(x) = x+1$

$a = ?$

- A) -3 B) $-\sqrt{3}$ C) 0 D) $\sqrt{3}$ E) 3

(YÖS - 1990)

16. $f\left(\frac{x-1}{2}\right) = 2x-2$

$f(x) = ?$

- A) $4x-4$ B) $4x+4$ C) $4x$
D) $2x-1$ E) $2x-3$

(YÖS - 1991)



17. $g(x) = 2x - 2$, $(g \circ f)(x) = 2x - 4$

$f(x) = ?$

- A) $x - 1$ B) $-x - 1$ C) $x + 1$
D) $2x - 1$ E) $2x + 1$

(YÖS - 1991)

18. $f(x) = 2x + 1$, $g(x) = x^2 - a$

$(f \circ g)(x) = 2x^2 - 3$

$a = ?$

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

(YÖS - 1993)

19. $f(x) = mx^2 + nx + r$, $g(x) = 4x + 3$

$(g \circ f)(x) = 4x^2 + 16x + 11$

$m \cdot n \cdot r = ?$

- A) 2 B) 4 C) 6 D) 7 E) 8

(YÖS - 1994)

20. $f: \mathbb{R} \rightarrow \mathbb{R}$, $g: \mathbb{R} \rightarrow \mathbb{R}$

$f(x) = 8x + 6$, $g(x) = 4x - 2$

$(f^{-1} \circ g)^{-1}(1) = ?$

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

(YÖS - 1995)

21. $f(x) = 2x - 1$, $(g \circ f)(x) = 2x - 3$

$g(3) = ?$

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

(YÖS - 1997)

22. $f: \mathbb{R} \rightarrow \mathbb{R}$

$f(x) = 2x - 5$, $(g \circ f)(x) = 4x + 1$

$g(x) = ?$

- A) $3x - 8$ B) $3x + 11$ C) $2x - 11$
D) $2x + 8$ E) $2x + 11$

(YÖS - 1998)

23. $f: \mathbb{R} - \left\{ \frac{1}{2} \right\} \rightarrow \mathbb{R} - \left\{ \frac{1}{2} \right\}$

$f(x) = \frac{2-x}{1-2x}$

$(f \circ f)(x) = ?$

- A) $\frac{3x-1}{6x-3}$ B) $\frac{x-2}{10x-5}$ C) $\frac{x-1}{2x-1}$
D) $\frac{2x}{3}$ E) x

(YÖS - 1999)

24. $f: \mathbb{R} \rightarrow \mathbb{R}$, $g: \mathbb{R} \rightarrow \mathbb{R}$

$f(x) = 4x - 5$, $g(x) = 3x + 2$

$f(g(0)) = ?$

- A) 0 B) 1 C) 2 D) 3 E) 5

(YÖS - 2000)



25. $f(x) = x$
 $g(x) = 2x$
 $h(x) = 3x$
 $(f \circ g \circ h)(x) = k \cdot h(x)$

$k = ?$

- A) 1 B) 2 C) 3 D) 5 E) 6

(YÖS – 2001)

26. $f: \mathbb{R} \rightarrow \mathbb{R}^+$

$f(x) = 3^x$

$f^{-1}(81) = ?$

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

(YÖS – 2002)

27. $f: \mathbb{R} - \left\{ \frac{1}{5} \right\} \rightarrow \mathbb{R}$

$f(x) = \frac{5-x}{1-5x}$

$(f \circ f)(x) = ?$

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

(YÖS – 2002)

28. $f: \mathbb{R} \rightarrow \mathbb{R}^+$

$$f(x) = \begin{cases} x+1 & x < -2 \\ x^2 + 4x & -2 \leq x < 3 \\ 2x+3 & 3 \leq x \end{cases}$$

$f(-4) + f(2) + f(5) = ?$

- A) 24 B) 22 C) 20 D) 18 E) 16

(YÖS – 2002)

29. $f(x) = e^{x+2}$

$f(2x+2) = ?$

A) $[f(x)]^2$ B) $[f(x)]^2 + 2$ C) $\frac{[f(x)]^2}{2}$

D) $2 \cdot f(x)$ E) $f(x) + 2$

(YÖS – 2003)

30. $y = f(x) = -x^2 - 2x - 3$

$\max(y) = ?$

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

(YÖS – 2004)

31. $f(x) = ax$

$g(x) = x+b$

$(f \circ g)(x) = x+2$

$b-a = ?$

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

(YÖS – 2004)

32. $f(x) = x-3$

$f \circ g(x) = x^2 - 6x + 6$

$g(x) = ?$

A) $x^2 - 3$ B) $x^2 - 6$ C) $(x-1)^2$

D) $(x-2)^2$ E) $(x-3)^2$

(YÖS – 2005)



33. $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x+1) = 3x+7$$

$$f^{-1}(a) = 2 \Rightarrow a = ?$$

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

(YÖS – 2006)

36. $f(x) = x - 1$

$$f^{-1}(x) = ?$$

- A)
- $f(x)+1$
- B)
- $f(x)+2$
- C)
- $2f(x)$

- D)
- $2f(x)-2$
- E)
- $\frac{f(x)+1}{2}$

(YÖS – 2008)

34. $(f \circ g)(x) = f(g(x))$

$$f \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 3 & 4 \end{pmatrix}$$

$$g \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix}$$

$$f \circ g = ?$$

A) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 2 & 3 \end{pmatrix}$

B) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 1 & 4 \end{pmatrix}$

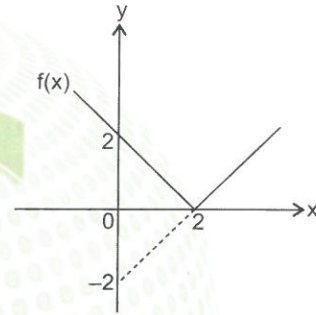
C) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$

D) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 2 & 1 & 4 \end{pmatrix}$

E) $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 1 & 2 \end{pmatrix}$

(YÖS – 2007)

37.



$$f(x) = ?$$

A) $|x|+2$

B) $|2+x|$

C) $|x-2|$

D) $|2x|-2$

E) $|2x-4|$

(YÖS – 2008)

38. $f: \mathbb{R}^+ \rightarrow [-1, \infty)$

$$f(x) = 3x^2 - 1$$

$$3(f^{-1}(x))^2 = ?$$

- A)
- $x-2$
- B)
- $x-1$
- C)
- $x+1$
- D)
- $2x-1$
- E)
- $3x+1$

(YÖS – 2009)

35. $f(x) = 2^{3x}$

$$f(x+4) = k \cdot f(x)$$

$$k = ?$$

- A)
- 2^{12}
- B)
- 2^{10}
- C)
- 2^9
- D)
- 2^7
- E)
- 2^6

(YÖS – 2007)



$$\begin{aligned} 1. \quad & \left. \begin{aligned} f(x) &= 3x - 5 \\ g(x) &= 3x + 5 \end{aligned} \right\} \Rightarrow f(g(x)) &= 3(3x + 5) - 5 \\ & &= 9x + 15 - 5 \\ & &= 9x + 10 \end{aligned}$$

Yanıt – Answer : E

$$\begin{aligned} 2. \quad & g(x) = 2x - 1 \\ & (g \circ f)(x) = g(f(x)) = 2x + 1 \\ & 2.f(x) - 1 = 2x + 1 \\ & 2.f(x) = 2x + 2 \\ & \cancel{2}.f(x) = \cancel{2}(x + 1) \\ & f(x) = x + 1 \end{aligned}$$

Yanıt – Answer : A

$$\begin{aligned} 3. \quad & \left. \begin{aligned} f(x) &= 2x^2 \\ g(x) &= x + 7 \end{aligned} \right\} \Rightarrow f(g(x)) &= 2(x + 7)^2 \\ & f(g(-4)) &= 2(-4 + 7)^2 \\ & &= 2(3)^2 \\ & &= 18 \end{aligned}$$

Yanıt – Answer : B

$$\begin{aligned} 4. \quad & \left. \begin{aligned} f(x) &= 3x + 1 \\ g(x) &= x^2 - 1 \end{aligned} \right\} \Rightarrow (f \circ g)(x) &= 3(x^2 - 1) + 1 \\ & &= 3x^2 - 2 \end{aligned}$$

Yanıt – Answer : B

$$\begin{aligned} 5. \quad & \left. \begin{aligned} f(x) &= x + 1 \\ g(x) &= x^2 - 1 \end{aligned} \right\} \Rightarrow (g \circ f)(x) &= (x + 1)^2 - 1 \\ & &= x^2 + 2x \\ & (g \circ f)(a) &= a^2 + 2a = 35 \\ & a(a + 2) &= 35 \\ & a &= 5 \\ & (g \circ f)(b) &= b^2 + 2b = 35 \\ & b(b + 2) &= 35 \\ & b &= -7 \end{aligned}$$

$$a + b = 5 - 7 = -2$$

Yanıt – Answer : D

$$\begin{aligned} 6. \quad & \begin{array}{c} \swarrow \quad \searrow \\ xy - 2x - 3y + 5 = 0 \end{array} \\ & y(x - 3) = 2x - 5 \\ & y = f(x) = \frac{2x - 5}{x - 3} \end{aligned}$$

Yanıt – Answer : E

$$\begin{aligned} 7. \quad & f^{-1}(0) = A \Rightarrow f(A) = 0 \\ & f(x) = \frac{(x - 3)^3}{4} \Rightarrow f(A) = \frac{(A - 3)^3}{4} = 0 \\ & (A - 3)^3 = 0 \Rightarrow A = 3 \\ & f^{-1}(0) = A \Rightarrow f^{-1}(0) = 3 \end{aligned}$$

Yanıt – Answer : C

$$\begin{aligned} 8. \quad & f(x) = \frac{2x}{x + 1} \Rightarrow f^{-1}(x) = \frac{-x}{x - 2} \\ & f^{-1}(3) = \frac{-3}{3 - 2} \\ & = -3 \end{aligned}$$

Yanıt – Answer : A



$$\begin{aligned} 9. \quad f(x) &= \frac{3x-2}{x+1} \Rightarrow f^{-1}(x) = \frac{-x-2}{x-3} \\ &= \frac{-(x+2)}{x-3} \\ &= \frac{x+2}{3-x} \end{aligned}$$

Yanıt – Answer : B

$$\begin{aligned} 10. \quad \left. \begin{aligned} f(x) &= x-1 \\ g(x) &= 2x+x^2 \end{aligned} \right\} \Rightarrow g[f(x)] &= 2(x-1) + (x-1)^2 \\ &= 2x-2+x^2-2x+1 \\ &= x^2-1 \end{aligned}$$

Yanıt – Answer : D

$$\begin{aligned} 11. \quad (g \circ f)(x) &= g[f(x)] = x-1 \\ g(x) &= 2x+1 \Rightarrow 2.f(x)+1 = x-1 \\ f(x) &= \frac{x-2}{2} \\ f(4) &= \frac{4-2}{2} \\ &= 1 \end{aligned}$$

Yanıt – Answer : D

$$\begin{aligned} 12. \quad 2 < 3 \Rightarrow f(x) &= x^2+2 \\ f(2) &= 2^2+2=6 \\ 6 > 3 \Rightarrow f(x) &= 2x-1 \\ f(6) &= 6 \cdot 2 - 1 \\ &= 11 \\ f(\underbrace{f(2)}_6) &= f(6) = 11 \end{aligned}$$

Yanıt – Answer : C

$$13. \quad (f \circ g \circ h)(2) = f \circ (g \circ h)(2) = f(g(h(2))) = 14$$

$$h(x) = \frac{x}{2} + 1 \quad f(g(h(2))) = 14$$

$$h(2) = \frac{2}{2} + 1 \quad f(\underbrace{g(2)}_3) = 14$$

$$h(2) = 2 \quad f(3) = 14$$

$$g(x) = x^2 - 1 \quad f(x) = ax - 1$$

$$g(2) = 2^2 - 1 \quad f(3) = 3a - 1 = 14$$

$$g(2) = 3 \quad 3a = 15 \\ a = 5$$

Yanıt – Answer : D

$$14. \quad f(x) = \frac{x\sqrt{2}-3}{\sqrt{3}} \Rightarrow f^{-1}(x) = \frac{-x\sqrt{3}-3}{-\sqrt{2}}$$

$$f^{-1}(x) = \frac{-(x\sqrt{3}+3)}{-\sqrt{2}}$$

$$f^{-1}(x) = \frac{x\sqrt{3}+3}{\sqrt{2}}$$

Yanıt – Answer : A

$$15. \quad f(x) = \frac{x\sqrt{3}-a}{a}$$

$$f^{-1}(x) = \frac{x \cdot a + a}{\sqrt{3}} = x+1$$

$$\begin{aligned} a(x+1) &= \sqrt{3} \cdot (x+1) \\ a &= \sqrt{3} \end{aligned}$$

Yanıt – Answer : D

$$\begin{aligned} 16. \quad f\left(\frac{x-1}{2}\right) &= 2x-2 \Rightarrow f(x) = 2 \cdot (2x+1) - 2 \\ &= 4x \end{aligned}$$

Yanıt – Answer : C



17. $g(x) = 2x - 2$ $(g \circ f)(x) = 2x - 4$

$$\begin{aligned} (g \circ f)(x) &= g(f(x)) = 2 \cdot f(x) - 2 = 2x - 4 \\ 2 \cdot f(x) &= 2x - 2 \\ f(x) &= x - 1 \end{aligned}$$

Yanıt – Answer : A

18. $f(x) = 2x + 1$ $g(x) = x^2 - a$
 $(f \circ g)(x) = f(g(x)) = 2(x^2 - a) + 1 = 2x^2 - 3$
 $2x^2 - 2a + 1 = 2x^2 - 3$
 $-2a + 1 = -3$
 $2a = 4$
 $a = 2$

Yanıt – Answer : E

19. $f(x) = mx^2 + nx + r$ $g(x) = 4x + 3$
 $(g \circ f)(x) = g(f(x)) = 4(mx^2 + nx + r) + 3$
 $= 4x^2 + 16x + 11$
 $4mx^2 + 4nx + 4r + 3 = 4x^2 + 16x + 11$
 $4m = 4 \Rightarrow m = 1$
 $4n = 16 \Rightarrow n = 4$
 $4r + 3 = 11 \Rightarrow r = 2$
 $m \cdot n \cdot r = 1 \cdot 4 \cdot 2 = 8$

Yanıt – Answer : E

20. $f(x) = 8x + 6$ $g(x) = 4x - 2$

$$f(1) = 14$$

$$g^{-1}(x) = \frac{x+2}{4}$$

$$\begin{aligned} g^{-1}(14) &= \frac{14+2}{4} \\ &= 4 \end{aligned}$$

$$(f^{-1} \circ g)^{-1}(1) = (g^{-1} \circ f)(1) = (g^{-1}(f(1)))$$

$$g^{-1}(14) = \frac{14+2}{4}$$

$$= 4$$

Yanıt – Answer : C

21. $(g \circ f)(x) = g(f(x)) = 2x - 3$

$$g(\underbrace{2x-1}_3) = 2x-3$$

$$\begin{aligned} x = 2 &\Rightarrow g(2 \cdot 2 - 1) = 2 \cdot 2 - 3 \\ g(3) &= 1 \end{aligned}$$

Yanıt – Answer : B

22. $f(x) = 2x - 5$

$$(g \circ f)(x) = g[f(x)]$$

$$= g(2x - 5) = 4x + 1$$

$$g(x) = 4\left(\frac{x+5}{2}\right) + 1$$

$$= 2x + 11$$

Yanıt – Answer : E



23. $f(x) = \frac{2-x}{1-2x}$

$(f \circ f)(x) = f(f(x))$

$$= \frac{2 - \left(\frac{2-x}{1-2x} \right)}{1 - 2 \cdot \left(\frac{2-x}{1-2x} \right)} = \frac{\cancel{2} - 4x - \cancel{2} + x}{1 - \frac{4-2x}{1-2x}}$$

$$= \frac{-3x}{1-2x} = \frac{-3x}{1-2x}$$

$$= \frac{-3x}{1-2x} = \frac{-3x}{1-2x} = x$$

Yanıt – Answer : E

24. $f(x) = 4x - 5$

$g(x) = 3x + 2$

$g(0) = 2$

$f(g(0)) = f(2)$

$\begin{matrix} 2 \\ 2 \end{matrix} = 4 \cdot (2) - 5$

$= 3$

Yanıt – Answer : D

25. $f(g(h(x))) = f(g(3x)) = f(6x) = 6x$

$3x$

$6x$

$\Rightarrow 6x = k \cdot 3x$

$k = 2$

Yanıt – Answer : B

26. $f(x) = 3^x$

$f^{-1}(81) = a \Rightarrow f(a) = 81$

$f(a) = 3^a = 81 \Rightarrow 3^a = 3^4$
 $\Rightarrow a = 4$

Yanıt – Answer : C

27. $f(x) = \frac{5-x}{1-5x} \Rightarrow f^{-1}(x) = \frac{5-x}{1-5x}$

$f(x) = f^{-1}(x) \Rightarrow (f \circ f)(x) = x$

Yanıt – Answer : E

28. $f: \mathbb{R} \rightarrow \mathbb{R}^+$

$$f(x) = \begin{cases} x+1 & x < -2 \\ x^2 + 4x & -2 \leq x < 3 \\ 2x+3 & 3 \leq x \end{cases}$$

$x = -4 \quad -4 < -2 \Rightarrow f(x) = x + 1$

$f(-4) = -4 + 1 = -3$

$x = 2 \quad 2 \in -2 \leq x < 3 \Rightarrow f(x) = x^2 + 4x$

$f(2) = 4 + 8 = 12$

$x = 5 \quad 3 \leq 5 \Rightarrow f(x) = 2x + 3$

$f(5) = 2 \cdot 5 + 3 = 13$

$f(-4) + f(2) + f(5) = -3 + 12 + 13 = 22$

Yanıt – Answer : B

29. $f(x) = e^{x+2}$

$f(2x+2) = e^{2x+2+2} = e^{2x+4} = (e^{x+2})^2$

$= [f(x)]^2$

Yanıt – Answer : A



30. $y = f(x) = -x^2 - 2x - 3$

$$y = -(x^2 + 2x + 1 + 2)$$

$$y = -[(x+1)^2 + 2]$$

$$\min((x+1)^2) = 0$$

$$\max(y) = -(0+2)$$

$$\max(y) = -2$$

Yanıt – Answer : E

32. $f(x) = x - 3$

$$fog(x) = x^2 - 6x + 6$$

$$f^{-1}(x) = x + 3$$

$$f^{-1} \circ (fog)(x) = g(x)$$

$$g(x) = (x+3) \circ (x^2 - 6x + 6)$$

$$= x^2 - 6x + 9$$

$$= (x-3)^2$$

Yanıt – Answer : E

31. $f(x) = ax$

$$g(x) = x + b$$

$$(fog)(x) = x + 2$$

$$(fog)(x) = f(g(x))$$

$$= f(x+b) = a(x+b)$$

$$= ax + ab$$

$$ax + ab = x + 2$$

$$\begin{array}{ll} ax = x & a.b = 2 \\ a = 1 & b = 2 \end{array}$$

$$b - a = 2 - 1 = 1$$

Yanıt – Answer : B

33. $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x+1) = 3x + 7$$

$$f^{-1}(a) = 2 \Rightarrow f(2) = a$$

$$f(x+1) = 3x + 7$$

$$x = 1 \quad f(2) = 3.1 + 7$$

$$f(2) = 10$$

Yanıt – Answer : D



34. $f: \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 3 & 4 \end{pmatrix}$

$$g: \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix}$$

$$(f \circ g): \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 3 & 4 \end{pmatrix} \circ \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix} \\ = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 1 & 2 \end{pmatrix}$$

Yanıt – Answer : E

35. $f(x) = 2^{3x}$

$$f(x+4) = k \cdot f(x)$$

$$2^{3(x+4)} = k \cdot 2^{3x}$$

$$2^{3x+12} = k \cdot 2^{3x}$$

$$2^{3x} \cdot 2^{12} = k \cdot 2^{3x}$$

$$2^{12} = k$$

Yanıt – Answer : A

36. $f(x) = x - 1 \Rightarrow x = 1 + f(x)$

$$f^{-1}(x) = x + 1 = 1 + f(x) + 1 = f(x) + 2$$

Yanıt – Answer : B

37. $\begin{cases} x = 2 \Rightarrow y = 0 \\ x = 0 \Rightarrow y = 2 \end{cases} \quad f(x) = |x - 2|$

Yanıt – Answer : C

38. $y = f(x) \Rightarrow x = f^{-1}(y)$

$$f(x) = y = 3x^2 - 1 \Rightarrow 3x^2 = y + 1$$

$$\Rightarrow x^2 = \frac{y+1}{3} \Rightarrow x = \sqrt{\frac{y+1}{3}} = f^{-1}(y)$$

$$\Rightarrow f^{-1}(x) = \sqrt{\frac{x+1}{3}}$$

$$(f^{-1}(x))^2 = \frac{x+1}{3}$$

$$3 \cdot (f^{-1}(x))^2 = x + 1$$

Yanıt – Answer : C



12. BÖLÜM

MODÜLER ARİTMETİK







1. $a, b \in \mathbb{Z}^+$

$$38 \equiv a \pmod{9}$$

$$49 \equiv b \pmod{11}$$

$$\min(a+b) = ?$$

- A) 11 B) 10 C) 9 D) 8 E) 7

2. $x \in \mathbb{N}$

$$5x + 5 \equiv x - 5 \pmod{6}$$

$$\min(x) = ?$$

- A) 1 B) 2 C) 3 D) 4 E) 5 A) 6 B) 4 C) 3 D) 1 E) 0

3. $x \in \mathbb{Z}^+$

$$2^{25} \equiv x \pmod{5}$$

$$x = ?$$

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

4. $3^{2009} \equiv x \pmod{7}$

$$x = ?$$

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

5. $2009^{2010} \equiv A \pmod{10}$

$$A = ?$$

- A) 1 B) 3 C) 5 D) 7 E) 9

6. $5^{27} + 4^{18} \equiv A$

$$\begin{array}{r|l} A & 7 \\ \hline - & \\ \hline & ? \end{array}$$

- A) 6 B) 4 C) 3 D) 1 E) 0

7. $5^{1907} + 3^{1903} - 2^{1905} \equiv m \pmod{10}$

$$m = ?$$

- A) 0 B) 1 C) 4 D) 6 E) 9

8.
$$\begin{array}{r|l} 6^{125} + 4^{43} - 3^{24} & 5 \\ \hline - & \\ \hline & n \end{array}$$

$$n = ?$$

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



9. $k \in \mathbb{N}^+$
 $2^{32k+3} \equiv x \pmod{5}$

$x = ?$

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

10. $2^{35} + 3^{19} \equiv x \pmod{5}$

$x = ?$

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

11. $19 \cdot m \equiv 5 \pmod{6}$

$m = ?$

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

12. $n \equiv 1 \pmod{4}$
 $n \equiv 1 \pmod{6}$
 $n = (ab)$

$\min(ab) = ?$

- A) 13 B) 25 C) 37 D) 40 E) 51

13. $29^{29} = (\dots zyx)$

$x = ?$

- A) 3 B) 6 C) 7 D) 8 E) 9

14. $x \in \mathbb{Z}^+$
 $9 - x \equiv 6 \pmod{12}$

$\min(x_1 + x_2) = ?$

- A) 20 B) 18 C) 16 D) 14 E) 10

15. $(352)^x \equiv 3 \pmod{5}$

$\min(x) = ?$

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

16. $m \in \mathbb{Z}^+$
 $37 \equiv 2 \pmod{m}$

$\sum m = ?$

- A) 53 B) 47 C) 45 D) 32 E) 24



1. $k \in \mathbb{Z}^+$
 $2^{24k+3} \equiv x \pmod{5}$

$x = ?$

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

2. $3^{36k+3} + 4^{28t+3} \equiv x \pmod{5}$

$x = ?$

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

3. $8^{87} + 7^{78} \equiv x \pmod{10}$

$x = ?$

- A) 1 B) 3 C) 4 D) 6 E) 9

4. $1009^{109} + 53^{17} \equiv n \pmod{9}$

$n = ?$

- A) 0 B) 1 C) 4 D) 6 E) 8

5. $x \equiv 3 \pmod{4}$
 $x \equiv 3 \pmod{6}$
 $x \in \mathbb{Z}^- \max(x) = a$
 $x \in \mathbb{Z}^+ \min(x) = b$

$a + b = ?$

- A) -6 B) -1 C) 3 D) 6 E) 9

6. $x \in \mathbb{Z}^-$
 $-11 - x \equiv 53 \pmod{13}$

$\max(x) = ?$

- A) -12 B) -11 C) -10 D) -9 E) -8

7. $x = (ab) \in \mathbb{Z}^-$
 $x \equiv -69 \pmod{7}$

$\max(x) = ?$

- A) -34 B) -27 C) -24 D) -20 E) -13

8. $n \in \mathbb{Z}^+$
 $-4n \equiv 4 \pmod{5}$

$\min(n) = ?$

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



9. $(53)^{85} = (\dots cba)$

a = ?

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

10. $3^{103} \equiv m \pmod{6}$

m = ?

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

11. $35 \equiv 5 \pmod{x}$

$\sum x = ?$

- A) 75 B) 71 C) 70 D) 65 E) 62

12. $x = (ab)$
 $x - 3 \equiv 16 \pmod{11}$

$\max(x) = ?$

- A) 99 B) 98 C) 97 D) 96 E) 95

13. $1! + 2! + 3! + \dots + 24! \equiv x \pmod{5}$

x = ?

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

14. $2^{43} \cdot 3^{44} \cdot 5^{45} \equiv m \pmod{7}$

m = ?

- A) 1 B) 3 C) 4 D) 5 E) 6

15. $2^{10} + 4^{10} + 8^{10} \equiv x \pmod{5}$

x = ?

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

1. $2010 \equiv x \pmod{19}$

$x = ?$

- A) 5 B) 7 C) 9 D) 15 E) 17

5. $7^{11} + 11^7 = x \pmod{5}$

x = ?

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

2. $2009^{2010} \equiv x \pmod{10}$

x = ?

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

6. $2^{45} \equiv x \pmod{9}$

$x = ?$

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

3.

$\begin{array}{r} 2099^{43} \\ \hline x \end{array}$

$x = ?$

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

7. $(-3)^{15} \equiv x \pmod{5}$

$x = ?$

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

4. $611 \equiv x \pmod{4}$

$$143 \equiv y \pmod{4}$$

$$x \cdot y \equiv z \pmod{4}$$

$$z = ?$$

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

8. $-2327 \equiv x \pmod{11}$

x = ?

- A) 1 B) 2 C) 3 D) 5 E) 7



9. $x > 100$
 $x + 2 \equiv 7 \pmod{11}$

$\min(x) = ?$

- A) 101 B) 102 C) 103 D) 104 E) 105

10. $(3!)^{5!} \equiv x \pmod{10}$

$x = ?$

- A) 1 B) 2 C) 3 D) 5 E) 6

11. $3^{-2010} \equiv x \pmod{5}$

$x = ?$

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

12. $(-5)^{-121} \equiv x \pmod{7}$

$x = ?$

- A) 0 B) 1 C) 3 D) 4 E) 5

13. $\left(\frac{3}{7}\right)^{151} \equiv x \pmod{11}$

$x = ?$

- A) 1 B) 2 C) 5 D) 7 E) 9

14. $\mathbb{Z}/4$

$$x^2 - 14x + 9 = 0$$

$SS = ?$

- A) {3} B) {0, 3} C) {0, 1}
D) {2, 3} E) {1, 3}

15. $\mathbb{Z}/5$

$$x^2 = 7x$$

$SS = ?$

- A) {0} B) {2, 3} C) {0, 2} D) {2, 3} E) {3, 4}



1. $311 \equiv x \pmod{11}$
 $2132 \equiv y \pmod{11}$
 $2x + 3y \equiv z \pmod{11}$

$z = ?$

- A) 0 B) 1 C) 4 D) 5 E) 6

2. $5^{1903} + 7^{1903} \equiv x \pmod{6}$

$x = ?$

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

3. $(-12)^{621} + x \equiv 4 \pmod{5}$

$x = ?$

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

4. $13^{200} \cdot 11^{321} \equiv x \pmod{8}$

$x = ?$

- A) 1 B) 2 C) 3 D) 4 E) 7

5. $\frac{1}{3} + \frac{1}{7} \equiv x \pmod{11}$

$x = ?$

- A) 0 B) 1 C) 2 D) 5 E) 6

6. $a \equiv 5 \pmod{9}$

$(3a + 1903)^{2010} \equiv x \pmod{9}$

$x = ?$

- A) 0 B) 1 C) 2 D) 3 E) 7

7. $\left(\frac{3}{2}\right)^{-1} + \left(\frac{5}{3}\right)^{-1} \equiv x \pmod{11}$

$x = ?$

- A) 0 B) 1 C) 2 D) 4 E) 8

8. $x > 1$

$x^2 + 15 \equiv 3 \pmod{x}$

$\sum x = ?$

- A) 6 B) 12 C) 18 D) 22 E) 27

9. $\mathbb{Z}/7$

$$5x - 3 = 1$$

 $x = ?$

- A) 0 B) 1 C) 2 D) 3 E) 5

10. $x + 3y \equiv 6 \pmod{7}$

$$x - 3y \equiv 5 \pmod{7}$$

 $y = ?$

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

11. $2x - y \equiv 3 \pmod{11}$

$$x + y \equiv 5 \pmod{11}$$

 $x = ?$

- A) 1 B) 2 C) 5 D) 7 E) 10

12. $f: \mathbb{Z}/7 \rightarrow \mathbb{Z}/7$

$$f(x) = 5x + 3$$

 $f^{-1}(2) = ?$

- A) 0 B) 1 C) 2 D) 4 E) 5

13. $x \in \mathbb{N}$

$$x^2 + 22 \equiv 3 \pmod{11}$$

 $\min(x) = ?$

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

14. $x \in \mathbb{N}$

$$14^x \equiv 2 \pmod{9}$$

 $\min(x) = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

15. $211^{63} \cdot 321^{57} \equiv x \pmod{9}$ $x = ?$

- A) 0 B) 3 C) 6 D) 7 E) 8

16. $2^{-2} + 3^{-2} \equiv x \pmod{13}$ $x = ?$

- A) 0 B) 1 C) 3 D) 4 E) 5



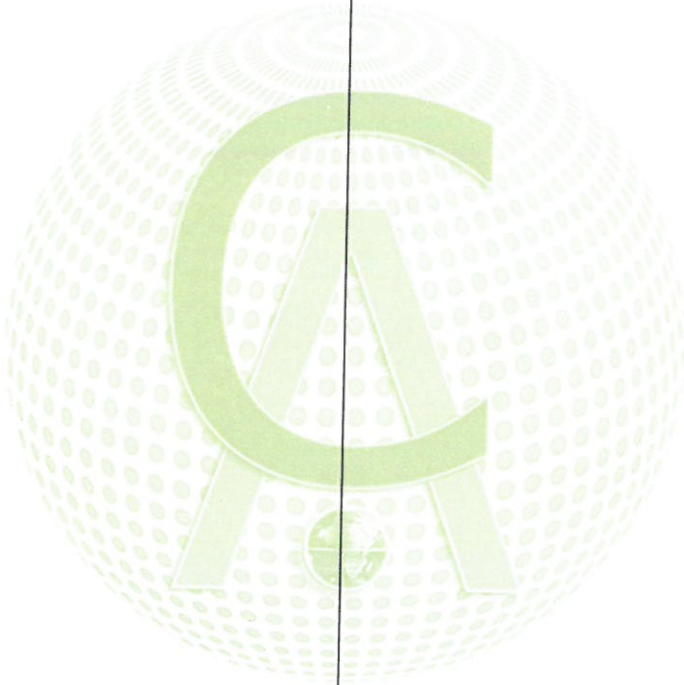
1. $A = \{x \mid 1 \leq x \leq 150, x \equiv 4 \pmod{5}\}$

$$B = \{y \mid 75 \leq y \leq 200, y \equiv 2 \pmod{3}\}$$

$$s(A \cap B) = ?$$

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

(YÖS – 2009)





1.
$$\left. \begin{array}{l} x = 5k + 4, \quad k \in \mathbb{Z} \\ y = 3t + 2, \quad t \in \mathbb{Z} \end{array} \right\}$$

$$z \in A \cap B \Rightarrow z = 5k + 4 = 3t + 2$$

$$\Rightarrow z + 1 = 15n, \quad n \in \mathbb{Z}$$

$$\Rightarrow z = 15n - 1$$

$$\Rightarrow A \cap B = \{z \mid 75 \leq 150, \quad z = 15n - 1\}$$

$$\left. \begin{array}{l} n = 6 \Rightarrow z = 89 \\ n = 7 \Rightarrow z = 104 \\ n = 8 \Rightarrow z = 119 \\ n = 9 \Rightarrow z = 134 \\ n = 10 \Rightarrow z = 149 \end{array} \right\} s(A \cap B) = 5$$

Yanıt – Answer : B

13. BÖLÜM

İKİNCİ DERECE DENKLEMLER







İKİNCİ DERECEDEKİ DENKLEMLER

TEST - 1

1. $(x-3)^2 = 0$

S.S. = ?

- A) $\{-9\}$ B) $\{-3\}$ C) $\{0\}$ D) $\{3\}$ E) $\{9\}$

2. $4x^2 - 36 = 0$

S.S. = ?

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

3. $a^2 + 16 = 0$

S.S. = ?

- A) $\{-4\}$ B) $\{4\}$ C) $\emptyset$ D) $\{-4, 4\}$ E) $\{16\}$

4. $x^2 - 6x = 0$

S.S. = ?

- A) $\{0, 1\}$ B) $\{0, 3\}$ C) $\{0, 4\}$
D) $\{0, 6\}$ E) $\{6\}$

5. $12x^2 - 6x = 0$

S.S. = ?

- A) $\{0, 2\}$ B) $\{0, -\frac{1}{2}\}$ C) $\{0, \frac{1}{2}\}$
D) $\{-\frac{1}{2}, \frac{1}{6}\}$ E) $\{\frac{1}{2}, \frac{1}{3}\}$

6. $x^3 + x^2 = 0$

S.S. = ?

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

7. $x^2 - x - 12 = 0$

S.S. = ?

- A) $\{-4, -3\}$ B) $\{-4, 3\}$ C) $\{-3, 4\}$
D) $\{-3, 6\}$ E) $\{-12, 1\}$

8. $x^2 - 6x + 8 = 0$

S.S. = ?

- A) $\{-4, -2\}$ B) $\{-4, 2\}$ C) $\{-2, 4\}$
D) $\{2, 4\}$ E) $\{-6, 8\}$



9. $16x^2 - 8x + 1 = 0$

S.S = ?

- A) $\{-16, 8\}$ B) $\{-8, 16\}$ C) $\{-\frac{1}{4}, \frac{1}{4}\}$
D) $\{-\frac{1}{4}\}$ E) $\{\frac{1}{4}\}$

10. $4x^2 - x - 5 = 0$

S.S = ?

- A) $\emptyset$ B) $\{-1, \frac{5}{4}\}$ C) $\{-\frac{5}{4}, 1\}$
D) $\{-\frac{5}{4}\}$ E) $\mathbb{R}$

11. $a^2 - 12a - 45 = 0$

S.S = ?

- A) $\{-15, -3\}$ B) $\{-12, -3\}$ C) $\{-5, 9\}$
D) $\{-3, 15\}$ E) $\{15\}$

12. $x^2 + (2-a)x - 2a + 1 = 0$
 $x_1 = x_2$

$\sum a = ?$

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

13. $\frac{x^2 - 2x - 8}{x^2 - 16} = 0$

S.S = ?

- A) $\{-2\}$ B) $\{-4\}$ C) $\{-2, 4\}$
D) $\{-4, 4\}$ E) $\{4\}$

14. $x^2 + (a-b)x + 3a + 4b - 7 = 0$
 $x_1 = 6$
 $x_2 = -2$

$\frac{a}{b} = ?$

- A) -5 B) -3 C) -2 D) 3 E) 5

15. $x^2 + (a+6)x - a - 15 = 0$

$x_1 = -x_2$

a = ?

- A) -8 B) -6 C) 6 D) 7 E) 8



1. $\frac{x-2}{x+3} + \frac{x-2}{x-1} = 0$

$x_1 + x_2 = ?$

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

2. $\frac{x-1}{x+2} - \frac{2x+1}{x-3} = 0$

$\frac{x_1 + x_2}{x_1 \cdot x_2} = ?$

- A) 12 B) 9 C) 4 D) -9 E) -12

3. $2x - \sqrt{4x+13} + 5 = 0$

$S \cdot S = ?$

- A) $\{-3, 1\}$ B) $\{-1, 3\}$ C) $\{-1, -3\}$
D) $\{1, 3\}$ E) $\{-1\}$

4. $x^2 + ax + 16 = 0$

$x_1 \cdot x_2 = \frac{8}{5} \cdot (x_1 + x_2)$

$a = ?$

- A) -10 B) -8 C) 4 D) 8 E) 10

5. $\frac{a}{a^2-1} - \frac{3}{a^2+a} = 0$

$a_1 + a_2 = ?$

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

6. $x^2 - 3mx + 81 = 0$

$x_1 = 3x_2^2$

$m = ?$

- A) -10 B) -8 C) 3 D) 9 E) 10

7. $x^2 - 6x - m + 7 = 0$

$2x_1 - x_2 = 15$

$m = ?$

- A) 15 B) 14 C) 12 D) 8 E) 4

8. $3x^2 - 21x - 14 = 0$

$\frac{6}{x_1} + \frac{6}{x_2} = ?$

- A) -18 B) -9 C) 3 D) 9 E) 18



9. $x^2 - 6x + 4 = 0$

$$\left(x_1 - \frac{2}{x_2}\right) \cdot \left(x_2 + \frac{2}{x_1}\right) = ?$$

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

10. $x^2 - 12x + 16 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$$\sqrt{\frac{x_1}{x_2}} + \sqrt{\frac{x_2}{x_1}} = ?$$

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

11. $x^2 - 7x + 2a = 0$

$$2x_1 + 3x_2 = 19$$

$$a = ?$$

- A) 3 B) 4 C) 5 D) 6 E) 7

12. $x^2 - 3x - 6 = 0$

$$x_1 x_2^2 + x_1^2 x_2 + \frac{4}{x_1} + \frac{4}{x_2} = ?$$

- A) -20 B) -18 C) -16 D) -14 E) -12

13. $x^2 - 4x + 5 = 0$

$$\frac{x_1 - 1}{x_2 - 2} + \frac{x_2 - 1}{x_1 - 2} = ?$$

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

14. $x^2 - 10x + 9 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$$x_1 \cdot \sqrt{x_2} + x_2 \sqrt{x_1} = ?$$

- A) 15 B) 12 C) 9 D) 8 E) 6

15. $\left(1 - \frac{6}{a}\right)^2 - 5 \cdot \left(1 - \frac{6}{a}\right) + 6 = 0$

$$\sum a = ?$$

- A) -11 B) -9 C) -4 D) 8 E) 12



1. $2x^2 + 3x - 5 = 0$

$$\frac{5.(x_1 + x_2)}{x_1 \cdot x_2} = ?$$

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

2. $2x^2 + 6x - 7 = 0$

$$x_1^2 + x_2^2 = ?$$

- A) 20 B) 16 C) 14 D) 12 E) 10

3. $x^2 + 4x - 3 = 0$

$$\frac{1}{x_1} + \frac{1}{x_2} = ?$$

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

4. $ax^2 - (2a+3)x + a+1 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$$x_1 = 3$$

$$a = ?$$

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

5. $x^2 - 7x + m + 7 = 0$ $2x_1 - x_2 = 2$

$$m = ?$$

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

6. $mx^2 - (2m+2)x + 4 = 0$

$$2x_1 + 2x_2 + x_1 \cdot x_2 = 5$$

$$m = ?$$

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

7. $x^2 - x + 2 = 0$

$$(3x_1 - 2) \cdot (3x_2 - 2) = ?$$

- A) 21 B) 18 C) 16 D) 12 E) 9

8. $(m+1)x^2 + (2m-3)x + 3m+1 = 0$

$$x_1 = \frac{2}{x_2}$$

$$x_1 + x_2 = ?$$

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



9. $m > 0$

$$x^2 + 3x - (m^2 - 1) = 0$$

$$x_1^2 x_2 + x_2^2 x_1 = 45$$

$m = ?$

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

10. $x^2 - 9x + 2n = 0$ $\begin{cases} x_1 = a \\ x_2 = b \end{cases}$

$$2a + b = 12$$

$n = ?$

- A) 9 B) 8 C) 7 D) 6 E) 5

11. $25^x - 26.5^x + 25 = 0$

$S.S = ?$

- A) $\{-5, 5\}$ B) $\{-2, 2\}$ C) $\{5, 0\}$
D) $\{0, 2\}$ E) $\{2\}$

12. $(x^2 - 1)^2 - 2x^2 + 3 = 0$

$S.S = ?$

- A) $(-\sqrt{2}, \sqrt{2})$ B) $\{-\sqrt{2}\}$ C) $\{0\}$
D) $\{\sqrt{2}\}$ E) $\{-2, 2\}$

13. $\sqrt{x-4}\sqrt{x} - \sqrt{5} = 0$

$S.S = ?$

- A) $\{25\}$ B) $\{1\}$ C) $\{-25, 1\}$
D) $\{1, 25\}$ E) $\emptyset$

14. $x^2 - |x+20| = 0$

$S.S = ?$

- A) $\{-5, -4, 4, 5\}$ B) $\{-5, 4\}$ C) $\{-4, 5\}$
D) $\{4, 5\}$ E) $(-5, 4)$

15. $x^2 - 9x + 3m + 6 = 0$

$$x_1^2 - x_2^2 = 27$$

$m = ?$

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



1. $\frac{x^2 + 3x + 2}{x^2 - x - 6} = 0$

Ç.K = ?

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

2. $a > 0$
 $x^2 - 12x + a^2 = 0$
 $\sqrt{\frac{x_1}{x_2}} + \sqrt{\frac{x_2}{x_1}} = \frac{12}{5}$

a = ?

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

3. $x^2 - a \cdot b \cdot x + 3 = 0$ $\begin{matrix} \nearrow a \\ \searrow b \end{matrix}$

$\Delta = ?$

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

4. $mx^2 + (mn - 1)x - n = 0$

Ç.K = ?

- A) $\{1, -1\}$ B) $\left\{\frac{1}{m}, \frac{1}{n}\right\}$ C) $\left\{m, \frac{1}{n}\right\}$
D) $\left\{-n, \frac{1}{m}\right\}$ E) $\{m, n\}$

5. $ax^2 + bx + c = 0$ $\begin{matrix} \nearrow 2 \\ \searrow 3 \end{matrix}$

$\frac{a+b}{c} = ?$

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

6. $\sqrt{x^2 - 5} + 5 = x$

S.S = ?

- A) $\{1, 3\}$ B) $\{3\}$ C) $\{3, 5\}$
D) $\emptyset$ E) $\{1, 3, 5\}$

7. $x \in \mathbb{R}$
 $x^2 = |x - 12|$

S.S = ?

- A) $\{-3, 4\}$ B) $\{-3\}$ C) $\{4\}$
D) $\{-4, 3\}$ E) $\{-4\}$

8. $|x^2 - 3| = 13$

S.S = ?

- A) $\{4\}$ B) $\{-4\}$ C) $\{\sqrt{10}\}$
D) $\{-4, 4\}$ E) $\{\sqrt{10}, -4, 4\}$



9. $x^2 - 2x + m + 7 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$
 $x^2 - x + m + 5 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_3 \end{matrix}$

$m = ?$

- A) -7 B) -5 C) 1 D) 2 E) 7

10. $3x^2 - 4mx + 2m - 3 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$x_1 = m$

$\sum m = ?$

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

11. $x^2 - 3mx - 8 + m = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$x_1 = m$

$\prod m = ?$

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

12. $\frac{x-2}{x^2-1} + \frac{1}{x+1} = 1 + \frac{1}{x-1}$

$x_1 \cdot x_2 = ?$

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

13. $(2x-3)^2 - (x+3)^2 = 0$

$S.S = ?$

- A) {0} B) {6} C) {0, 6}
D) {0, 3} E) $\left\{-3, \frac{3}{2}\right\}$

14. $x^2 - 2mx + 5m - 6 = 0$

$x_1 = x_2$

$m = ?$

- A) {-1, 2} B) {-2, 2} C) {2, 3}
D) {3} E) {-2, 3}

15. $x^2 - (m-2)x + m + 3 = 0$

$x_1^2 + x_2^2 = 3$

$\prod m = ?$

- A) -12 B) -8 C) -5 D) 6 E) 10

16. $x \neq 0$
 $\frac{x^{2x} - 3x^x - 4}{x^x - 1} = 0$

$S.S = ?$

- A) $\emptyset$ B) {2} C) $\left\{\frac{1}{2}, 2\right\}$
D) $\left\{\frac{1}{2}\right\}$ E) {-1, 2}



İKİNCİ DERECEDEKİ DENKLEMLER

ÇIKMIŞ SORULAR

1. $f(x) = \frac{1}{x-4} + \frac{x}{4} + \frac{1}{4}$

$f(x_1) = 0 \quad f(x_2) = 0$

$x_1 = ? \quad x_2 = ?$

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

(YÖS - 1981)

4. $a > 0$

$f(x) = x^2 - (a+2)x + a + 10$

$f(x) = 0$

$x_1 = x_2$

$a = ?$

- A) 15 B) 10 C) 8 D) 6 E) 3

(YÖS - 1983)

2. $4x - \sqrt{15+8x} = 0$

$x = ?$

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

(YÖS - 1981)

5. $x > 0$

$\frac{1}{\frac{x}{3}} + \frac{1}{\frac{3}{x}} = \frac{x}{6}$

$x = ?$

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

(YÖS - 1989)

3. $f(x) = x^2 - ax + a - b$

$f(2) = 0 \quad f(3) = 2$

$b = ?$

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

(YÖS - 1982)

6. $2x^2 + (m-3)x - 3 = 0$

$x_1 \cdot x_2 + x_1 + x_2 = 1$

$m = ?$

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

(YÖS - 1990)



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

$x = ?$

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

(YÖS - 1990)

8. $2x^2 - (m-1)x - (4-m) = 0$

$x_1 = \frac{1}{x^2}$

$m = ?$

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

(YÖS - 1991)

9. $0 < x$

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

$x = ?$

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

(YÖS - 1991)

10. $2x^2 + kx - 3 = 0$

$x_1 + x_2 = 1$

$k = ?$

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

(YÖS - 1992)

11. $x^2 + (b-2)x + b = 0$

$\frac{1}{x_1} + \frac{1}{x_2} = 3$

$b = ?$

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

(YÖS - 1992)

12. $x \in \mathbb{Z}$

$(m+1)^{2x} = (9m^2 + 12m + 4)^x$

$m_1 + m_2 = ?$

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

(YÖS - 1994)



13. $a \cdot (x+1)^2 - x + 1 = 8$

$$x_1 \cdot x_2 = -\frac{2}{5}$$

$a = ?$

- A) 1 B) 2 C) 4 D) 5 E) 8

(YÖS – 1994)

16. $\frac{1}{3^x + 1} + \frac{8}{9^x - 1} = \frac{1}{5}$

$x = ?$

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

(YÖS – 1997)

14. $a \neq 0$

$$ax^2 - 8ax + 8(a+2) = 0$$

$$x_1 = x_2$$

$a = ?$

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

(YÖS – 1995)

17. $x^2 + 3x + 2 = 0$

$$\frac{x_1}{x_2} + \frac{x_2}{x_1} = ?$$

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

(YÖS – 1998)

15. $x^2 + bx + 9 = 0$

$$x_1 \cdot x_2 = \frac{3}{2}(x_1 + x_2) \quad b = ?$$

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

(YÖS – 1997)

18. $x^2 - 2|x| - 3 = 0$

$$\{x_1 \cdot x_2\} = \{?, ?\}$$

- A) $\{-3, 3\}$ B) $\{-3, 1\}$ C) $\{-1, 3\}$
D) $\{-1, 1\}$ E) $\{1, 3\}$

(YÖS – 1998)



19. $\frac{x-5}{x-2} + \frac{x-5}{x+3} = 0$

$x_1 + x_2 = ?$

- A) $\frac{5}{2}$ B) $\frac{7}{2}$ C) $\frac{9}{2}$ D) $\frac{10}{3}$ E) $\frac{13}{4}$

(YÖS – 1999)

22. $x^2 - 2x + 8a = 0$

$x_1 \cdot x_2 (x_1 + x_2) = -48$

$a = ?$

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

(YÖS – 2004)

20. $0 < x$

$\frac{1}{x} + \frac{1}{2x+1} = 1$

$x = ?$

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

(YÖS – 2001)

23. $\sqrt{3^x + 72} = 3^x$

$x = ?$

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

(YÖS – 2005)

21. $x^2 - ax + 14 = 0$

$\frac{x_1}{x_2} + \frac{x_2}{x_1} = \frac{53}{14}$

$a^2 = ?$

- A) 36 B) 49 C) 64 D) 81 E) 100

(YÖS – 2003)

24. $x^2 - x - 2 = 0$

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

- A) 2 B) 3 C) 4 D) 6 E) 8

(YÖS – 2005)



İKİNCİ DERECEDEN DENKLEMLER

ÇIKMIŞ SORULAR

25. $f(x) = x + \frac{2}{x} - 3$

$$f(x_1) = f(x_2) = 0$$

$$x_1 + x_2 = ?$$

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

(YÖS - 2006)

28. $f(x) = 2x^2 + 3x - 1$

$$f(x_1) = f(x_2) = 0$$

$$\frac{1}{x_1} + \frac{1}{x_2} = ?$$

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

(YÖS - 2008)

26. $f(x) = x^2 - (a+1)x + 3a + 4$

$$f(x_1) = f(x_2) = 0$$

$$x_1 + x_2 = k$$

$$x_1 \cdot x_2 = m$$

$$m = ?$$

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

(YÖS - 2007)

29. $f(x) = x^2 - ax + 4$

$$f(x_1) = f(x_2) = 0$$

$$\frac{2}{x_1} + x_2 = 3$$

$$a = ?$$

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

(YÖS - 2009)

27. $2^{4x+1} - 2^{2x+2} = 96$

$$x = ?$$

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

(YÖS - 2007)



$$\begin{aligned}
 1. \quad & \frac{1}{x-4} + \frac{x}{4} + \frac{1}{4} = 0 \\
 & (4) \quad (x-4) \quad (x-4) \\
 & \frac{4+x \cdot (x-4) + (x-4)}{4 \cdot (x-4)} = 0 \\
 & 4+x \cdot (x-4) + x-4 = 0 \\
 & 4+x^2-4x+x-4 = 0 \\
 & x^2-3x = 0 \\
 & x \cdot (x-3) = 0 \\
 & x = 0 \quad x-3 = 0 \\
 & x_1 = 0 \quad x_2 = 3
 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned}
 2. \quad & 4x - \sqrt{15+8x} = 0 \\
 & 4x = \sqrt{15+8x} \\
 & (4x)^2 = (\sqrt{15+8x})^2 \\
 & 16x^2 = 15+8x \\
 & 16x^2 - 8x - 15 = 0 \\
 & \begin{array}{r} 4x \quad -5 \\ 4x \quad +3 \\ \hline (4x+3)(4x-5) = 0 \end{array} \\
 & 4x+3=0 \quad 4x-5=0 \\
 & 4x=-3 \quad 4x=5 \\
 & x_1 = -\frac{3}{4} \quad x_2 = \frac{5}{4}
 \end{aligned}$$

x_1 denklemini sağlamaz.
(x_1 does not satisfy the equation)

$$\Rightarrow x = \frac{5}{4}$$

Yanıt – Answer: B

$$\begin{aligned}
 3. \quad & f(x) = x^2 - ax + a - b \\
 & f(2) = 2^2 - a \cdot 2 + a - b = 0 \\
 & 4 - 2a + a - b = 0 \\
 & a + b = 4 \dots (I) \\
 & f(3) = 3^2 - a \cdot 3 + a - b = 2 \\
 & 9 - 3a + a - b = 2 \\
 & 2a + b = 7 \dots (II) \\
 & \begin{array}{r} a + b = 4 \dots (I) \\ 2a + b = 7 \dots (II) \\ \hline -a - b = -4 \\ 2a + b = 7 \\ \hline a = 3 \\ b = 1 \end{array}
 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned}
 4. \quad & x^2 - (a+2)x + a + 10 = 0 \\
 & x_1 = x_2 \Rightarrow \Delta = 0 \\
 & \Delta = (-(a+2))^2 - 4 \cdot 1 \cdot (a+10) = 0 \\
 & a^2 + 4a + 4 - 4a - 40 = 0 \\
 & a^2 - 36 = 0 \\
 & (a-6)(a+6) = 0 \\
 & a = 6 \quad a = -6 \\
 & a > 0 \Rightarrow a = 6
 \end{aligned}$$

Yanıt – Answer: D

$$\begin{aligned}
 5. \quad & \frac{1}{\frac{x}{3}} + \frac{1}{\frac{3}{x}} = \frac{x}{6} \\
 & \frac{1}{\frac{x}{3}} + \frac{1}{\frac{3}{x}} = \frac{x}{6} \Rightarrow \frac{3}{x} + \frac{x}{3} = \frac{x}{6} \\
 & \Rightarrow 3x^2 = 12 \\
 & \Rightarrow x^2 = 4 \\
 & \Rightarrow x = \pm 2 \\
 & \Rightarrow x > 0 \quad x = 2
 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned}
 6. \quad & 2x^2 + (m-3)x - 3 = 0 \\
 & x_1 \cdot x_2 + x_1 + x_2 = 1 \\
 & \frac{c}{a} - \frac{b}{a} = 1 \\
 & \frac{-3}{2} - \frac{m-3}{2} = 1 \\
 & \frac{-3-m+3}{2} = 1 \\
 & -\frac{m}{2} = 1 \Rightarrow m = -2
 \end{aligned}$$

Yanıt – Answer: B



7. $\frac{4}{x} - \frac{1}{x-1} = 1$
 $(x-1) \cdot (x) = 1$
 $\frac{4 \cdot (x-1) - x}{x \cdot (x-1)} = 1$
 $\frac{4x - 4 - x}{x^2 - x} = 1$
 $\frac{3x - 4}{x^2 - x} = 1$
 $x^2 - x = 3x - 4$
 $x^2 - 4x + 4 = 0$
 $(x-2)^2 = 0$
 $x - 2 = 0$
 $x = 2$

Yanıt – Answer: B

8. $2x^2 - (m-1)x - (4-m) = 0$
 $x_1 = \frac{1}{x^2} \Rightarrow x_1 \cdot x_2 = 1 \Rightarrow \frac{c}{a} = 1$
 $\frac{-(4-m)}{2} = 1$
 $-4 + m = 2$
 $m = 6$

Yanıt – Answer: E

9. $\frac{2}{3} - \frac{3}{\frac{2}{x}} = 0$
 $\frac{2}{3x} - \frac{3x}{2} = 0$
 $(2) \quad (3x)$
 $\frac{4 - 9x^2}{6x} = 0$
 $4 - 9x^2 = 0$
 $(2 - 3x) \cdot (2 + 3x) = 0$
 $2 - 3x = 0 \quad 2 + 3x = 0$
 $x = \frac{2}{3} \quad x = -\frac{2}{3}$
 $x > 0 \Rightarrow x = \frac{2}{3}$

Yanıt – Answer: C

10. $2x^2 + kx - 3 = 0$
 $x_1 + x_2 = 1$
 $\frac{-k}{2} = 1 \Rightarrow k = -2$

Yanıt – Answer: E

11. $x^2 + (b-2)x + b = 0$
 $\frac{1}{x_1} + \frac{1}{x_2} = 3 \Rightarrow \frac{x_1 + x_2}{x_1 \cdot x_2} = 3$
 $\frac{-(b-2)}{b} = 3$
 $-b + 2 = 3b$
 $2 = 4b$
 $b = \frac{1}{2}$

Yanıt – Answer: D

12. $((m+1)^2)^x = (9m^2 + 12m + 4)^x$
 $(m+1)^2 = 9m^2 + 12m + 4$
 $m^2 + 2m + 1 = 9m^2 + 12m + 4$
 $0 = 9m^2 + 12m + 4 - m^2 - 2m - 1$
 $0 = 8m^2 + 10m + 3$
 $8m^2 + 10m + 3 = 0$
 $m_1 + m_2 = -\frac{10}{8}$
 $= -\frac{5}{4}$

Yanıt – Answer: A



13. $a \cdot (x+1)^2 - x + 1 = 8$

$$a \cdot (x^2 + 2x + 1) - x + 1 = 8$$

$$ax^2 + 2ax + a - x + 1 - 8 = 0$$

$$ax^2 + (2a-1)x + a - 7 = 0$$

$$x_1 \cdot x_2 = \frac{c}{a}$$

$$x_1 \cdot x_2 = -\frac{2}{5}$$

$$\frac{a-7}{a} = -\frac{2}{5}$$

$$5a - 35 = -2a$$

$$7a = 35$$

$$a = 5$$

Yanıt – Answer: D

16. $\frac{1}{3^x + 1} + \frac{8}{9^x - 1} = \frac{1}{5}$

$$\frac{3^x - 1 + 8}{9^x - 1} = \frac{1}{5}$$

$$9^x - 1 = 5 \cdot 3^x + 35$$

$$9^x - 5 \cdot 3^x - 36 = 0$$

$$(3^x)^2 - 5 \cdot 3^x - 36 = 0$$

$$(3^x - 9) \cdot (3^x + 4) = 0$$

$$3^x + 4 = 0$$

$$3^x = 9$$

~~$$3^x = -4$$~~

$$3^x = 3^2$$

$$x = 2$$

Yanıt – Answer: C

14. $ax^2 - 8ax + 8 \cdot (a+2) = 0$

$$x_1 = x_2 \Rightarrow \Delta = 0$$

$$(-8a)^2 - 4 \cdot a \cdot 8 \cdot (a+2) = 0$$

$$64a^2 - 32a^2 - 64a = 0$$

$$32a^2 - 64a = 0$$

$$a^2 - 2a = 0$$

$$a \cdot (a-2) = 0$$

$$a = 0 \quad a = 2$$

$$a \neq 0 \Rightarrow a = 2$$

Yanıt – Answer: D

17. $x^2 + 3x + 2 = 0$

$$\frac{x_1}{x_2} + \frac{x_2}{x_1} = \frac{x_1^2 + x_2^2}{x_1 \cdot x_2}$$

$$= \frac{(x_1 + x_2)^2 - 2x_1 \cdot x_2}{x_1 \cdot x_2}$$

$$= \frac{(-3)^2 - 2 \cdot 2}{2}$$

$$= \frac{9 - 4}{2} = \frac{5}{2}$$

Yanıt – Answer: D

15. $x_1 \cdot x_2 = \frac{3}{2} (x_1 + x_2)$

$$\frac{9}{1} = \frac{3}{2} \cdot \left(-\frac{b}{1}\right)$$

$$9 = -\frac{3b}{2}$$

$$\frac{18}{(-3)} = \frac{-3b}{(-3)}$$

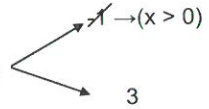
$$-6 = b$$

Yanıt – Answer: E

18. $x^2 - 2|x| - 3 = 0$

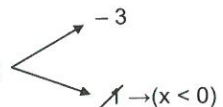
i) $x > 0 \Rightarrow$

$$x^2 - 2x - 3 = 0$$



ii) $x < 0 \Rightarrow$

$$x^2 + 2x - 3 = 0$$



$$\mathcal{C} = \{-3, 3\}$$

Yanıt – Answer: A



19. $\frac{x-5}{x-2} + \frac{x-5}{x+3} = 0$
 $(x+3)(x-2)$

$$\frac{(x-5)(x+3) + (x-5)(x-2)}{(x-2)(x+3)} = 0$$

$$x^2 + 3x - 5x - 15 + x^2 - 2x - 5x + 10 = 0$$

$$2x^2 - 9x - 5 = 0$$

$$x_1 + x_2 = -\frac{b}{a}$$

$$x_1 + x_2 = -\frac{(-9)}{2}$$
$$= \frac{9}{2}$$

Yanıt – Answer: C

20. $\frac{1}{x} + \frac{1}{2x+1} = 1 \Rightarrow \frac{2x+1+x}{2x^2+x} = 1$
 $(2x+1)(x)$

$$3x+1 = 2x^2 + x$$

$$2x^2 - 2x - 1 = 0$$

$$\Delta = b^2 - 4ac$$

$$\Delta = 4 - 4 \cdot 2 \cdot (-1)$$

$$\Delta = 12$$

$$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$x_{1,2} = \frac{2 \pm \sqrt{12}}{4}$$

$$x_1 = \frac{2 - 2\sqrt{3}}{4} = \frac{1 - \sqrt{3}}{2} \rightarrow x < 0$$

$$x_2 = \frac{1 + \sqrt{3}}{2} \quad x_2 > 0$$

Yanıt – Answer: E

21.

$$x^2 - ax + 14 = 0 \begin{cases} x_1 + x_2 = a \\ x_1 \cdot x_2 = 14 \end{cases}$$

$$\frac{x_1}{x_2} + \frac{x_2}{x_1} = \frac{53}{14} \Rightarrow \frac{x_1^2 + x_2^2}{x_1 \cdot x_2} = \frac{53}{14}$$

$$\Rightarrow \frac{(x_1 + x_2)^2 - 2x_1 \cdot x_2}{x_1 \cdot x_2} = \frac{53}{14}$$

$$\Rightarrow \frac{a^2 - 2 \cdot 14}{14} = \frac{53}{14} \Rightarrow a^2 = 81$$

Yanıt – Answer: D

22. $x_1 + x_2 = 2 \quad x_1 \cdot x_2 = 8a$

$$\Rightarrow (x_1 \cdot x_2) \cdot (x_1 + x_2) = -48$$

$$\Rightarrow 8a \cdot 2 = -48 \Rightarrow a = -3$$

Yanıt – Answer: B

23. $\sqrt{3^x + 72} = 3^x$

$$3^x = t$$

$$(\sqrt{t+72})^2 = (t)^2$$

$$\Rightarrow t + 72 = t^2$$

$$\Rightarrow t^2 - t - 72 = 0$$

$$\Rightarrow (t-9)(t+8) = 0$$

$$t = 9, \quad t = -8$$

$$3^x = 9 \quad \cancel{3^x = -8}$$

$$3^x = 3^2$$

$$x = 2$$

Yanıt – Answer: B



24. $x^2 - x - 2 = 0$
 $x^4 - 2x^3 + x^2 = ?$
 $(x-2)(x+1) = 0 \Rightarrow x_1 = 2$
 $x_2 = -1$
 $x^4 - 2x^3 + x^2 = x^2 (x^2 - 2x + 1)$
 $= x^2 (x-1)^2 \Rightarrow 2^2 \cdot (2-1)^2 = 4$
 $\Rightarrow (-1)^2 \cdot (-1-1)^2 = 4$

Yanıt – Answer: C

25. $f(x) = x + \frac{2}{x} - 3$
 $f(x_1) = f(x_2) = 0$
 $x_2 - 3x + 2 = 0$
 $x_1 + x_2 = \frac{-b}{a} \Rightarrow x_1 + x_2 = 3$

Yanıt – Answer: E

26. $x^2 - (a+1)x + 3a + 4 = 0$
 $x_1 + x_2 = k = a+1 \Rightarrow a = k-1$
 $x_1 \cdot x_2 = m = 3a + 4$
 $m = 3 \cdot (k-1) + 4$
 $m = 3k + 1$

Yanıt – Answer: B

27. $2^{4x+1} - 2^{2x+2} = 96$
 $(2^{2x})^2 \cdot 2 - 2^{2x} \cdot 2^2 - 96 = 0$
 $2^{2x} = t$
 $2t^2 - 4t - 96 = 0$
 $t^2 - 2t - 48 = 0$
 -8
 $+6$
 $(t-8) \cdot (t+6) = 0$
 $t = 8 \quad t = -6$
 $2^{2x} = 2^3 \Rightarrow x = \frac{3}{2}$

Yanıt – Answer : D

28. $\frac{1}{x_1} + \frac{1}{x_2} = -\frac{b}{c} = -\frac{3}{-1} = 3$

Yanıt – Answer : E

29. $x^2 - ax + 4 = 0$
 $\frac{2}{x_1} + x_2 = 3 \Rightarrow \frac{2 + \overbrace{x_1 x_2}^4}{x_1} = 3$
 $\Rightarrow \frac{2+4}{x_1} = 3 \Rightarrow x_1 = 2$
 $x_1 \cdot x_2 = 4, \quad x_1 = 2 \Rightarrow x_2 = 2$
 $x_1 + x_2 = 4 = \frac{a}{1} \Rightarrow a = 4$

Yanıt – Answer : E

14. BÖLÜM

EŞİTSİZLİKLER







EŞİTSİZLİKLER

TEST - 1

1. $4x - x^2 \geq 0$

Ç.K. = ?

- A) (0, 4) B) $\mathbb{R} - (0, 4)$ C) $(-\infty, 0]$
D) [0, 4] E) $\mathbb{R} - [0, 4]$

2. $x^2 - 2x - 8 < 0$

Ç.K. = ?

- A) [4, ∞) B) $(-\infty, -2)$ C) [-2, 4]
D) $\mathbb{R} - [-2, 4]$ E) (-2, 4)

3. $x \in \mathbb{Z}$

$-x^2 - 2x + 15 \leq 0$

$\sum x = ?$

- A) 6 B) -1 C) 3 D) 7 E) 12

4. $x \in \mathbb{Z}$

$\left(\frac{1}{3}\right)^{x^2} \geq \left(\frac{1}{9}\right)^{2x - \frac{3}{2}}$

$\sum x = ?$

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

5. $x \in \mathbb{Z}$

$\frac{x+2}{3-x} \geq 0$

$\sum x = ?$

- A) -2 B) -1 C) 0 D) 3 E) 5

6. $x \in \mathbb{Z}$

$\frac{x}{3} < \frac{3}{x}$

$\max(x) = ?$

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

7. $\frac{x^2 + 5x + 6}{x^2 + 3x - 4} < 0$

Ç.K. = ?

- A) $(-\infty, -4) \cup (-2, 1)$ B) $(-4, -3) \cup (-2, 1)$
C) $(-\infty, -4) \cup (-3, -2)$ D) $(-4, -2)$
E) $(-3, -2) \cup (1, \infty)$

8. $\frac{(3-x)(x^2+4)}{|x+2|(x+4)} \leq 0$

Ç.K. = ?

- A) $(-4, -2) \cup [3, \infty)$ B) $(-4, -2)$
C) $(-4, 3] - \{-2\}$ D) $(-\infty, -4) \cup (-2, 3)$
E) $(-\infty, -4) \cup [3, \infty)$



9. $\frac{(x+1)^2 \cdot (x-3)}{x} \geq 0$

Ç.K=?

- A) $R-[0, 3]$ B) $(0, 3]$ C) $(0, 3)$
D) $(-\infty, -1]$ E) $R-(0, 3]$

10. $x \in Z$

$$\frac{(x+3)^2(x-2)}{x^2+4x+3} > 0$$

min(x) = ?

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

11. $x \in Z$

$$\frac{|x+4|+2}{|x-2|-4} \leq 0$$

$\sum x = ?$

- A) 9 B) 11 C) 13 D) 14 E) 15

12. $x \in Z, n \in Z$

$$\frac{(x+2)^{2n-1}(-2x+6)^{4n}}{(x-1)^{1003}(x-2)^{2n+1}} \leq 0$$

max(x) = ?

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

13. $m \in Z$

$$x^2 + mx - m + 3 = 0$$

$$\text{Ç.K} = \emptyset$$

$\sum m = ?$

- A) -19 B) -18 C) -14 D) -12 E) -10

14. $a < b < 0$

$$x(ax+b) > 0$$

Ç.K=?

- A) $\left(-\frac{b}{a}, 0\right)$ B) $\left(-\frac{b}{a}, \infty\right)$ C) $(0, \infty)$
D) $\left(0, \frac{b}{a}\right)$ E) $\left(-\infty, -\frac{b}{a}\right)$

15. $\frac{3x}{x-2} > 0$

$$\frac{x^2}{x+2} \leq 0$$

Ç.K=?

- A) $[0, 2)$ B) $(0, 2)$ C) $(-\infty, -2)$
D) $[-2, 0)$ E) $(-2, 2]$

16. $\sqrt{x+2} \geq 2$

$$2^{x^2-49} < 1$$

Ç.K=?

- A) $(-7, 7)$ B) $R-(-7, 7)$ C) $(0, 7)$
D) $[2, 7)$ E) $(-7, 2]$



1. $x \in \mathbb{Z}$

$$\frac{x-3}{x+2} \leq 0$$

$$\sum x = ?$$

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

2. $2x-1 < x+8 < 3x-6$

$$SS = ?$$

- A)
- $7 < x < 11$
- B)
- $7 < x < 9$
- C)
- $6 < x < 9$
-
- D)
- $5 < x < 7$
- E)
- $5 < x < 11$

3. $\sqrt{x^2-x-6} < x-2$

$$SS = ?$$

- A)
- $x \leq 2$
- B)
- $x \geq -3$
- C)
- $x = 3$
-
- D)
- $-2 \leq x < 3$
- E)
- $3 \leq x < \frac{10}{3}$

4. $x \in \mathbb{Z}$

$$\frac{x+2}{3} - x > 0$$

$$\max(x) = ?$$

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

5. $(1-x) \cdot (x^2-3x-4) < 0$

$$SS = ?$$

- A)
- $(-1, 1) \cup \{4\}$
- B)
- $(4, \infty)$
-
- C)
- $(-1, 1) \cup (4, \infty)$
- D)
- $(1, \infty)$
-
- E)
- $(-1, \infty)$

6. $\frac{(-x+2)^2 \cdot (x-3)}{x^2 \cdot (x+1)} \leq 0$

$$SS = ?$$

- A)
- $(-1, 2]$
- B)
- $(-1, 3]$
- C)
- $(-1, 3] - \{0\}$
-
- D)
- $(2, 3] \cup \{-1\}$
- E)
- $\mathbb{R} - (-1, 3]$

7. $\frac{(x-2)^{100} \cdot (2x-1)}{x+1} \leq 0$

$$SS = ?$$

- A)
- $\left(-1, \frac{1}{2}\right]$
- B)
- $\mathbb{R} - \left(-1, \frac{1}{2}\right]$
-
- C)
- $\left(-1, \frac{1}{2}\right] \cup \{2\}$
- D)
- $(-1, 2]$
-
- E)
- $\mathbb{R} - (-1, 2]$

8. $\frac{x^2-4x-12}{x^2+x-2} \leq 0$

$$SS = ?$$

- A)
- $\{-2, 1, 6\}$
- B)
- $(1, 6]$
- C)
- $(-2, 6]$
-
- D)
- $(-2, 6] - \{1, 2\}$
- E)
- $\{-2\} \cup (1, 6]$



9. $(x-1)^2 \cdot (9-x^2) > 0$

SS = ?

A) $[-3, 3]$

B) $(-3, 1] \cup [2, 3)$

C) $(-3, 3)$

D) $(-3, 1) \cup (1, 3)$

E) $[-3, 3] - \{1\}$

10. $\frac{4}{x} \leq \frac{x}{4}$

SS = ?

A) $[-4, 4]$

B) $[-4, 4] - \{0\}$

C) $[-4, 0) \cup [4, \infty)$

D) $\{-4, 4\}$

E) $(-2, 4]$

11. $\sqrt{x^2 - 4x + 4} \leq x - 2$

SS = ?

A) $(-4, -2]$

B) $\{2\}$

C) $[2, \infty)$

D) $\emptyset$

E) $\mathbb{R}$

12. $x^2 - 2x \leq 0$

$x \cdot (2-x) \cdot (x+1) > 0$

SS = ?

A) $(0, 2]$

B) $(0, 2)$

C) $(-1, 2)$

D) $\emptyset$

E) $[-2, 0) \cup (0, 2]$

13. $x > \sqrt{6-x}$

SS = ?

A) $\{6\}$

B) $[-3, 2]$

C) $(-3, 2) \setminus \{1\}$

D) $\mathbb{R} - (-3, 2)$

E) $(2, 6]$

14. $\frac{x^2 - 4x - 21}{|x^2 - 1|} \leq 0$

SS = ?

A) $[-3, 7]$

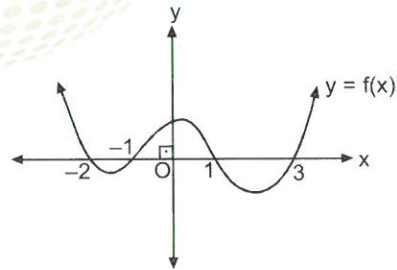
B) $\mathbb{R} - \{-1, 1\}$

C) $\{-3, 7\}$

D) $[-3, 7] - \{-1, 1\}$

E) $\mathbb{R} - [-1, 1]$

15.



$y = f(x)$

$x \in \mathbb{Z}$

$(x^2 - 5x + 4) \cdot f(x) > 0$

$\sum x = ?$

A) -7

B) -5

C) 0

D) 2

E) 4



1. $\frac{x^2 - 16}{|x - 2|} \leq 0$

$\sum x = ?$

- A) 9 B) 8 C) 4 D) 0 E) -2

2. $\frac{x}{4} - \frac{2}{x} > 0$

SS = ?

- A) $(-2\sqrt{2}, 0) \cup (2\sqrt{2}, \infty)$ B) $(-\infty, -2\sqrt{2})$
C) $(2\sqrt{2}, \infty)$ D) $(-2\sqrt{2}, 0)$
E) $(-\infty, -2\sqrt{2}) \cup (0, 2\sqrt{2})$

3. $x \in \mathbb{Z}^-$
 $x - \frac{15}{x} < 2$

max(x) = ?

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

4. $x^2 - 2x - 3 \leq 0$
 $x^2 + 3x - 4 \geq 0$

SS = ?

- A) [-1, 3] B) [-1, 1] C) [-4, -1]
D) [1, 3] E) [-4, 3]

5. $x^2 - 3ax + 25 = 0$

$\sqrt{x_1} + \sqrt{x_2} \leq 5$

max(a) = ?

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

6. $x^2 - 2x < 15 < x^2 + 2x$

SS = ?

- A) (-3, 3) B) (-5, -3) C) (3, 5)
D) (-3, 5) E) (-4, 4)

7. $x \in \mathbb{Z}$
 $|x^2 - 9| < |x - 3|$

$\sum x = ?$

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

8. $(3x + 1)^2 < 49$

SS = ?

- A) $(-\frac{8}{3}, 2)$ B) $(-\frac{4}{3}, 0)$ C) (0, 2)
D) (0, 3) E) $(-\frac{8}{3}, 0)$



9. $|x^2 - 3x| < x$

SS = ?

- A) (0, 2) B) (2, 4) C) $(-\infty, 0)$
D) $(4, \infty)$ E) (0, 4)

10. $x \in \mathbb{Z}$

$$5 < x^2 - 4x \leq 12$$

$\sum x = ?$

- A) 8 B) 6 C) 4 D) -2 E) -3

11. $\frac{x-3}{x+1} \leq 0$

$$x^2 + 2x - 3 > 0$$

SS = ?

- A) (1, 3] B) [-1, 1) C) (-3, -1]
D) [-3, 1) E) [-1, 3]

12. $n \in \mathbb{Z}$

$$(3-n)x^2 + (n-1)x + n + 2 = 0$$

$$\frac{x_1}{x_2} < 0$$

$\sum n = ?$

- A) -5 B) -3 C) -2 D) 0 E) 3

13. $n \in \mathbb{Z}$

$$nx^2 + (n-3)x + n - 5 = 0$$

$$x_1 \cdot x_2 < 0$$

$\sum n = ?$

- A) 10 B) 7 C) 5 D) 3 E) 1

14. $x^2 + 3|x| - 18 < 0$

SS = ?

- A) (0, 3) B) (-3, 3) C) (-3, 0)
D) (-6, -3) E) (4, 6)

15. $nx^2 - (n+1)x + 5 - n = 0$

$$x_1 + x_2 < x_1 \cdot x_2$$

$n \in ?$

- A) (0, 5) B) (0, 2) C) (-1, 0)
D) $(2, \infty)$ E) $(-\infty, 5)$

15. BÖLÜM

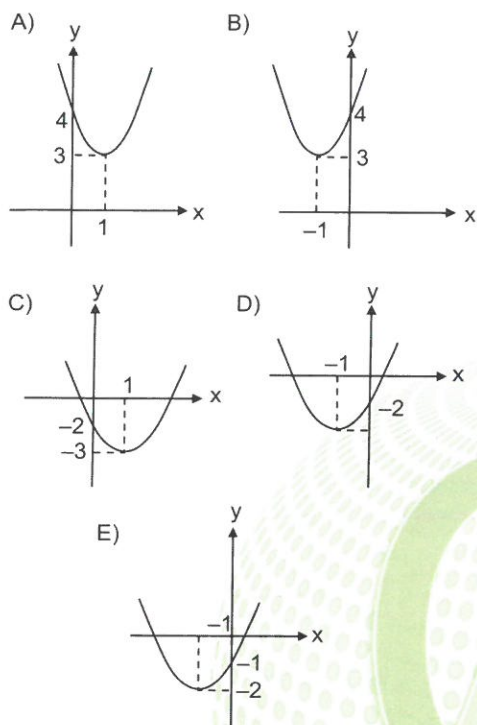
PARABOL



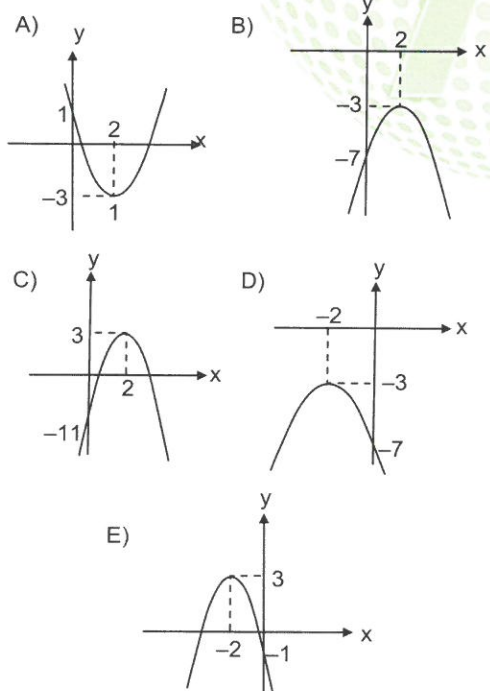




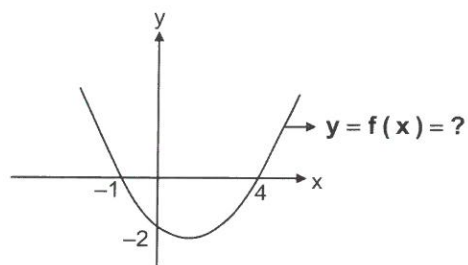
1. $f(x) = (x+1)^2 - 3$
 $\text{Grf}[f(x)] = ?$



2. $y = -(x-2)^2 - 3$
 $\text{Grf}[f(x)] = ?$



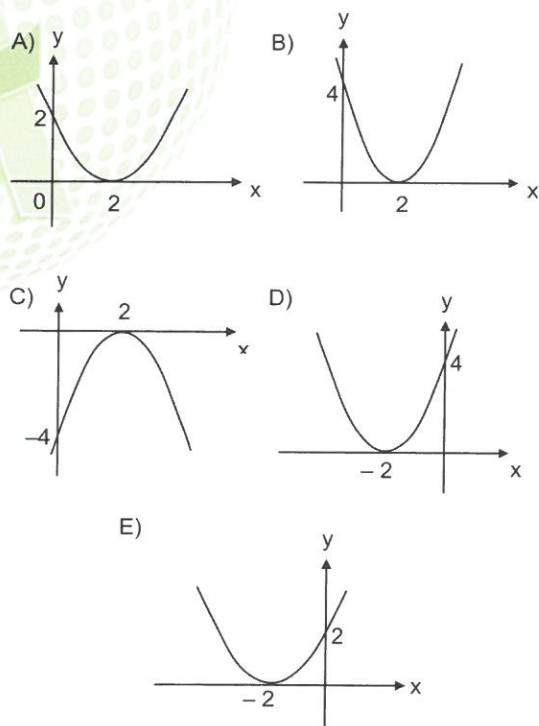
3.



- A) $y = -2(x-1).(x-4)$ B) $y = -2(x-1).(x+4)$
C) $y = \frac{1}{2}(x+1).(x-4)$ D) $y = \frac{2}{5}(x-2).(x+4)$
E) $y = -\frac{1}{2}(x+1).(x-4)$

4.

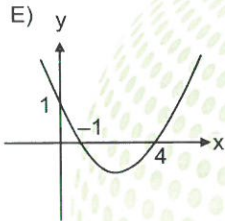
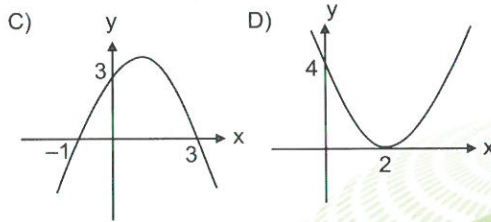
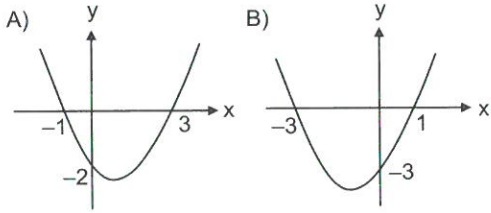
$y = x^2 + 4x + 4$
 $\text{Grf}(y) = ?$



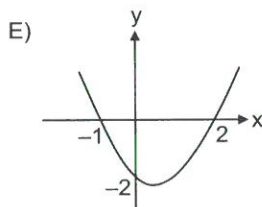
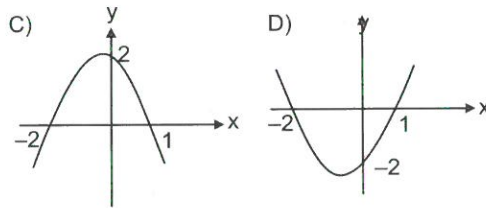
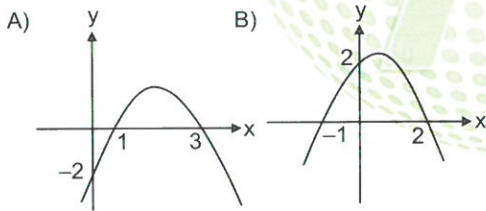


5. $y = x^2 + 2x - 3$

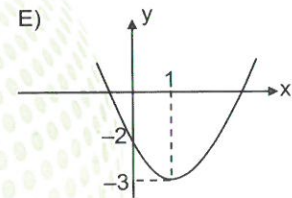
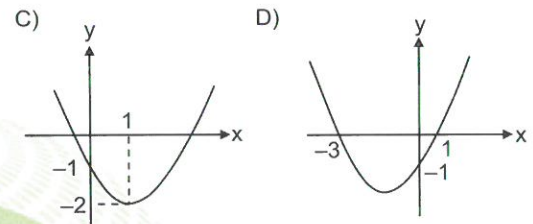
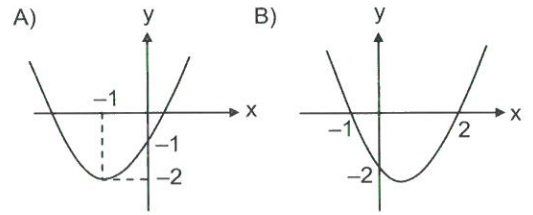
Grf(y) = ?



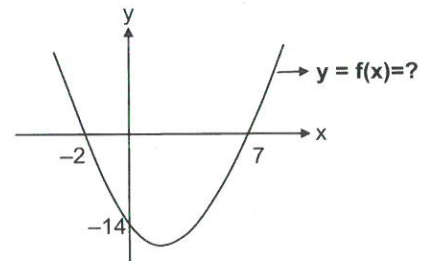
6. $y = -x^2 - x + 2$
Grf(y) = ?



7. $y = x^2 - 2x - 1$
Grf(y) = ?



8.



A) $-x^2 + 5x + 14$

B) $x^2 + 5x - 14$

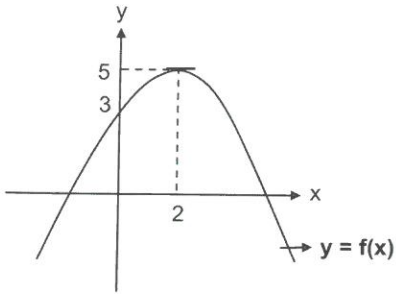
C) $x^2 - 5x - 14$

D) $2x^2 - 10x + 25$

E) $3x^2 - 13x - 42$



9.



$$f(x) = ax^2 + bx + c$$

$$f(x) = ?$$

A) $\frac{x^2}{2} - 2x - 3$

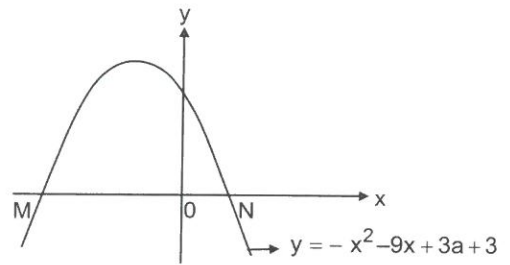
B) $-\frac{x^2}{2} + 2x + 3$

C) $-2x^2 - 4x + 3$

D) $3x^2 + 6x + 7$

E) $-\frac{x^2}{2} + 2x - 7$

11.



$$|MO| = 4|ON|$$

$$a = ?$$

A) -13

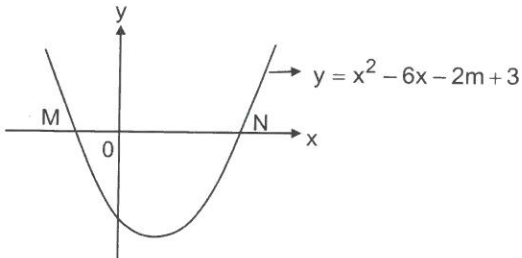
B) -12

C) -11

D) 11

E) 13

10.



$$|MN| = 8$$

$$m = ?$$

A) 8

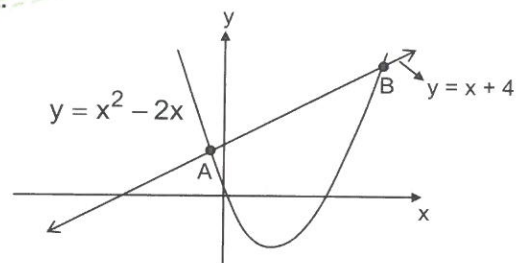
B) 7

C) 6

D) 5

E) 4

12.



$$|AB| = ?$$

A) $\sqrt{2}$

B) $2\sqrt{3}$

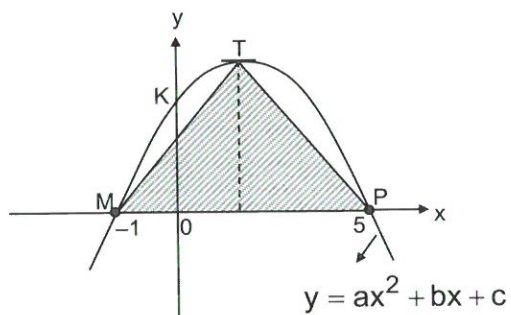
C) $3\sqrt{2}$

D) $5\sqrt{2}$

E) $7\sqrt{2}$



13.



$$A(MTP) = 30 \text{ br}^2$$

$$|OK| = ?$$

A) $-\frac{45}{9}$

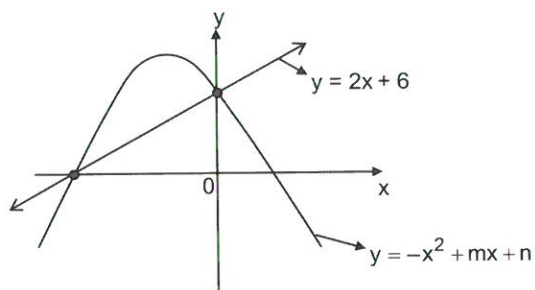
B) $-\frac{25}{9}$

C) $\frac{20}{9}$

D) $\frac{25}{9}$

E) $\frac{50}{9}$

14.



$$m + n = ?$$

A) 3

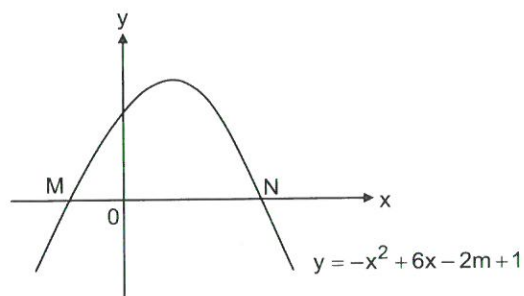
B) 4

C) 5

D) 6

E) 9

15.



$$|ON| + |OM| = 8$$

$$m = ?$$

A) -3

B) -2

C) -1

D) 1

E) 2



1. $f(x) = x^2 - 4x + 2$

$\min[f(x)] = ?$

- A) -8 B) -4 C) -2 D) 2 E) 4

2. $f(x) = ax^2 - 3(a+1)x - 4$

$T(-1, k)$

$a = ?$

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

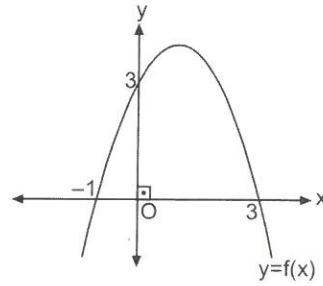
3. $y = x^2 - (m-2)x + 3$

$T\left(\frac{3}{2}, k\right)$

$\min(y) = ?$

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

4.

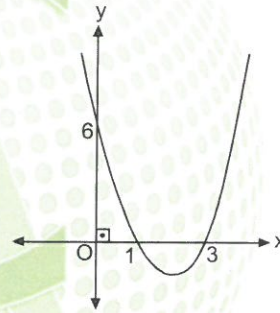


$f(x) = ax^2 + bx + c$

$f(2) = ?$

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

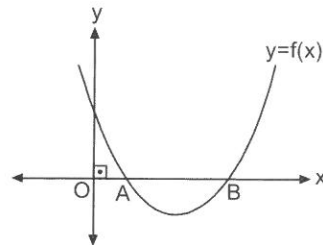
5.



$\min[f(x)] = ?$

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

6.



$y = f(x) = x^2 - 5x + m - 2$

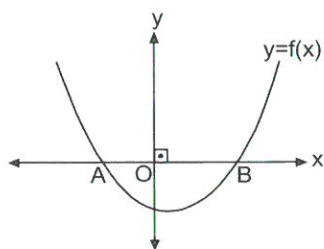
$3|OA| = |AB|$

$m = ?$

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



7.



$$f(x) = x^2 - 2x + m - 9$$

$$3|AO| = 2|OB|$$

$$m = ?$$

- A) -15 B) -12 C) -8 D) 8 E) 14

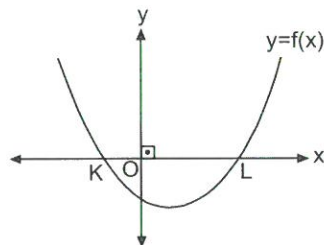
8. $f(x) = a(x-2) \cdot (x+3)$

$$\max[f(x)] = 5$$

$$a = ?$$

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

9.



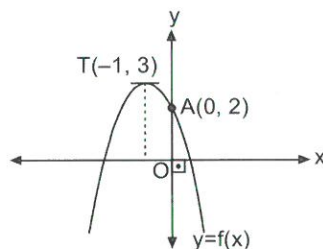
$$y = x^2 - 4x + m - 3$$

$$|KL| = 6 \text{ br}$$

$$m = ?$$

- A) -5 B) -2 C) 1 D) 3 E) 6

10.

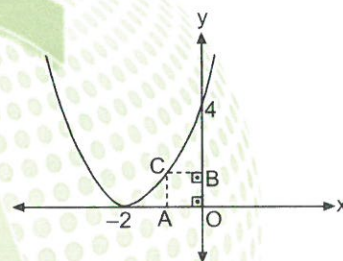


$$y = ax^2 + bx + c$$

$$b = ?$$

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

11.

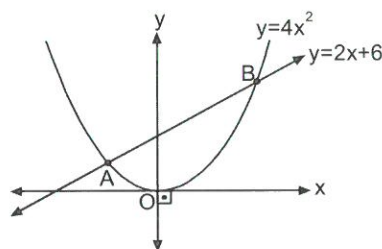


$$|AO| = |CA|$$

$$A(OABC) = ? \text{ br}^2$$

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

12.

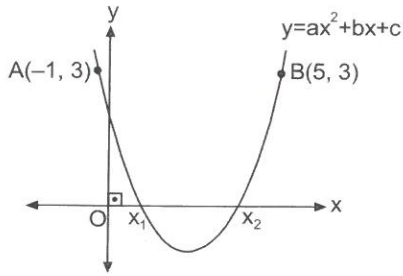


$$|AB| = ?$$

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



1.



$$x_1 + x_2 = ?$$

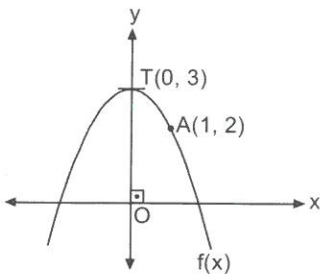
- A) 3 B) 4 C) 5 D) 6 E) 8

2. $A = 2x^2 - 8x + 9$

$$\min(A) = ?$$

- A) -3 B) 1 C) 3 D) 6 E) 9

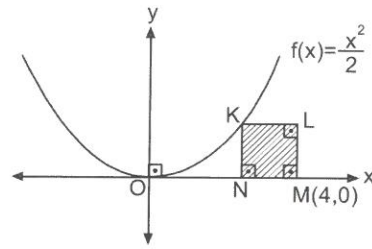
3.



$$f(3) = ?$$

- A) -9 B) -6 C) -3 D) 0 E) 3

4.

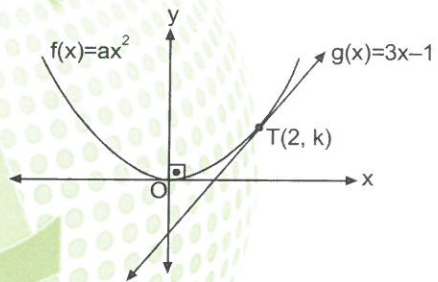


$$|NM| = |LM|$$

$$A(KLMN) = ? br^2$$

- A) 1 B) 2 C) 4 D) 6 E) 8

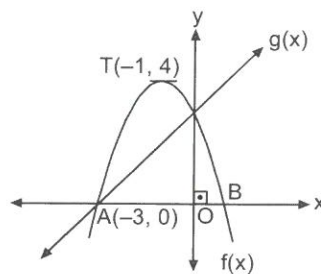
5.



$$a = ?$$

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

6.

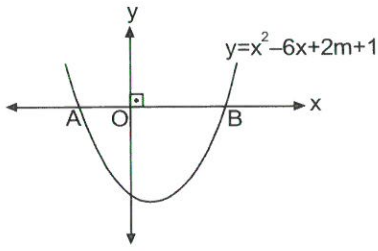


$$g(1) = ?$$

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



7.

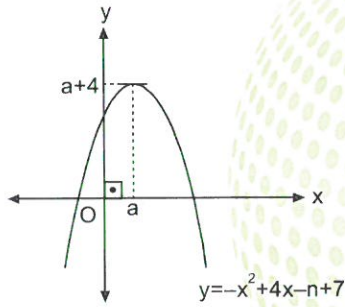


$$3|AO| = |OB|$$

$$m = ?$$

- A) -7 B) -10 C) -14 D) -18 E) -20

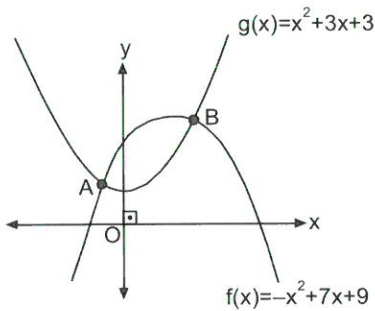
8.



$$n = ?$$

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

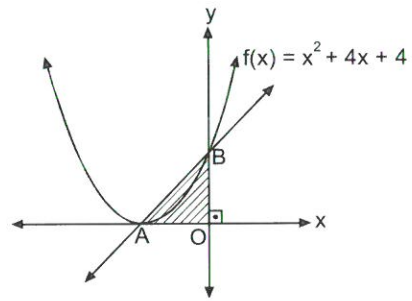
9.



$$|AB| = ?$$

- A) $10\sqrt{5}$ B) 15 C) $3\sqrt{26}$
D) $4\sqrt{26}$ E) $12\sqrt{3}$

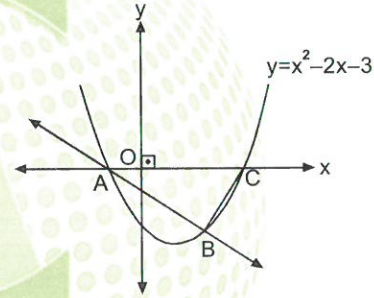
10.



$$A(\triangle AOB) = ? br^2$$

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

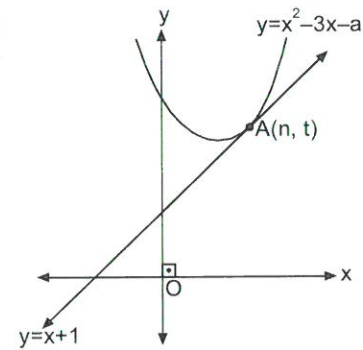
11.



$$\max [S(\triangle ABC)] = ? br^2$$

- A) 16 B) 12 C) 8 D) 6 E) 4

12.



$$a = ?$$

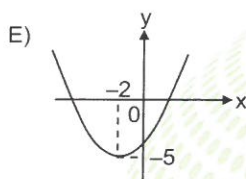
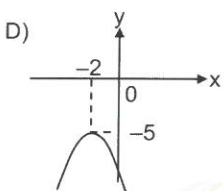
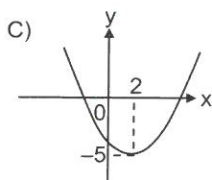
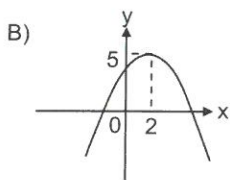
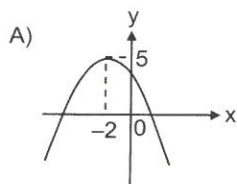
- A) -6 B) -5 C) -4 D) -3 E) -2



PARABOL

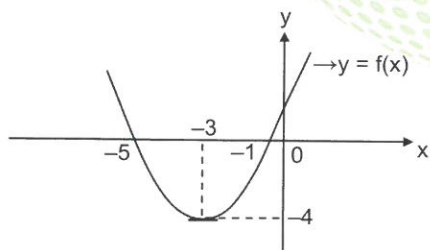
ÇIKMIŞ SORULAR

1. $y = (x+2)^2 - 5 = ?$



(YÖS - 1981)

2.



$y = ?$

A) $(x+1)^2 + 5$

B) $(x+3)^2 - 4$

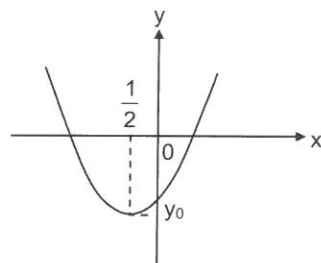
C) $(x+3)^2 + 5$

D) $(x-3)^2 + 4$

E) $(x+5)^2 - 1$

(YÖS - 1982)

3.



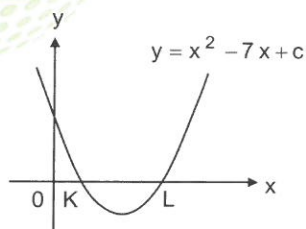
$T\left(-\frac{1}{2}, y_0\right) \quad y = (m-1)x^2 + x - m$

$m = ?$

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

(YÖS - 1992)

4.



$y = x^2 - 7x + c \quad |KL| = 5 \cdot |OK|$

$c = ?$

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

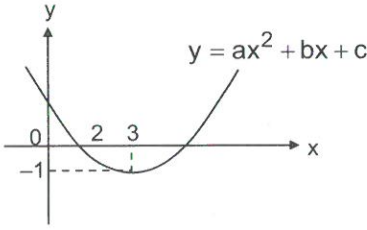
(YÖS - 1997)



PARABOL

ÇIKMIŞ SORULAR

5.



$$y = ax^2 + bx + c$$

$y = ?$

A) $x^2 - 6x + 8$

B) $x^2 + 6x + 8$

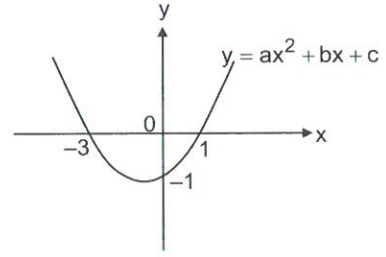
C) $x^2 + 6x - 8$

D) $2x^2 - 6x + 8$

E) $2x^2 + 6x - 8$

(YÖS - 1998)

7.



$$3a + 6b + 2c = ?$$

A) 1

B) 2

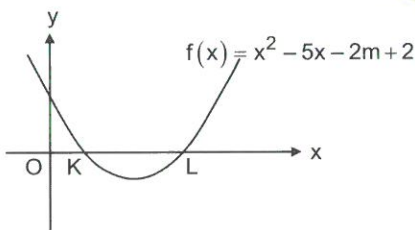
C) 3

D) 4

E) 5

(YÖS - 2001)

6.



$$f(x) = x^2 - 5x - 2m + 2 \quad |OL| - |OK| = 3$$

$m = ?$

A) -2

B) -1

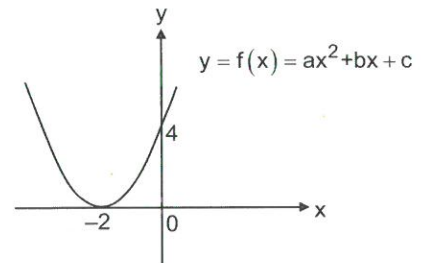
C) 1

D) 2

E) 3

(YÖS - 1999)

8.



$$f(-3) = ?$$

A) -2

B) -1

C) 0

D) 1

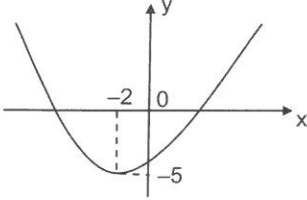
E) 2

(YÖS - 2002)



1. $y = (x+2)^2 - 5$

$T(-2, -5) \quad a > 0 \quad (a=1)$



Yanıt – Answer : E

2. $T(-3, -4)$

$y = a \cdot (x+3)^2 - 4$

$(-1, 0) \in y \Rightarrow 0 = a \cdot (-1+3)^2 - 4$

$0 = a \cdot 4 - 4$

$4 = 4 \cdot a$

$a = 1$

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

Yanıt – Answer : B

3. $y = (m-1)x^2 + x - m$

$T\left(-\frac{1}{2}, y_0\right) = \left(-\frac{b}{2a}, y_0\right)$

$-\frac{1}{2} = -\frac{1}{2 \cdot (m-1)}$

$2(m-1) = 2$

$m-1 = 1$

$m = 2$

Yanıt – Answer : B

4. $y = x^2 - 7x + c$

$K(x_1, 0) \quad L(6x_1, 0)$

$x_1 + 6x_1 = -\frac{(-7)}{1}$

$7x_1 = 7$

$x_1 = 1$

$0 = 1 - 7 + c \Rightarrow c = 6$

Yanıt – Answer : C

5. $y = a(x-r)^2 + k$

$T(3, -1) \Rightarrow r = 3$

$k = -1$

$y = a(x-3)^2 - 1$

$(2, 0) \in y \Rightarrow 0 = a(2-3)^2 - 1$

$a = 1$

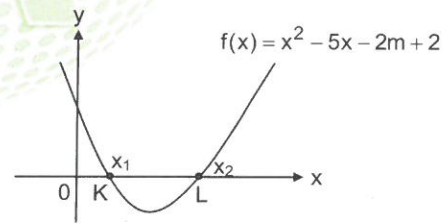
$y = (x-3)^2 - 1$

$= x^2 - 6x + 9 - 1$

$= x^2 - 6x + 8$

Yanıt – Answer : A

6.



$|OL| - |OK| = 3 \Rightarrow$

$x_2 - x_1 = 3$

$+ x_1 + x_2 = 5$

$2x_2 = 8$

$x_2 = 4 \Rightarrow x_1 = 1$

$x_1 \cdot x_2 = \frac{c}{a} \Rightarrow 1 \cdot 4 = -2m + 2$

$2 = -2m$

$m = -1$

Yanıt – Answer : B



7. $y = a(x - x_1)(x - x_2)$

$$y = a(x + 3)(x - 1)$$

$$(0 - 1) \in y$$

$$-1 = a(0 + 3)(0 - 1)$$

$$a = \frac{1}{3}$$

$$y = \frac{1}{3}(x + 3)(x - 1) \Rightarrow y = \frac{x^2}{3} + \frac{2x}{3} - 1$$

$$\left. \begin{array}{l} a = \frac{1}{3} \\ b = \frac{2}{3} \\ c = -1 \end{array} \right\} \begin{array}{l} 3a + 6b + 2c = 3 \cdot \frac{1}{3} + 6 \cdot \frac{2}{3} + 2 \cdot (-1) \\ = 1 + 4 - 2 \\ = 3 \end{array}$$

Yanıt – Answer : C

8. $f(x) = k \cdot (x + 2)^2$

$$(0 - 1) \in y$$

$$4 = k \cdot (0 + 2)^2 \Rightarrow k = 1$$

$$f(x) = (x + 2)^2$$

$$f(-3) = (-3 + 2)^2 = 1$$

Yanıt – Answer : D

16. BÖLÜM

TRİGONOMETRİ







1. $a = \sin 20^\circ$
 $b = \tan 70^\circ$
 $c = \cot 40^\circ$
- $? < ? < ?$
- A) $a < b < c$ B) $a < c < b$ C) $b < c < a$
D) $b < a < c$ E) $c < b < a$

2. $a = \sin 400^\circ$
 $b = \cos 370^\circ$
 $c = \cot 400^\circ$
- $? < ? < ?$
- A) $a < b < c$ B) $b < a < c$ C) $c < b < a$
D) $c < a < b$ E) $b < c < a$

3. $a = \cos 271^\circ$
 $b = \sin 179^\circ$
 $c = \cot 354^\circ$
- $(a, b, c) = (?, ?, ?)$
- A) $(+, +, +)$ B) $(+, -, +)$ C) $(-, +, -)$
D) $(+, +, -)$ E) $(-, -, -)$

4. $a = \sin 415^\circ$
 $b = \cos(-310^\circ)$
 $c = \cot(-710^\circ)$
- $? < ? < ?$
- A) $a < b < c$ B) $a < c < b$ C) $b < a < c$
D) $b < c < a$ E) $c < b < a$

5. $a = \sin 95^\circ$
 $b = \cos 340^\circ$
 $c = \cot 220^\circ$
- $? < ? < ?$
- A) $a < b < c$ B) $b < a < c$ C) $b < c < a$
D) $c < b < a$ E) $c < a < b$

6. $a = \sin(-130^\circ)$
 $b = \cos(-260^\circ)$
 $c = \cot(-220^\circ)$
- $? < ? < ?$
- A) $a = b < c$ B) $a = c < b$ C) $b < a < c$
D) $c < b < a$ E) $c < a < b$

7. $a = \tan 670^\circ$
 $b = \cot(-550^\circ)$
 $c = \sin(-800^\circ)$
- $? < ? < ?$
- A) $c < b < a$ B) $c < a < b$ C) $b < c < a$
D) $b < a < c$ E) $a < b < c$

8. $a = \sin(-780^\circ)$
 $b = \cos(-920^\circ)$
 $c = \tan(-510^\circ)$
- $(a, b, c) = (?, ?, ?)$
- A) $(+, +, +)$ B) $(+, +, -)$ C) $(+, -, -)$
D) $(-, -, +)$ E) $(-, -, -)$



9. $a = \cos(-1220^\circ)$

$b = \tan(-760^\circ)$

$c = \cot 1250^\circ$

$(a, b, c) = (?, ?, ?)$

A) $(-, -, -)$ B) $(-, -, +)$ C) $(-, +, +)$

D) $(+, -, -)$ E) $(+, +, -)$

10. $x \in \left(0, \frac{\pi}{2}\right)$

$\sin x = \frac{3}{4}$

$\cot x = ?$

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

11. $x \in \left(0, \frac{\pi}{2}\right)$

$\tan x = \frac{\sqrt{3}}{5}$

$\sin x = ?$

A) $\frac{3}{4}$ B) $\frac{3}{5}$ C) $\frac{\sqrt{21}}{7}$ D) $\frac{\sqrt{21}}{14}$ E) $\frac{\sqrt{21}}{28}$

12. $\frac{(\cos^2 x - 1) \cdot \cot x}{\sin x} = ?$

A) $-\sin x$ B) $-\sec x$ C) $-\cos x$ D) $\cos x$ E) $\sec x$

13. $\frac{\tan(180^\circ - x) \cdot \cot x \cdot \sin(180^\circ - x)}{\cot(270^\circ - x) \cdot \cos x} = ?$

A) $-\sin x$ B) $-\sec x$ C) -1 D) 1 E) $\sin x$

14. $\frac{\cos\left(\frac{3\pi}{2} - x\right) \cdot \cot(\pi + x)}{\sin\left(\frac{\pi}{2} + x\right) \cdot \cos(-x)} = ?$

A) $-\cos x$ B) $-\sec x$ C) $-\operatorname{cosec} x$ D) $\sec x$ E) $\operatorname{cosec} x$

15. $x \in \left(\pi, \frac{3\pi}{2}\right), \cot x = \frac{2}{3}$

$\frac{\sin x - \cos x}{\operatorname{cosec} x} + 1 = ?$

A) $-\frac{23}{13}$ B) $-\frac{16}{13}$ C) $\frac{3}{13}$ D) $\frac{16}{13}$ E) $\frac{23}{13}$



1. $\frac{\cos^2(-x) + \cos^2(90^\circ - x) - \sin(180^\circ - x)}{1 - \operatorname{cosec} x} = ?$

- A) $-\sec x$ B) $-\operatorname{cosec} x$ C) $-\sin x$ D) $\cos x$ E) $\sin x$

2. $\frac{\tan x \cdot \cos x \cdot \sin x + \cot x \cdot \sin x \cdot \cos x}{\operatorname{cosec} x} = ?$

- A) $\tan x$ B) $\cot x$ C) $\sin x \cdot \cos x$ D) $\sin x$ E) $\cos x$

3. $\frac{\cot \frac{5\pi}{4} + \sec \frac{5\pi}{6}}{\tan \frac{7\pi}{4} - \operatorname{cosec} \frac{5\pi}{3}} = ?$

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

4. $\tan x = \frac{2}{3}$
 $\sin 2x = ?$

- A) $\frac{12\sqrt{13}}{13}$ B) $\frac{6\sqrt{13}}{13}$ C) $\frac{3}{2}$
D) $\frac{12}{13}$ E) $\frac{6}{13}$

5. $\frac{(\cot x + \operatorname{cosec} x) \cdot \tan x}{1 + \cos x} = ?$

- A) $\operatorname{cosec} x$ B) $\sec x$ C) $\sin x$ D) $\cos x$ E) $\tan x$

6. $\sec x = \frac{6}{5}$
 $\cos 2x = ?$

- A) $-\frac{11}{36}$ B) $\frac{7}{36}$ C) $\frac{25}{36}$ D) $\frac{7}{18}$ E) $\frac{25}{18}$

7. $\cot x = \frac{1}{2}$
 $\tan 2x = ?$

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

8. $\tan x - \cot x = \sqrt{5}$
 $\tan^2 x + \cot^2 x = ?$

- A) 3 B) 5 C) 7 D) 9 E) 11



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

- A) $\frac{8}{9}$ B) 1 C) $\frac{10}{9}$ D) $\frac{11}{9}$ E) $\frac{4}{3}$

10. $x \in \left(0, \frac{\pi}{2}\right)$, $\operatorname{cosec} x = \frac{5}{3}$

$\frac{\cos 2x + 1}{\sin 2x} = ?$

- A) $\frac{7}{25}$ B) $\frac{3}{4}$ C) $\frac{24}{25}$ D) $\frac{4}{3}$ E) $\frac{32}{25}$

11. $\tan x + \cot x = 2\sqrt{3}$

$\tan^2 x + \cot^2 x = ?$

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

12. $\frac{\sin 32^\circ \cdot \cos 48^\circ + \sin 48^\circ \cdot \cos 32^\circ}{\sin 100^\circ} = ?$

- A) -1 B) 1 C) $\sin 80^\circ$ D) $\tan 80^\circ$ E) $\cot 80^\circ$

13. $\frac{1}{\sin 10^\circ} + \frac{\sqrt{3}}{\cos 10^\circ} = ?$

- A) $6\cos 40^\circ$ B) $2\cos 40^\circ$ C) $8\cos 20^\circ$
D) $4\cos 20^\circ$ E) $4\sin 20^\circ$

14. $\frac{\sqrt{3}}{\sin 15^\circ} - \frac{1}{\cos 15^\circ} = ?$

- A) $8\sqrt{2}$ B) $6\sqrt{2}$ C) $4\sqrt{2}$ D) $3\sqrt{2}$ E) $2\sqrt{2}$

15. $\sin 70^\circ = 2a$

$\frac{\sin 30^\circ}{\sin 10^\circ} + \frac{\cos 30^\circ}{\cos 10^\circ} = ?$

- A) $\frac{a}{2}$ B) a C) $2a$ D) $4a$ E) $8a$



1. $\frac{\sin 75^\circ \cdot \cos 75^\circ}{\sin^2 22,5^\circ - \cos^2 22,5^\circ} = ?$

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

2. $0 < x < \frac{\pi}{2}$, $\sin x = \frac{3}{5}$

$$\frac{\sin \frac{x}{2} + \cos \frac{x}{2}}{\tan \frac{x}{2}} = ?$$

- A) $-\frac{12\sqrt{10}}{5}$ B) $-\frac{6\sqrt{10}}{5}$ C) $-\frac{3\sqrt{10}}{5}$
D) $\frac{6\sqrt{10}}{5}$ E) $\frac{12\sqrt{10}}{5}$

3. $8x = \pi$

$$\frac{\cos 3x + \cos 2x + \cos x}{\cos^2 x + 2\cos x + \sin^2 x} = ?$$

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

4. $14x = \pi$

$$\frac{\cos 6x + \cos 4x}{\cos 8x - \cos 4x} = ?$$

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

5. $0 < x < \frac{\pi}{2}$, $\frac{\sin 3x + \sin x}{1 + \cos 2x} = \frac{6}{5}$

$$\sec x = ?$$

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

6. $\sin x - \cos x = \cos(\arccot \sqrt{3})$

$$\sin 2x = ?$$

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

7. $\cos 17^\circ \cdot \cos 13^\circ - \sin 32^\circ \cdot \sin 28^\circ = ?$

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

8. $3\sin x - 2\cos x - 5 = 0$

$$\sin x = ?$$

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



9. $\frac{\sin x}{1 - \cos x} - \frac{\sin x}{1 + \cos x} = \frac{8}{7}$

cotx=?

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

10. $\frac{\sin 6x}{\sin 3x} - \frac{\cos 6x}{\cos 3x} = 4$

sin3x=?

- A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{\sqrt{5}}{2}$ D) $\frac{\sqrt{11}}{4}$ E) $\frac{\sqrt{15}}{4}$

11. $x + y = \frac{\pi}{6}$

$(\sin x + \cos y)^2 + (\cos x + \sin y)^2 = ?$

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

12. $\left(\frac{\cos 68^\circ \cdot \cos 22^\circ - \sin 68^\circ \cdot \sin 22^\circ}{\cos 45^\circ \cdot \sin 45^\circ - \tan 75^\circ} \right)^4 = ?$

- A) 625 B) 125 C) 32 D) 27 E) 0

13. $\frac{\cot 80^\circ \cdot \cot 20^\circ + 1}{\cot 20^\circ - \cot 80^\circ} = ?$

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

14. $\sin x = 8 \cos^2 \frac{x}{2} - 4$

sinx . cosx=?

- A) $\frac{1}{4}$ B) $\frac{4\sqrt{17}}{17}$ C) $\frac{4}{17}$ D) $\frac{3}{16}$ E) $\frac{\sqrt{3}}{4}$

15. $2 \sin^2 x + \sin x \cdot \cos x = 1$

cos2x=?

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



1. $\sin 15^\circ = ?$

- A) $\frac{\sqrt{6}-\sqrt{2}}{2}$ B) $\frac{\sqrt{6}+\sqrt{2}}{2}$ C) $\frac{2-\sqrt{3}}{4}$
D) $\frac{\sqrt{6}-\sqrt{2}}{4}$ E) $\frac{2+\sqrt{3}}{4}$

2. $\frac{\tan 33^\circ + \tan 72^\circ}{1 - \tan 33^\circ \cdot \tan 72^\circ} = ?$

- A) $2+2\sqrt{3}$ B) $2-\sqrt{3}$ C) $4+2\sqrt{3}$
D) $\sqrt{3}-2$ E) $-2-\sqrt{3}$

3. $\frac{\sin 2x}{1 + \cos 2x} = ?$

- A) $\sec x$ B) $\operatorname{cosec} x$ C) $2\sin x$
D) $\tan x$ E) $\cot x$

4. $\cot a = \frac{1}{3}$
 $\cot b = \frac{3}{2}$

$\tan(a+b) = ?$

- A) $-\frac{11}{3}$ B) $-\frac{11}{6}$ C) $-\frac{7}{6}$ D) $\frac{7}{6}$ E) $\frac{11}{3}$

5. $\cos 52^\circ = \frac{1}{3}$

$\sin 154^\circ = ?$

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

6. $\sin 75^\circ \cdot \sin 15^\circ = ?$

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

7. $0 < x < \frac{\pi}{2}$

$\cos x - \sin x = \frac{1}{\sqrt{3}}$

$\tan 2x = ?$

- A) $2\sqrt{5}$ B) $\sqrt{5}$ C) $\frac{2\sqrt{5}}{5}$ D) $\frac{\sqrt{5}}{5}$ E) $\frac{\sqrt{5}}{7}$

8. $\sin 26^\circ = a$

$\cos 38^\circ = ?$

- A) $2a^2-2$ B) $2a \cdot \sqrt{1-a^2}$ C) 2
D) $2 \cdot \sqrt{1-a^2}$ E) $2a \cdot \sqrt{1+a^2}$

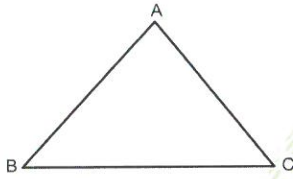


9. $\sin 125^\circ = a$

$\cos 70^\circ = ?$

- A) $\sqrt{1-a^2}$ B) $1-2a^2$ C) $2a^2-1$
D) $1+2a^2$ E) a^2-1

10.



$\tan \hat{A} = \frac{3}{2}$

$\tan \hat{B} = 2$

$\tan \hat{C} = ?$

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

11. $\sin 75^\circ + \cos 75^\circ = ?$

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

12. $\frac{\sin 20^\circ + \sin 45^\circ + \sin 70^\circ}{\cos 70^\circ + \cos 20^\circ + \cos 45^\circ} = ?$

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

13. $\frac{\sin^4 x - \cos^4 x}{\sin 4x} = ?$

- A) $-\frac{\operatorname{cosec} 2x}{2}$ B) $\sec 2x$ C) $-2\operatorname{cosec} 2x$
D) $-2\tan x$ E) $-\frac{\cot 2x}{2}$

14. $\sin 6^\circ = a$

$\cos 42^\circ \cdot \sin 48^\circ = ?$

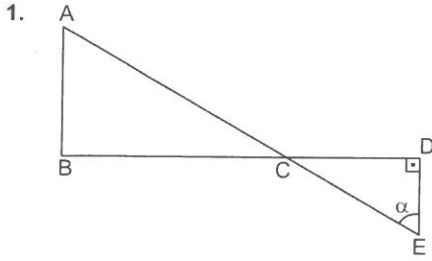
- A) $\frac{a+1}{4}$ B) $\frac{a+1}{2}$ C) $\frac{a-1}{2}$ D) $\sqrt{\frac{a+1}{2}}$ E) $\frac{a-1}{4}$

15. $\cos 40^\circ \cdot \cos 20^\circ - \cos 5^\circ \cdot \sin 65^\circ = ?$

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

16. $\tan 15^\circ + \cot 15^\circ = ?$

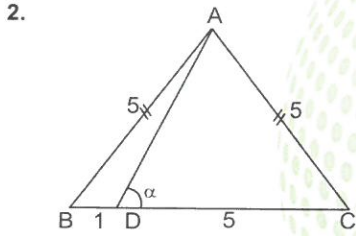
- A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$ E) 4



$[AB] \parallel [DE]$, $[ED] \perp [BD]$
 $|AE| = 10$ br, $|AB| = 5$ br, $|DE| = 1$ br
 $m(\widehat{DEC}) = \alpha$

$\sin \alpha = ?$

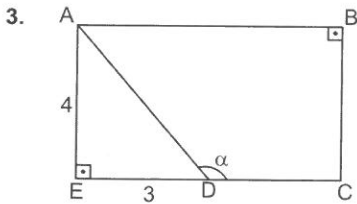
- A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) $\frac{4}{5}$ D) $\frac{5}{8}$ E) $\frac{1}{2}$



$|AB| = |AC| = |DC| = 5$ cm
 $|BD| = 1$ cm

$\tan \alpha = ?$

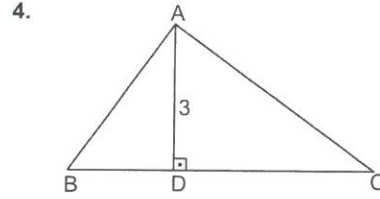
- A) 1 B) 2 C) $\frac{5}{2}$ D) 3 E) $\frac{7}{2}$



$|ED| = 3$ cm
 $|AE| = 4$ cm

$\cos \alpha = ?$

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



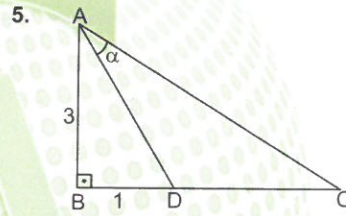
$[AD] \perp [BC]$

$|AD| = 3$ br

$$\cot \widehat{B} + \frac{1}{\tan \widehat{C}} = 5$$

$|BC| = ?$

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



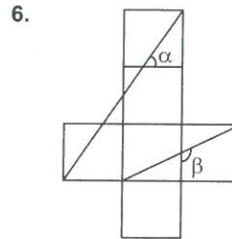
$[AB] \perp [BC]$

$|AB| = 3$ br, $|BD| = 1$ br

$$\tan \alpha = \frac{1}{2}$$

$|DC| = ?$ br

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



$\tan \alpha + \tan \beta = ?$

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



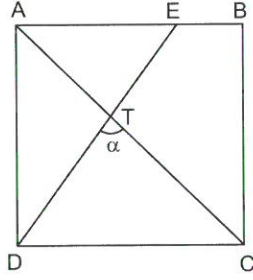
7. $[AD] \perp [DC]$

$[AB] \parallel [DC]$

$|AD| = |AB| = |DC| = 3|EB|$

$m(\widehat{DTC}) = \alpha$

$\tan \alpha = ?$



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

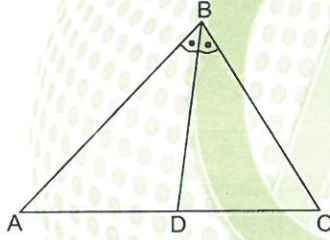
8. $m(\widehat{ABD}) = m(\widehat{DBC})$

$$\sin \hat{A} = \frac{5}{6}$$

$$\sin \hat{C} = \frac{5}{7}$$

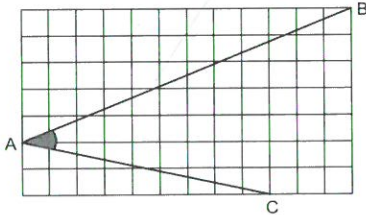
$|AC| = 26$ br

$|AD| = ?$ br



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

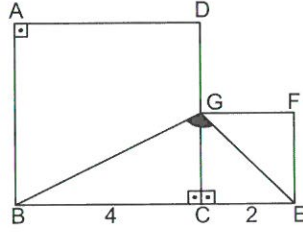
9.



$m(\widehat{BAC}) = \alpha \Rightarrow \tan \alpha = ?$

- A) $\frac{30}{49}$ B) $\frac{67}{98}$ C) $\frac{34}{49}$ D) $\frac{69}{98}$ E) $\frac{5}{7}$

10.



$|AB| = |BC| = |CD| = |AD| = 4$ br

$|CG| = |GF| = |FE| = |EC| = 2$ br

$\cot(\widehat{BGE}) = ?$

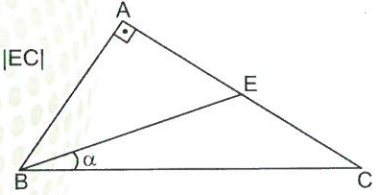
- A) -4 B) -3 C) -2 D) $-\frac{1}{2}$ E) $-\frac{1}{3}$

11. $[AB] \perp [AC]$

$|AB| = |AE| = \frac{1}{2}|EC|$

$m(\widehat{EBC}) = \alpha$

$\cot \alpha = ?$



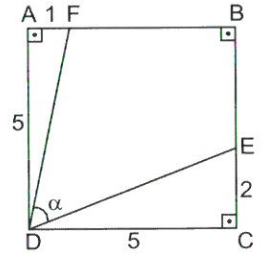
- A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 2 D) 3 E) 4

12. $|AF| = 1$ cm

$|EC| = 2$ cm

$|AD| = |DC| = 5$ cm

$\cot \alpha = ?$



- A) $\frac{13}{23}$ B) $\frac{15}{23}$ C) $\frac{17}{23}$ D) $\frac{21}{23}$ E) $\frac{23}{25}$



1. $\cos(\text{Arctan}2) = ?$

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

2. $\tan\left(\text{Arcsin}\frac{2}{3}\right) = ?$

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

3. $\cos\left(\pi + \text{Arcsin}\frac{1}{2}\right) = ?$

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

4. $2 \cdot \text{Arcsin}\left(\frac{x-1}{3}\right) = \pi$

$x = ?$

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

5. $\sin\left(2\text{Arccos}\frac{2}{3}\right) = ?$

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

6. $\cos\left(\text{Arcsin}\frac{4}{5} + \text{Arcsin}\frac{1}{\sqrt{10}}\right) = ?$

- A)
- $\sqrt{10}$
- B)
- $\frac{\sqrt{10}}{2}$
- C)
- $\frac{\sqrt{10}}{5}$
- D)
- $\frac{\sqrt{10}}{10}$
- E)
- $\frac{\sqrt{5}}{10}$

7. $2 \sin x - 1 = 0$

$\text{Ç.K} = ?$

- A)
- $\left\{x \mid x = \frac{\pi}{6} + 2k\pi \vee x = \frac{5\pi}{6} + 2k\pi, k \in \mathbb{Z}\right\}$
-
- B)
- $\left\{x \mid x = \frac{\pi}{3} + 2k\pi \vee x = \frac{5\pi}{3} + 2k\pi, k \in \mathbb{Z}\right\}$
-
- C)
- $\left\{x \mid x = \frac{\pi}{4} + 2k\pi \vee x = \frac{3\pi}{4} + 2k\pi, k \in \mathbb{Z}\right\}$
-
- D)
- $\left\{x \mid x = \frac{\pi}{6} + k\pi \vee x = \frac{5\pi}{6} + k\pi, k \in \mathbb{Z}\right\}$
-
- E)
- $\left\{x \mid x = \frac{\pi}{12} + k\pi \vee x = \frac{11\pi}{12} + k\pi, k \in \mathbb{Z}\right\}$

8. $\text{Arc cot}\left(\tan\frac{2\pi}{5}\right) = ?$

- A)
- $\frac{\pi}{10}$
- B)
- $\frac{\pi}{5}$
- C)
- $\frac{\pi}{3}$
- D)
- $\frac{2\pi}{3}$
- E)
- $\frac{5\pi}{6}$



9. $0 \leq x \leq \pi$

$$\cot(4x - 130^\circ) = \sqrt{3}$$

Ç. K = ?

A) $\left\{\frac{5\pi}{9}, \frac{8\pi}{9}\right\}$

B) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{5\pi}{36}\right\}$

C) $\left\{\frac{4\pi}{9}, \frac{2\pi}{9}\right\}$

D) $\left\{\frac{\pi}{9}, \frac{\pi}{3}\right\}$

E) $\left\{\frac{2\pi}{9}, \frac{17\pi}{36}\right\}$

10. $\cos(3x - 60^\circ) = -1$

Ç. K = ?

A) $\{x \mid x = 80^\circ + k\pi, k \in \mathbb{Z}\}$

B) $\{x \mid x = 80^\circ + 2k\pi, k \in \mathbb{Z}\}$

C) $\left\{x \mid x = 80^\circ + \frac{2k\pi}{3}, k \in \mathbb{Z}\right\}$

D) $\left\{x \mid x = 60^\circ + \frac{k\pi}{3}, k \in \mathbb{Z}\right\}$

E) $\{x \mid x = 60^\circ + 2k\pi, k \in \mathbb{Z}\}$

11. $x \in (0, 2\pi)$

$$\tan 2x = 1$$

Ç. K = ?

A) $\{45^\circ, 225^\circ\}$

B) $\{22,5^\circ, 112,5^\circ\}$

C) $\{45^\circ, 135^\circ\}$

D) $\{22,5^\circ, 67,5^\circ\}$

E) $\{22,5^\circ, 135^\circ\}$

12. $x \in \left(\frac{\pi}{2}, 2\pi\right)$

$$\frac{1 - \cos x}{1 + \cos x} = \frac{1}{3}$$

x = ?

A) $\frac{2\pi}{3}$

B) π

C) $\frac{7\pi}{6}$

D) $\frac{5\pi}{3}$

E) $\frac{11\pi}{6}$

13. $x \in (0^\circ, 90^\circ)$

$$\sin(2x - 30^\circ) = \sin(4x - 60^\circ)$$

$$\sum x = ?^\circ$$

A) 35

B) 60

C) 90

D) 110

E) 120

14. $x \in (0^\circ, 180^\circ)$

$$\sin 2x - \sqrt{3} \cdot \cos 2x = 0$$

$$\sum x = ?^\circ$$

A) 30

B) 60

C) 90

D) 120

E) 150

15. $\tan(x + 20^\circ) = \cot(3x - 50^\circ)$

Ç. K = ?

A) $\left\{x \mid x = 30^\circ + \frac{k\pi}{4}, k \in \mathbb{Z}\right\}$

B) $\left\{x \mid x = 60^\circ + \frac{k\pi}{4}, k \in \mathbb{Z}\right\}$

C) $\left\{x \mid x = 40^\circ + \frac{k\pi}{2}, k \in \mathbb{Z}\right\}$

D) $\left\{x \mid x = 30^\circ + \frac{k\pi}{2}, k \in \mathbb{Z}\right\}$

E) $\left\{x \mid x = 50^\circ + \frac{k\pi}{4}, k \in \mathbb{Z}\right\}$

16. $\sin x = 2 - \sin^2 x$

Ç. K = ?

A) $\left\{x \mid x = \frac{\pi}{6} + 2k\pi \vee x = \frac{5\pi}{6} + 2k\pi, k \in \mathbb{Z}\right\}$

B) $\left\{x \mid x = \frac{\pi}{3} + 2k\pi \vee x = \frac{2\pi}{3} + 2k\pi, k \in \mathbb{Z}\right\}$

C) $\left\{x \mid x = \frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}\right\}$

D) $\left\{x \mid x = \frac{3\pi}{2} + 2k\pi, k \in \mathbb{Z}\right\}$

E) $\{x \mid x = 2k\pi, k \in \mathbb{Z}\}$



1. $\cot \frac{x}{2} = a$

$\sin x = ?$

(cot:ctg:cotangent)

A) $\frac{2a}{1+a^2}$ B) $\frac{2+a}{a^2}$ C) $\frac{2}{1+a^2}$

D) $\frac{2}{1-a^2}$ E) $\frac{2a^2}{1+a}$

(YÖS - 1981)

2. $\frac{1 + \sin^2 p - \cos^2 p}{2 \sin^2 p} = ?$

A) 0 B) 1 C) 2 D) $\sin p$ E) $\cos p$

(YÖS - 1982)

3. $\sin(\pi + \alpha) = ?$

A) $\cos(\pi - \alpha)$ B) $\cos(\pi + \alpha)$ C) $\sin \alpha$

D) $\cos(-\alpha)$ E) $\sin(-\alpha)$

(YÖS - 1984)

4. $\sin 120^\circ = ?$

A) $\cos 30^\circ$ B) $-\sin 30^\circ$ C) $-\cos 120^\circ$

D) $-\cos 30^\circ$ E) $\sin 30^\circ$

(YÖS - 1985)

5. $x \in \left[0, \frac{\pi}{2}\right]$, $\tan x \cdot \sin 2x - \cos 2x = 0$

$x = ?$

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

(YÖS - 1990)

6. $\frac{\sin 135^\circ \cdot \cos 30^\circ}{\cos(-30^\circ)} = ?$

A) $\frac{\sqrt{2}}{2}$ B) $\frac{\sqrt{2}}{3}$ C) $\frac{\sqrt{3}}{3}$

D) $-\frac{\sqrt{2}}{2}$ E) $-\frac{\sqrt{3}}{2}$

(YÖS - 1991)

7. $\frac{\sin 10x}{\sin 2x} - \frac{\cos 10x}{\cos 2x} = ?$

A) $\cos 2x$ B) $\cos x$ C) $2\cos x$

D) $4\cos 4x$ E) $3\cos 2x$

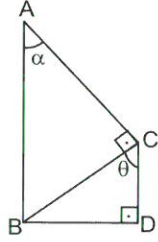
(YÖS - 1995)



8. $[AC] \perp [BC], [BD] \perp [CD]$

$$\sin \alpha = \frac{5}{13}, \quad \tan \theta = \frac{4}{3}$$

$$\cos(\hat{ABD}) = ?$$



- A) $-\frac{4}{13}$ B) $-\frac{9}{13}$ C) $-\frac{13}{8}$
D) $-\frac{16}{65}$ E) $-\frac{24}{65}$

(YÖS - 1998)

9. $\cot x = \frac{2}{3}$

$$\frac{\sin 2x - \cos 2x}{\sin x \cdot \cos x} = ?$$

- A) $\frac{13}{5}$ B) $\frac{13}{6}$ C) $\frac{17}{6}$
D) $\frac{14}{7}$ E) $\frac{17}{13}$

(YÖS - 1999)

10. $\sin x - \cos x = \frac{1 - \sqrt{3}}{2}$

$$\sin 2x = ?$$

- A) $\frac{\sqrt{3} - 2}{2}$ B) $\frac{\sqrt{3} + 2}{2}$ C) $\frac{2 - \sqrt{3}}{2}$
D) $\frac{\sqrt{3}}{2}$ E) $\frac{\sqrt{3}}{4}$

(YÖS - 2002)

11. $\sin 2x = 0,4$

$$(\sin x - \cos x)^2 = ?$$

- A) 0,5 B) 0,6 C) 0,8 D) 1 E) 2

(YÖS - 2003)

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

$$\cot x = ?$$

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

(YÖS - 2005)

13. $\frac{\sin(\arctan(\sqrt{3}))}{\cos 60^\circ} = ?$

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

(YÖS - 2007)

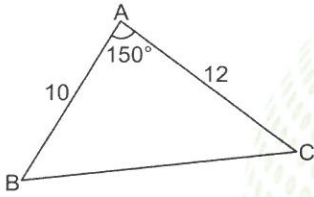


14. $\frac{1+\tan 50^\circ}{1+\tan 40^\circ} = ?$

- A) $1+\tan 20^\circ$ B) $1+\cot 20^\circ$ C) $1+\tan 40^\circ$
D) $\tan 40^\circ$ E) $\cot 40^\circ$

(YÖS - 2008)

15.



$m(\widehat{BAC}) = 150^\circ$

$|AB| = 10 \text{ cm}$

$|AC| = 12 \text{ cm}$

$A(ABC) = ? \text{ cm}^2$

- A) 30 B) 36 C) 42 D) 48 E) 56

(YÖS - 2008)

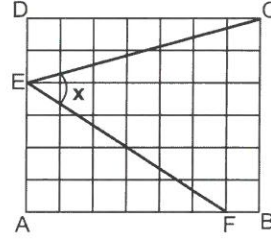
16.

$\frac{\cos \frac{\pi}{8} \cdot \sin \frac{\pi}{8}}{\left(2\cos^2 \frac{\pi}{8}\right) - 1} = ?$

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

(YÖS - 2008)

17.



$\tan x = ?$

- A) $\frac{20}{17}$ B) $\frac{20}{21}$ C) $\frac{17}{21}$ D) $\frac{21}{40}$ E) 1

(YÖS - 2008)

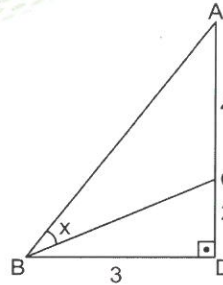
18. $\sin x \cdot \cos x = \frac{1}{4}$

$\sin^4 x + \cos^4 x = ?$

- A) $\frac{3}{4}$ B) $\frac{5}{8}$ C) $\frac{7}{8}$ D) $\frac{5}{12}$ E) $\frac{7}{12}$

(YÖS - 2009)

19.



$AD \perp BD$

$|AC| = 4 \text{ cm}$

$|CD| = 2 \text{ cm}$

$|BD| = 3 \text{ cm}$

$m(\widehat{ABC}) = x$

$\tan x = ?$

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

(YÖS - 2009)



1. $\sin 2x = 2 \cdot \sin x \cdot \cos x$

$$\sin x = 2 \cdot \sin \frac{x}{2} \cdot \cos \frac{x}{2}$$

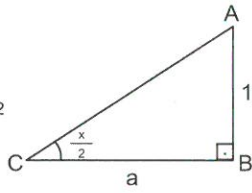
$$|AC|^2 = |AB|^2 + |BC|^2$$

$$|AC|^2 = 1 + a^2$$

$$|AC| = \sqrt{1 + a^2}$$

$$\sin x = 2 \cdot \frac{1}{\sqrt{1 + a^2}} \cdot \frac{a}{\sqrt{1 + a^2}}$$

$$\sin x = \frac{2a}{1 + a^2}$$



Yanıt – Answer: A

$$\begin{aligned} 2. \frac{1 + \sin^2 p - \cos^2 p}{2 \sin^2 p} &= \frac{\sin^2 p + \cos^2 p + \sin^2 p - \cos^2 p}{2 \sin^2 p} \\ &= \frac{2 \sin^2 p}{2 \sin^2 p} \\ &= 1 \end{aligned}$$

$$\boxed{\sin^2 p + \cos^2 p = 1}$$

Yanıt – Answer: B

3. $\sin(\pi + \alpha) = -\sin \alpha$
 $= \sin(-\alpha)$

Yanıt – Answer: E

4. $\sin 120^\circ = \sin(180^\circ - 60^\circ) = \sin 60^\circ = \cos 30^\circ$

Yanıt – Answer: A

5. $\tan x \cdot \sin 2x - \cos 2x = 0$

$$\frac{\sin x}{\cos x} \cdot 2 \cdot \sin x \cdot \cos x - (1 - 2 \sin^2 x) = 0$$

$$2 \sin^2 x - 1 + 2 \sin^2 x = 0$$

$$4 \sin^2 x = 1 \Rightarrow \sin x = \frac{1}{2}$$

$$\Rightarrow x = 30^\circ = \frac{\pi}{6}$$

Yanıt – Answer: E

6. $\sin 135^\circ = \sin(180^\circ - 45^\circ) = \sin 45^\circ = \frac{\sqrt{2}}{2}$

$$= \frac{\sqrt{2}}{2}$$

$$\cos(-30^\circ) = \cos 30^\circ$$

$$\frac{\sin 135^\circ \cdot \cos 30^\circ}{\cos(-30^\circ)} = \frac{\frac{\sqrt{2}}{2} \cdot \cos 30^\circ}{\cos 30^\circ}$$

$$= \frac{\sqrt{2}}{2}$$

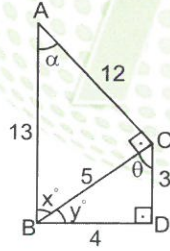
Yanıt – Answer: A



$$\begin{aligned}
 7. \quad \frac{\sin 10x}{\sin 2x} - \frac{\cos 10x}{\cos 2x} &= \frac{\sin 10x \cdot \cos 2x - \cos 10x \cdot \sin 2x}{\sin 2x \cdot \cos 2x} \\
 &= \frac{\sin(10x - 2x)}{\sin 2x \cdot \cos 2x} \\
 &= \frac{\sin 8x}{\frac{1}{2} \sin 4x} \\
 &= \frac{2 \cdot \sin 4x \cdot \cos 4x}{\sin 4x} \\
 &= \frac{4 \cdot \sin 4x \cdot \cos 4x}{\sin 4x} \\
 &= 4 \cdot \cos 4x
 \end{aligned}$$

Yanıt – Answer: D

$$\begin{aligned}
 8. \quad m(\hat{ABC}) &= x^\circ \\
 m(\hat{CBD}) &= y^\circ \\
 |AB| &= 13 \\
 |BC| &= 5 \\
 |BD| &= 4, |CD| = 3 \\
 |AC| &= 12
 \end{aligned}$$

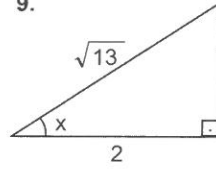


$$\cos(\hat{ABD}) = \cos(x + y) = \cos x \cdot \cos y - \sin x \cdot \sin y$$

$$\begin{aligned}
 &= \frac{5}{13} \cdot \frac{4}{5} - \frac{12}{13} \cdot \frac{3}{5} \\
 &= \frac{20}{65} - \frac{36}{65} \\
 &= -\frac{16}{65}
 \end{aligned}$$

Yanıt – Answer: D

9.



$$\sin x = \frac{3}{\sqrt{13}}, \cos x = \frac{2}{\sqrt{13}}$$

$$\begin{aligned}
 \frac{\sin 2x - \cos 2x}{\sin x \cdot \cos x} &= \frac{2 \sin x \cdot \cos x - \cos^2 x + \sin^2 x}{\sin x \cos x} \\
 &= \frac{2 \cdot \frac{3}{\sqrt{13}} \cdot \frac{2}{\sqrt{13}} - \left(\frac{2}{\sqrt{13}}\right)^2 + \left(\frac{3}{\sqrt{13}}\right)^2}{\frac{3}{\sqrt{13}} \cdot \frac{2}{\sqrt{13}}} \\
 &= \frac{\frac{12}{13} - \frac{4}{13} + \frac{9}{13}}{\frac{6}{13}} = \frac{\frac{17}{13}}{\frac{6}{13}} = \frac{17}{6}
 \end{aligned}$$

Yanıt – Answer: C

$$10. \quad (\sin x - \cos x)^2 = \left(\frac{1 - \sqrt{3}}{2}\right)^2$$

$$\sin^2 x + \cos^2 x - 2 \sin x \cdot \cos x = \frac{3 + 1 - 2\sqrt{3}}{4}$$

$$1 - \sin 2x = \frac{4 - 2\sqrt{3}}{4}$$

$$\sin 2x = 1 - \frac{2 - \sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

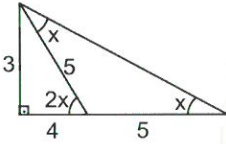
Yanıt – Answer: D



$$\begin{aligned} 11. (\sin x - \cos x)^2 &= \underbrace{\sin^2 x + \cos^2 x}_1 - \underbrace{2 \cdot \sin x \cdot \cos x}_{\sin 2x} \\ &= 1 - \underbrace{\sin 2x}_{0,4} \\ &= 1 - 0,4 \\ &= 0,6 \end{aligned}$$

Yanıt – Answer: B

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



$$\begin{aligned} \Rightarrow \cot x &= \frac{9}{3} \\ &= 3 \end{aligned}$$

Yanıt – Answer: D

$$13. \arctan \sqrt{3} = t$$

$$\tan t = \sqrt{3} \Rightarrow t = 60^\circ$$

$$\begin{aligned} \frac{\sin(\arctan \sqrt{3})}{\cos 60^\circ} &= \frac{\sin t}{\cos 60^\circ} \\ &= \frac{\sin 60^\circ}{\cos 60^\circ} \\ &= \tan 60^\circ \\ &= \sqrt{3} \end{aligned}$$

Yanıt – Answer : D

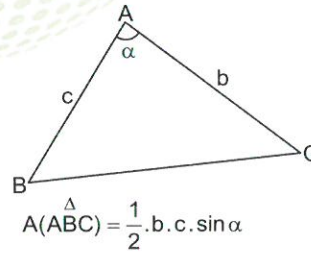
$$14. 1 + \tan 50^\circ = 1 + \frac{\sin 50^\circ}{\cos 50^\circ} = \frac{\sin 50^\circ + \cos 50^\circ}{\cos 50^\circ}$$

$$\begin{aligned} 1 + \tan 40^\circ &= 1 + \frac{\sin 40^\circ}{\cos 40^\circ} = \frac{\sin 40^\circ + \cos 40^\circ}{\cos 40^\circ} \\ &= \frac{\cos 50^\circ + \sin 50^\circ}{\cos 40^\circ} \end{aligned}$$

$$\begin{aligned} \frac{1 + \tan 50^\circ}{1 + \tan 40^\circ} &= \frac{\frac{\sin 50^\circ + \cos 50^\circ}{\cos 50^\circ}}{\frac{\cos 50^\circ + \sin 50^\circ}{\cos 40^\circ}} \\ &= \frac{\cos 40^\circ}{\cos 50^\circ} = \frac{\cos 40^\circ}{\sin 40^\circ} = \cot 40^\circ \end{aligned}$$

Yanıt – Answer : E

15.



$$A(\triangle ABC) = \frac{1}{2} \cdot b \cdot c \cdot \sin \alpha$$

$$A(\triangle ABC) = \frac{1}{2} \cdot 10 \cdot 12 \cdot \sin 150^\circ$$

$$= 60 \cdot \frac{1}{2} = 30 \text{ cm}^2$$

Yanıt – Answer : A



16. $(2\sin x \cdot \cos x = \sin 2x)$

$$\frac{2 \cdot \cos \frac{\pi}{8} \cdot \sin \frac{\pi}{8}}{2} = \frac{\sin \frac{\pi}{4}}{2} = \frac{\frac{\sqrt{2}}{2}}{2} = \frac{\sqrt{2}}{4} \dots I$$

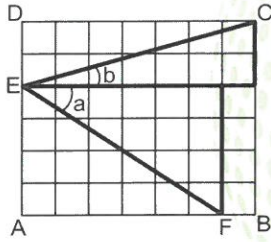
$$(2\cos^2 x - 1 = \cos 2x)$$

$$2\cos^2 \frac{\pi}{8} - 1 = \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} \dots II$$

$$I + II \Rightarrow \frac{\frac{\sqrt{2}}{4}}{\frac{\sqrt{2}}{2}} = \frac{1}{2}$$

Yanıt – Answer : C

17.



$$x = a + b$$

$$\tan x = \tan(a + b)$$

$$= \frac{\tan a + \tan b}{1 - \tan a \cdot \tan b}$$

$$= \frac{\frac{4}{3} + \frac{2}{7}}{1 - \frac{4}{3} \cdot \frac{2}{7}} = \frac{\frac{2}{3} + \frac{2}{7}}{1 - \frac{4}{21}}$$

$$= \frac{\frac{14+6}{21}}{\frac{21-4}{21}}$$

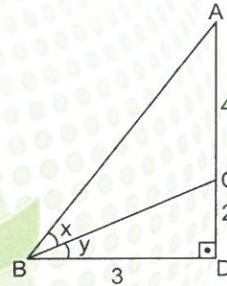
$$= \frac{20}{17}$$

Yanıt – Answer : A

$$\begin{aligned} 18. \quad \sin^4 x + \cos^4 x &= \left(\frac{\sin^2 x + \cos^2 x}{1} \right)^2 - 2\sin^2 x \cdot \cos^2 x \\ &= 1 - 2 \cdot (\sin x \cos x)^2 \\ &= 1 - 2 \cdot \frac{1}{16} \\ &= 1 - \frac{1}{8} = \frac{7}{8} \end{aligned}$$

Yanıt – Answer : C

19.



$$\tan(x + y) = \frac{6}{3} = 2$$

$$\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \cdot \tan y}$$

$$\tan y = \frac{2}{3}$$

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

$$2 = \frac{3 \tan x + 2}{3 - 2 \tan x}$$

$$\Rightarrow 6 - 4 \tan x = 3 \tan x + 2$$

$$4 = 7 \tan x$$

$$\frac{4}{7} = \tan x$$

Yanıt – Answer : E



17. BÖLÜM

LOGARİTMA







1. $\log_3 x = 4$

$x = ?$

- A) 81 B) 64 C) 27 D) 16 E) 12

2. $\log_{16} (x + 1) = \frac{1}{4}$

$x = ?$

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

3. $\log_{\frac{1}{9}} \left(\frac{x-1}{x+2} \right) = \frac{1}{2}$

$x = ?$

- A)
- $\frac{1}{2}$
- B)
- $\frac{3}{2}$
- C)
- $\frac{5}{2}$
- D)
- $\frac{7}{2}$
- E)
- $\frac{9}{2}$

4. $\log_x 81 = 2$

$x = ?$

- A) -9 B) -3 C) 0 D) 3 E) 9

5. $\log_x (x + 2) = 2$

$x = ?$

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

6. $\log_{1-x} 25 = 2$

$x = ?$

- A) -5 B) -4 C) 3 D) 4 E) 5

7. $\log_x \frac{10}{x+3} = 1$

$x = ?$

- A) -5 B) -2 C) 0 D) 2 E) 5

8. $\log_3 (9^x - 22) = x + 2$

$x = ?$

- A)
- $\log_{11} 3$
- B)
- $\log_3 11$
- C)
- $\log 3$
- D)
- $\log 11$
- E) 0



9. $\log_5 \left(\log_2 (x + 2) \right) = 1$

$x = ?$

- A) 3 B) 8 C) 30 D) 32 E) 34

10. $\log_{\frac{1}{4}} \left(\log_{16} \left(\log_3 \left(\frac{x+2}{3} \right) \right) \right) = 1$

$x = ?$

- A) 23 B) 25 C) 27 D) 29 E) 31

11. $\log_5 5 + \log_3 1 + \log_4 16 = ?$

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

12. $\log_{\frac{1}{2}} \frac{1}{4} + \log_2 32 + \log_{\frac{1}{3}} 9 = ?$

- A) 3 B) 5 C) 7 D) 9 E) 11

13. $\frac{5}{\log_9 3} + \frac{2}{\log_{\frac{1}{25}} 5} = ?$

- A) $\frac{3}{2}$ B) $\frac{5}{2}$ C) $\frac{7}{2}$ D) 6 E) 10

14. $\log_{\frac{1}{4}} (x^2 + 4) = \log_3 \frac{1}{27}$

$x = ?$

- A) $\sqrt{5}$ B) $\sqrt{10}$ C) $2\sqrt{10}$ D) $\sqrt{15}$ E) $2\sqrt{15}$

15. $3 \log_5 6 - \frac{2}{\log_6 5} = \log_5 (x + 1)$

$x = ?$

- A) 7 B) 6 C) 5 D) 4 E) 3



1. $\log 3 = m$

$\log 90 = ?$

- A) $m - 1$ B) $2m - 1$ C) $m + 1$
D) $m + 2$ E) $2m + 1$

2. $\log 2 = m$ $\log 3 = n$

$\log 720 = ?$

- A) $m + n + 1$ B) $3m + n + 1$ C) $2m + 3n + 1$
D) $3m + 2n + 1$ E) $3m + 2n - 1$

3. $\log 5 = m$

$\log 2000 = ?$

- A) $4 - m$ B) $3 - m$ C) $2 - m$
D) $1 - m$ E) $3 - 2m$

4. $\log 5 = m$ $\log 3 = n$

$\log 180 = ?$

- A) $2n + m + 2$ B) $2n - m - 2$ C) $2n - m + 2$
D) $2n - m + 1$ E) $n - m + 2$

5. $\log_2 9 = a$

$\log_2 6 = ?$

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

6. $\log_{15} 3 = m$

$\log_{15} 675 = ?$

- A) $m + 1$ B) $m + 2$ C) $2m + 2$
D) $2m + 4$ E) $3m + 4$

7. $\log \left(\frac{0,04}{0,4} \right) = ?$

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

8. $\log_{27} m^3 \cdot \log_m k + \log_{\frac{1}{3}} (2k + 1) = 1$

$k = ?$

- A) $-\frac{3}{7}$ B) $-\frac{3}{5}$ C) 0 D) $\frac{3}{5}$ E) $\frac{3}{7}$



9. $\log_3 25 \cdot \log_5 (x + 30) \cdot \log_x 27 = 30$

$x = ?$

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

10. $\log_5 4 - \log_5 x - \log_5 3 = 1$

$x = ?$

- A) $\frac{20}{3}$ B) 4 C) $\frac{15}{4}$ D) $\frac{4}{15}$ E) $\frac{3}{20}$

11. $3 \cdot \log_{\frac{1}{5}} \frac{1}{x} + \log_5 x \cdot \log_{\sqrt[3]{x}} 3 = \log_{25} 64$

$x = ?$

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

12. $\log_9 25 + \log_{\frac{1}{3}} (2x + 1) = -2$

$x = ?$

- A) 23 B) 22 C) 20 D) 19 E) 17

13. $\log_3 x - 3 \log_x 3 = 2$

$\sum x = ?$

- A) -1 B) 2 C) 3 D) 27 E) $\frac{82}{3}$

14. $\log_x 2 + 6 \log_2 x = 5$

$\prod x = ?$

- A) $\sqrt[6]{2}$ B) $\sqrt[6]{4}$ C) $\sqrt[6]{8}$ D) $\sqrt[6]{16}$ E) $\sqrt[6]{32}$

15. $\log_{\sqrt{\sqrt[3]{x}}} \sqrt[4]{x^3 \cdot \sqrt[3]{x}} = ?$

- A) $\frac{5}{3}$ B) 3 C) $\frac{10}{3}$ D) 5 E) 6



1. $a = \log 101$, $b = \log_3 10$, $c = \log_5 26$
 $? < ? < ?$

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

2. $a = \log_7 60$, $b = \log_5 429$, $c = \log_{11} 99$
 $? < ? < ?$

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

3. $a = \log 71$, $b = \log_6 37$, $c = \log_9 82$
 $? < ? < ?$

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

4. $x \in \mathbb{Z}$
 $\log_2 (x - 5) < 1$

$x = ?$

- A) 5 B) 6 C) 7 D) 8 E) 9

5. $x \in \mathbb{Z}$
 $\log_7 (3 - x) \geq 1$
 $x = ?$

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

6. $x \in \mathbb{Z}$
 $\log_{\frac{1}{3}} (2x - 5) > -2$

$\sum x = ?$

- A) 4 B) 12 C) 18 D) 20 E) 360

7. $x \in \mathbb{Z}$
 $\log_{\frac{1}{5}} 25 < \log_{\frac{1}{3}} (x + 2) < \log_3 \frac{1}{3}$

$\min(x) + \max(x) = ?$

- A) 7 B) 8 C) 9 D) 10 E) 11

8. $\log 2 = 0,30103$ $\log 3 = 0,47712$

$\log \frac{500}{3} = ?$

- A) $\bar{3},77815$ B) 4,22185 C) $\bar{2},13412$
D) 2,22185 E) 3,77815



9. $7^{2x} + m \cdot 7^x + n = 0$

$\sum x = 2$

$\log_7 n = ?$

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

10. $2^{2x} + m \cdot 2^x + n = 0$

$\sum x = 5$

$\log_n 16 = ?$

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

11. $f(x) = \log_5 x$, $f^{-1}(m) = 25$

$m = ?$

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

12. $f(x) = 3 + 2 \log_5 (x - 1)$, $f^{-1}(m) = 26$

$m = ?$

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

13. $f(x) = \log_3 (x + 1)$, $g(x) = 3x - 1$

$(f \circ g^{-1})^{-1}(x) = ?$

A) $3^x - 4$ B) $3^{x+1} - 4$ C) $3^x - 3$

D) $3^{x+1} - 3$ E) 3^{x+1}

14. $x \in \mathbb{Z}$

$x^{3 - \log x} = 100$

$\prod x = ?$

A) 1000 B) 100 C) 10 D) 1 E) $\frac{1}{1000}$

15. $x^{2 + \log_5 x} = 125$

$\prod x = ?$

A) $\frac{1}{125}$ B) $\frac{1}{25}$ C) 5 D) 25 E) 125



1. $a.c = 9.b$

$$\frac{1}{\log_a 3} - \frac{1}{\log_b 3} + \frac{1}{\log_c 3} = ?$$

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

2. $\frac{1}{\log_a ab} + \frac{1}{\log_b ab} = ?$

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

3. $\log_3 5 + \frac{1}{\log_5 3 + \frac{1}{\log_3 5}} = ?$

- A)
- $\frac{\log_3 5}{2}$
- B)
- $\log_3 5$
- C)
- $\frac{3 \cdot \log_3 5}{2}$
-
- D) 1 E)
- $\frac{3}{2 \log_3 5}$

4. $x^{\log x} = 10$

$$\prod x = ?$$

- A) 0 B) 1 C)
- $\sqrt{10}$
- D) 10 E) 100

5. $x^{2 \log_3 x} = 9$

$$\sum x = ?$$

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

6. $\log_3(x^2 - 15) = \log_5(3x - 11)$

$$x = ?$$

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

7. $\frac{3}{1 + \log x} = \frac{1}{1 - \log x}$

$$x = ?$$

- A) 1 B) 2 C) 3 D)
- $\sqrt{10}$
- E)
- $2\sqrt{10}$

8. $\log(x - 6) = \log x - \log 3$

$$\ln(y + 3) = \ln y + \ln 2$$

$$\log_x y + \log_y x = ?$$

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



9. $5^{x^2-3x}=8$

$\sum x = ?$

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

10. $x^{\ln x} < e$

$SS = ?$

- A)
- $(-\infty, e)$
- B)
- $(-1, e)$
- C)
- $(-e, e)$
-
- D)
- $\left(\frac{1}{e}, e\right)$
- E)
- $\left(-\frac{1}{e}, e\right)$

11. $b > a$

$\frac{\ln a}{\ln b} + \frac{\log b}{\log a} = \frac{10}{3}$

$\log_b a = ?$

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

12. $\log(4 - \sqrt{x}) + \log(4 + \sqrt{x}) - 1 = 0$

$x = ?$

- A) 1 B) 3 C) 4 D) 6 E) 9

13. $\log_{\ln x} 2 = 1$

$x = ?$

- A) 1 B) e C)
- e^2
- D) 3 E) 4

14. $4^x - 8 \cdot 2^x + 15 = 0$

$\sum x = ?$

- A)
- $\log_2 3$
- B)
- $\log_2 5$
- C)
- $\log_2 15$
-
- D)
- $3\log_2 5$
- E)
- $5\log_2 3$

15. $9^x - 7 \cdot 3^x + 10 = 0$

$\sum x = ?$

- A)
- $\log_3 2$
- B)
- $\log_3 5$
- C)
- $\log_5 3$
-
- D) 1 E)
- $\log_3 10$



1. $\log x = 1,233$

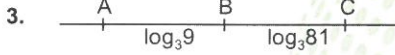
$\text{colog} x = ?$

- A) $\bar{2},767$ B) $\bar{3},223$ C) $1,767$
D) $\bar{2},223$ E) $-2,767$

2. $\text{colog} x = 2,1624$

$\log x = ?$

- A) $\bar{4},6376$ B) $\bar{2},1624$ C) $\bar{3},6376$
D) $\bar{3},8376$ E) $\bar{4},1624$



$\frac{|AB|}{|AC|} = ?$

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

4. $\log 2 = 0,301$
 $\log 3 = 0,477$

$\log 36 = ?$

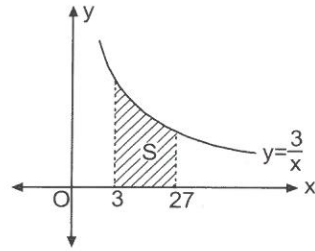
- A) $\bar{1},556$ B) $\bar{1},954$ C) $1,954$
D) $1,556$ E) $2,556$

5. $\log 2 = 0,30103$

$\text{colog} 8 = ?$

- A) $\bar{2},30103$ B) $\bar{2},69896$ C) $\bar{1},96910$
D) $\bar{1},30103$ E) $\bar{1},09691$

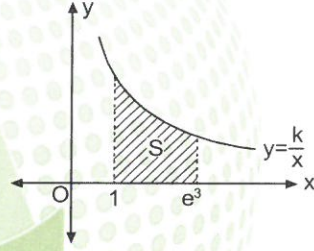
6.



$S = ? \text{ br}^2$

- A) $2\ln 3$ B) $3\ln 3$ C) $4\ln 3$
D) $5\ln 3$ E) $6\ln 3$

7.

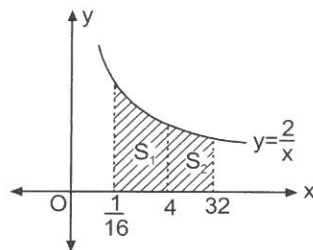


$S = 12$

$k = ? \text{ br}^2$

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

8.

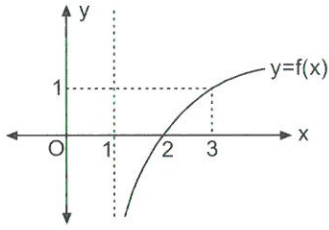


$\frac{S_1}{S_2} = ?$

- A) 2 B) 3 C) e^2 D) e^3 E) $\ln 8$

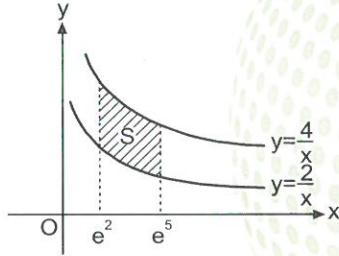


9.

 $f(x) = ?$

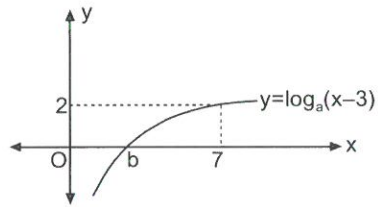
- A) $\log_2(x-2)$ B) $\log_2(x-1)$
C) $\log_1(x-1)$ D) $\log_3(x-2)$
E) $\log_3(x-1)$

10.

 $S = ?$

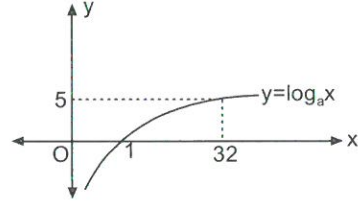
- A) e^3 B) $e^{\frac{5}{2}}$ C) 6 D) 4 E) $\ln 8$

11.

 $a + b = ?$

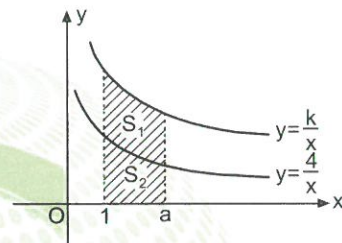
- A) 2 B) 3 C) 4 D) 5 E) 6

12.

 $a = ?$

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

13.



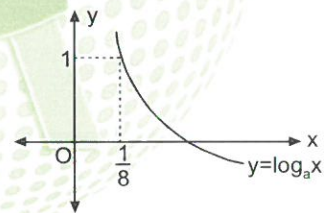
$$S_1 = 16 \text{ br}^2$$

$$S_2 = 8 \text{ br}^2$$

 $k = ?$

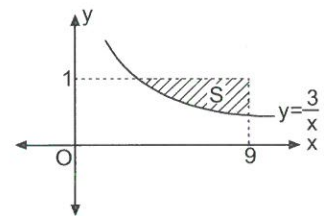
- A) 4 B) 6 C) 8 D) 12 E) 16

14.

 $f(4a) = ?$

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

15.

 $S = ? \text{ br}^2$

- A) $9 - 3\ln 3$ B) $6 - 3\ln 3$ C) $3 - \ln 3$
D) $3 - 3\ln 3$ E) $9 - \ln 3$



LOGARİTMA

ÇIKMIŞ SORULAR

1. $\log_{10} [\log_3 [\log_4 64]] = ?$

- A) 10 B) 4 C) 3 D) 1 E) 0

(YÖS - 1985)

2. $\log_8 a = 2$, $\log_2 b = 5$

$a + b = ?$

- A) 72 B) 89 C) 96 D) 124 E) 1281

(YÖS - 1987)

3. $\log_a x + \log_a \left(\frac{4}{x} \right) = \log_3 9$

$a = ?$

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

(YÖS - 1988)

4. $\log_5 125 + \log_{\frac{1}{3}} 81 - \log_{\frac{5}{3}} 1 = ?$

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

(YÖS - 1989)

5. $x > 1$, $(x-1)^{(x+3)} = 1$

$\log_x \frac{1}{2} = ?$

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

(YÖS - 1990)

6. $\log_3 5 = x$

$\log_3 15 = ?$

- A) $2x + 2$ B) $2x + 1$ C) $2x - 1$
D) $x - 2$ E) $x + 1$

(YÖS - 1991)

7. $\log_{10} 5 = x$

$5^{1-x} = ?$

- A) 2^x B) 2^{-x} C) 2^{x-1}
D) 2^{1-x} E) 2^{x+1}

(YÖS - 1992)

8. $\begin{array}{c} | \quad | \quad | \\ A \quad \log_2 8 \quad B \quad \log_2 4 \quad C \end{array}$

$|AB| = \log_2 8$ $|BC| = \log_2 4$

$\frac{|AC|}{|BC|} = ?$

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

(YÖS - 1993)



LOGARİTMA

ÇIKMIŞ SORULAR

9. $\log_a \frac{a}{b} = 4$

$\log_a b = ?$

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

(YÖS - 1994)

10. $\frac{1}{\log_4 16} + \frac{1}{\log_2 4} = ?$

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

(YÖS - 1995)

11. $\log_a x = 30$, $\log_b x = 70$

$\log_{ab} x = ?$

- A) 15 B) 21 C) 28 D) 35 E) 50

(YÖS - 1997)

12. $x \in \mathbb{R}^+$, $x \neq 1$

$\log_3 (3 \cdot \log_x (2x - 3)) = 1$

$x = ?$

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

(YÖS - 1998)

13. $x > 1$
 $\log_x (x \cdot \log_{x+3} 2x) = 1$

$x = ?$

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

(YÖS - 1999)

14. $\log 2 = a$
 $\log 3 = b$

$\log 216 = ?$

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

(YÖS - 2000)

15. $\log(x - a) = \log x - \log a$

$x = ?$

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

(YÖS - 2001)

16. $\log_5 405 = k$

$\log_5 3 = ?$

- A) $\frac{k-1}{4}$ B) $\frac{k+1}{2}$ C) k
D) $k-1$ E) $2(k-1)$

(YÖS - 2002)



17. $e^{\ln x - 2} = 1$

$x = ?$

- A) 1 B) 2 C) e D) 2e E) e^2

(YÖS – 2002)

20. $\log 3 = x$

$\log 5 = y$

$\log 7 = z$

$\log \frac{225}{7} = ?$

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

(YÖS – 2004)

18. $\log_{\frac{3}{2}} \frac{81}{16} = x$

$\log_{\frac{5}{4}} \frac{64}{125} = y$

$x - y = ?$

- A) 4 B) 5 C) 6 D) 7 E) 9

(YÖS – 2003)

21. $\log_2 3 = a$

$\log_3 48 = ?$

- A) $\frac{a-2}{a}$ B) $\frac{a-3}{a}$ C) $\frac{a+2}{a}$
D) $\frac{a+3}{a}$ E) $\frac{a+4}{a}$

(YÖS – 2005)

19. $\log_{16} (\log_2 x) = \log_7 \sqrt{7}$

$x = ?$

- A) 1 B) 2 C) 4 D) 8 E) 16

(YÖS – 2003)

22. $x \neq -3$

$\log_{10} (4x + 12) + \log_{10} \frac{250}{x+3} = ?$

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

(YÖS – 2005)



23. $\log_2(x-3) + \log_2(x+3) \leq 4$

? < x < ?

- A) $-5 < x < 0$ B) $-3 < x < 0$ C) $-3 < x < 3$
D) $2 \leq x < 3$ E) $3 < x \leq 5$

(YÖS – 2007)

26. $x > 0$

$\log_2(x+2) - \log_4 4x^2 = 2$

x = ?

- A) $\frac{2}{5}$ B) $\frac{1}{6}$ C) $\frac{2}{7}$ D) $\frac{3}{8}$ E) $\frac{4}{9}$

(YÖS – 2009)

24. $x \in \mathbb{R}^+, x \neq 1$

$\log_{0,001} x^2 = p \log_{10} x$

p = ?

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

(YÖS – 2008)

25. $2^{x-2} = 5$

x = ?

- A) $-2 + \log_2 5$ B) $2 + \log_2 5$ C) $5 - \log_2 x$
D) $2 - \log_5 2$ E) $5 - \log_5 2$

(YÖS – 2008)



$$1. \log_{10} \left[\log_3 \left(\log_2 2^6 \right) \right] = \log_{10} \left[\log_3 \left(\frac{6}{2} \right) \right]$$

$$\begin{aligned} &= \log_{10} (\log_3 3) \\ &= \log_{10} 1 \\ &= 0 \end{aligned}$$

Yanıt – Answer: E

$$2. \log_8 a = 2 \Rightarrow a = 8^2 = 64$$

$$\begin{aligned} \log_2 b = 5 &\Rightarrow b = 2^5 = 32 \\ a + b &= 64 + 32 = 96 \end{aligned}$$

Yanıt – Answer: C

$$3. \log_a x + \log_a \left(\frac{4}{x} \right) = \log_a \left(x \cdot \frac{4}{x} \right)$$

$$\begin{aligned} &= \log_a 4 = \log_3 3^2 \\ \log_a 4 &= 2 \\ 4 &= a^2 \\ a &= 2 \end{aligned}$$

Yanıt – Answer: C

$$\begin{aligned} 4. \log_5 125 + \log_{\frac{1}{3}} 81 - \log_{\frac{5}{3}} 1 \\ = \log_5 5^3 + \log_{3^{-1}} 3^4 - 0 = 3 - 4 \\ = -1 \end{aligned}$$

Yanıt – Answer: B

$$\begin{aligned} 5. \quad x - 1 = 1 &\Rightarrow x = 2 \\ x + 3 = 0 &\Rightarrow x = -3 \end{aligned}$$

logaritmanın tabanı negatif olamaz.
(Base of a logarithm can not be negative)

$$\begin{aligned} x &= 2 \\ \log_2 \frac{1}{2} &= -\log_2 2 \\ &= -1 \end{aligned}$$

Yanıt – Answer: A

$$6. \log_3 5 = x$$

$$\log_3 15 = \log_3 (3 \cdot 5) = \log_3 3 + \log_3 5 = 1 + x$$

Yanıt – Answer: E

$$\begin{aligned} 7. \log_{10} 5 = x &\Rightarrow 5 = 10^x \\ 5 &= 5^x \cdot 2^x \\ \frac{5}{5^x} &= 2^x \\ 5^{1-x} &= 2^x \end{aligned}$$

Yanıt – Answer: A

$$8. \frac{|AC|}{|BC|} = \frac{\log_2 8 + \log_2 4}{\log_2 4} = \frac{3+2}{2} = \frac{5}{2}$$

Yanıt – Answer: A



9. $\log_a \frac{a}{b} = 4$

$$\begin{aligned}\log_a a - \log_a b &= 4 \\ 1 - \log_a b &= 4 \\ \log_a b &= -3\end{aligned}$$

Yanıt – Answer: C

10. $\frac{1}{\log_4 16} + \frac{1}{\log_2 4} = \frac{1}{\log_2 2^4} + \frac{1}{\log_2 2^2}$

$$= \frac{1}{2} + \frac{1}{2} = 1$$

Yanıt – Answer: A

11. $\log_{ab} x = \frac{1}{\log_x ab} = \frac{1}{\log_x a + \log_x b}$

$$= \frac{1}{\frac{1}{30} + \frac{1}{70}} = \frac{1}{\frac{10}{210}} = 21$$

Yanıt – Answer: B

12. $\log_3 (3 \cdot \log_x (2x-3)) = 1$

$$\begin{aligned}3 \cdot \log_x (2x-3) &= 3^1 = 3 \\ \log_x (2x-3) &= 1 \\ 2x-3 &= x \\ x &= 3\end{aligned}$$

Yanıt – Answer: C

13. $x > 1$

$$\begin{aligned}\log_x (x \cdot \log_{x+3} 2x) &= 1 \\ x \cdot \log_{x+3} 2x &= x^1 \\ \log_{x+3} 2x &= 1 \Rightarrow 2x = x+3 \\ x &= 3\end{aligned}$$

Yanıt – Answer: B

14. $\log_2 = a$

$$\begin{aligned}\log_3 &= b \\ 216 &= 2^3 \cdot 3^3 \\ \log 216 &= \log 2^3 \cdot 3^3 \\ &= \log 2^3 + \log 3^3 \\ &= 3 \log 2 + 3 \log 3 \\ &= 3a + 3b\end{aligned}$$

Yanıt – Answer: A

15. $\log(x-a) = \log x - \log a$

$$\begin{aligned}\log(x-a) &= \log \frac{x}{a} \\ x-a &= \frac{x}{a} \\ x - \frac{x}{a} &= a \\ x \left(1 - \frac{1}{a}\right) &= a \Rightarrow x \cdot \left(\frac{a-1}{a}\right) = a \\ \Rightarrow x &= \frac{a^2}{a-1}\end{aligned}$$

Yanıt – Answer: D

16. $\log_5 405 = k \Rightarrow \log_5 3^4 \cdot 5 = k$

$$\begin{aligned}\log_5 5 + 4 \cdot \log_5 3 &= k \\ 1 + 4 \cdot \log_5 3 &= k \Rightarrow \log_5 3 = \frac{k-1}{4}\end{aligned}$$

Yanıt – Answer: A



17. $e^{\ln x - 2} = 1 \Rightarrow \ln x - 2 = 0$

$\ln x = 2 \Rightarrow x = e^2$

Yanıt – Answer: E

18. $\log_a a^m = m \cdot \log_a a = m$

$\log_{\frac{3}{2}} \frac{81}{16} = \log_{\frac{3}{2}} \left(\frac{3}{2} \right)^4$

$= 4 \log_{\frac{3}{2}} \frac{3}{2} = 4 = x$

$\log_4 \frac{64}{125} = \log_{\frac{5}{4}} \left(\frac{4}{5} \right)^3$

$= \log_{\frac{5}{4}} \left(\frac{5}{4} \right)^{-3} = -3 \log_{\frac{5}{4}} \frac{5}{4} = -3 = y$

$= x - y = 4 + 3 = 7$

Yanıt – Answer: D

19. $\log_{16} (\log_2 x) = \log_7 \sqrt{7}$

$\Rightarrow \log_{2^4} (\log_2 x) = \log_7 7^{\frac{1}{2}}$

$\Rightarrow \frac{1}{4} \log_2 (\log_2 x) = \frac{1}{2} \log_7 7$

$\Rightarrow \log_2 (\log_2 x) = 2$

$\Rightarrow \log_2 x = 4 \Rightarrow x = 16$

Yanıt – Answer: E

20. $\log \frac{225}{7} = \log 225 - \log 7$

$= \log (3^2 \cdot 5^2) - \log 7$

$= \log 3^2 + \log 5^2 - \log 7$

$= 2 \log 3 + 2 \log 5 - \log 7$

$= 2x + 2y - z$

Yanıt – Answer: D

21. $\log_2 3 = a$

$\log_3 48 = \log_3 (2^4 \cdot 3)$

$= \log_3 2^4 + \log_3 3$

$= 4 \cdot \log_3 2 + 1$

$= 4 \cdot \frac{1}{a} + 1 \Rightarrow \frac{4}{a} + 1$

$= \frac{4+a}{a}$

Yanıt – Answer: E

22. $x \neq -3$

$\log_{10} (4x + 12) + \log_{10} \frac{250}{x+3}$

$= \log_{10} \left[(4x + 12) \cdot \frac{250}{x+3} \right]$

$= \log_{10} \left[4 \cdot \frac{(x+3)}{x+3} \cdot \frac{250}{x+3} \right]$

$= \log_{10} 1000 = \log_{10} 10^3 = 3 \log_{10} 10$

$= 3$

Yanıt – Answer: C



23. $\log_2(x-3) + \log_2(x+3) \leq 4$

$$\log_2(x^2 - 9) \leq 4$$

$$x^2 - 9 \leq 16$$

$$x^2 \leq 25$$

$$-5 \leq x \leq 5 \dots I$$

$$x - 3 > 0$$

$$x > 3 \dots II$$

$$(I, II) \Rightarrow 3 < x \leq 5$$

Yanıt – Answer : E

24. $\log_{0,001} x^2 = p \cdot \log_{10} x$

$$\log_{10^{-3}} x^2 = p \cdot \log_{10} x$$

$$-\frac{2}{3} \log_{10} x = p \cdot \log_{10} x$$

$$\Rightarrow p = -\frac{2}{3}$$

Yanıt – Answer : B

25. $2^{x-2} = 5 \Rightarrow \log_2 2^{x-2} = \log_2 5$

$$\Rightarrow x - 2 = \log_2 5$$

$$x = 2 + \log_2 5$$

Yanıt – Answer : B

26. $\log_2(x+2) - \log_{2^2}(2x)^2 = 2$

$$= \log_2 \left(\frac{x+2}{2x} \right) = 2$$

$$= \frac{x+2}{2x} = 4 \Rightarrow x = \frac{2}{7}$$

Yanıt – Answer : C

18. BÖLÜM

KARMAŞIK SAYILAR







1. $\frac{i^{65} + i^{43} + i^{50}}{i^{81}} = ?$

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

2. $\frac{\sqrt{-9} \cdot \sqrt{-16} \cdot \sqrt{-4}}{\sqrt{-36} - \sqrt{-4}} = ?$

- A) -12i B) -8 C) -6i D) -6 E) -4i

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

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

4. $\frac{2-i}{2+i} - \frac{2+i}{2-i} = ?$

- A) $-\frac{8i}{5}$ B) $-\frac{8}{5}$ C) $\frac{5i}{8}$ D) $\frac{5}{8}$ E) $\frac{i}{5}$

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

- A) i-1 B) 1 C) i+1 D) 2i E) 1-2i

6. $z = \frac{2i-1}{2i+1} - \frac{i+1}{2i-1}$

Re(z) = ?

- A) $-\frac{7}{5}$ B) $-\frac{2}{5}$ C) 0 D) $\frac{2}{5}$ E) $\frac{7}{5}$

7. $\left(1 + \frac{1}{i+1}\right)\left(1 - \frac{1}{i-1}\right) = ?$

- A) $-\frac{9}{2}$ B) $-\frac{7}{2}$ C) $\frac{5}{2}$ D) $\frac{5i}{2}$ E) $\frac{9i}{2}$

8. $1 + \frac{1}{i} + \frac{1}{i^2} + \frac{1}{i^3} + \dots + \frac{1}{i^{50}} = ?$

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



9. $x, y \in \mathbb{R}$

$$2x - iy = (2 - i)(3 + 2i)$$

$$x + y = ?$$

- A) -5 B) -3 C) 1 D) 3 E) 6

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

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

11. $z = \sqrt{2} - \sqrt{2}i$

$$z^{20} = ?$$

- A) $-2^{15}i$ B) -2^{20} C) 2^{20}
D) $2^{15}i$ E) $2^{20}i$

12. $\left(\frac{1}{1-i}\right)^{20} = ?$

- A) $\frac{1}{2^{20}}$ B) $\frac{1}{2^{10}}$ C) -i D) $-\frac{i}{2^{20}}$ E) $-\frac{1}{2^{10}}$

13. $(1+i)^{15} \cdot (1-i)^{17} = ?$

- A) -2^{16} B) $-2^{16}i$ C) -2^{16} D) 2^{16} E) $2^{16}i$

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

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

15. $\frac{3\sqrt{2} - \sqrt{3}i}{2\sqrt{3} - \sqrt{2}i} = ?$

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

16. $\frac{4z-1}{2+3i} = z-1$

$$\text{Im}(z) = ?$$

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



1. $z = 4\sqrt{3} - i$

$|z| = ?$

- A) 1 B) 3 C) 5 D) 7 E) 9

2. $z = 2 - i$

$|z^{-1}| = ?$

- A) 1 B) $\frac{1}{5}$ C) $\frac{2}{5}$ D) $\frac{\sqrt{5}}{5}$ E) $\frac{\sqrt{10}}{5}$

3. $z = \frac{2+3i}{2-3i}$

$|z| = ?$

- A) 1 B) 2 C) $\sqrt{5}$ D) $\sqrt{10}$ E) $2\sqrt{5}$

4. $z_1 = 2\sqrt{3} - 2i$

$z_2 = 1 + \sqrt{3}i$

$\left| \frac{z_1}{z_2} \right| = ?$

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

5. $z = \frac{(3-4i) \cdot (6+8i)}{(5-12i) \cdot (3+4i)}$

$|z| = ?$

- A) $\frac{5}{13}$ B) $\frac{10}{13}$ C) $\frac{12}{13}$ D) $\frac{13}{12}$ E) $\frac{13}{10}$

6. $z \neq 0$
 $z = a + ib$

$\frac{|\bar{z}| \cdot |z|}{|-\bar{z}| \cdot |-\bar{z}|} = ?$

- A) $2a^2$ B) $2b^2$ C) a^2+b^2 D) 1 E) a^2-b^2

7. $z \neq 0$
 $z = a + ib$

$(1-2i) \cdot z = 2 + i\bar{z}$

$\sqrt{10} \cdot |z| = ?$

- A) $\sqrt{2}$ B) $\sqrt{5}$ C) $\sqrt{10}$ D) 5 E) 10

8. $z_1 = 2 - i$

$z_2 = 1 + 2i$

$|z_1 - z_2| = ?$

- A) $\sqrt{2}$ B) $\sqrt{5}$ C) $\sqrt{10}$ D) $2\sqrt{5}$ E) $2\sqrt{10}$



9. $z = \frac{(1+i) \cdot (\sqrt{3}-i)}{(2\sqrt{3}+2i) \cdot (1-i)}$

$|z| = ?$

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

10. $z + iz - 5 = 3i - 4$

$|z| = ?$

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

11. $|z - z| + 3 + z = 8 - 3i$

$\text{im}(z) = ?$

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

12. $i^2 = -1$

$\left| \frac{(1-i)^{12} \cdot (1+i)^{10}}{(\sqrt{3}-i)^8} \right| = ?$

- A) 2 B) 4 C) 6 D) 8 E) 16

13. $z_1 = 2 - i$

$z_2 = 2 + i$

$z_3 = 3i$

$\left| \frac{z_1 \cdot z_3}{z_2} \right| = ?$

- A) 1 B) $\sqrt{3}$ C) $\sqrt{5}$ D) 3 E) 5

14. $z_1 = 4 - 2i$

$z_2 = 2 + ai$

$|z_1 + z_2| = |z_1 - z_2|$

$a = ?$

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

15. $z \neq 0$

$z = a + ib$

$|z| = 8$

$\left| \frac{(\bar{z})^{-1} \cdot \sqrt[3]{z}}{z} \right| = ?$

- A) $\frac{1}{16}$ B) $\frac{1}{24}$ C) $\frac{1}{32}$ D) $\frac{1}{36}$ E) $\frac{1}{40}$



1. $z_1 = 6\text{cis}\frac{\pi}{6}$
 $z_2 = 2\text{cis}\frac{5\pi}{6}$

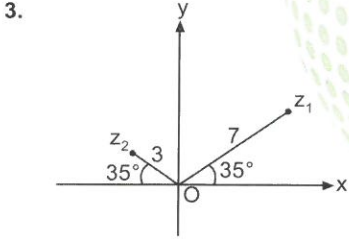
$z_1 + z_2 = ?$

- A) $\sqrt{3} + i$ B) $2\sqrt{3} + i$ C) $2\sqrt{3} + 3i$
D) $2\sqrt{3} + 4i$ E) $2\sqrt{3} - 4i$

2. $z_1 = 3\text{cis}40^\circ$
 $z_2 = 4\text{cis}50^\circ$

$z_1 \cdot z_2 = ?$

- A) $12 + 12i$ B) 12 C) $12i$
D) $12 - 12i$ E) $6\sqrt{3} + 6i$



$z_1 \cdot z_2 = ?$

- A) $21 - 21i$ B) 21 C) $21i$
D) $21 + 21i$ E) -21

4. $z = 2\text{cis}10^\circ$
 $z^3 = ?$

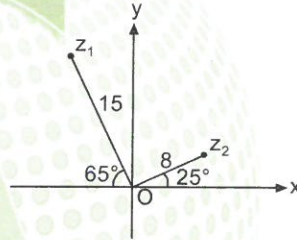
- A) $2\sqrt{3} + 2\sqrt{3}i$ B) $2\sqrt{3} - 2i$
C) $4\sqrt{3} + 4i$ D) $4\sqrt{3} - 4i$
E) $4 + 4\sqrt{3}i$

5. $z_1 = \text{cis}12^\circ$
 $z_2 = 2\text{cis}66^\circ$

$z_2 \cdot z_1^{-3} = ?$

- A) $\sqrt{3} + i$ B) $\sqrt{3} - i$ C) $1 - \sqrt{3}i$
D) $1 + \sqrt{3}i$ E) $\frac{\sqrt{3} + i}{2}$

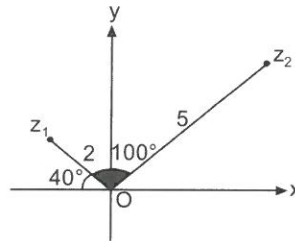
6.



$|z_2 - z_1| = ?$

- A) 8 B) 15 C) 17 D) 20 E) 25

7.



$z_1 \cdot z_2 = ?$

- A) 10 B) -10 C) $10i$ D) $-10i$ E) $10 - 10i$



8. $z_1 = \cos 50^\circ - i \sin 50^\circ$
 $z_2 = \cos 40^\circ + i \sin 40^\circ$

$$\frac{z_1}{z_2} = ?$$

- A) -i B) i C) 1 D) -1 E) 1-i

9. $z_1 = 6 \cos 170^\circ - 6i \sin 170^\circ$
 $z_2 = \cos 20^\circ + i \cos 70^\circ$

$$z_1 \cdot z_2 = ?$$

- A) $3\sqrt{3} + 3i$ B) $3\sqrt{3} - 3i$ C) $-3\sqrt{3} - 3i$
D) $-3\sqrt{3}i$ E) $-3i$

10. $z = 1 + \sqrt{3}i$

$$z^5 = ?$$

- A) $32(1 + \sqrt{3}i)$ B) $16(1 - \sqrt{3}i)$ C) $16(-1 + \sqrt{3}i)$
D) $32(-1 - \sqrt{3}i)$ E) $16(\sqrt{3} - i)$

11. $z_1 = 3(\cos 200^\circ - i \sin 200^\circ)$
 $z_2 = 2(\cos 10^\circ + i \sin 10^\circ)$

$$z_1 \cdot z_2^2 = ?$$

- A) 12 B) -12 C) $12 + 12i$
D) $12 - 12i$ E) $-12 - 12i$

12. $\text{Arg}(z_1) = \frac{\pi}{5}$

$$\text{Arg}(z_2) = \frac{3\pi}{10}$$

$$\text{Arg}\left(\frac{z_1^2}{z_2}\right) = ?$$

- A) $\frac{\pi}{10}$ B) $\frac{\pi}{5}$ C) $\frac{3\pi}{10}$ D) $\frac{2\pi}{5}$ E) $\frac{\pi}{2}$

13. $z_1 = 1 - i$
 $z_2 = i - \sqrt{3}$

$$\text{Arg}\left(\frac{z_1}{z_2}\right) = ?$$

- A) $\frac{\pi}{12}$ B) $\frac{5\pi}{12}$ C) $\frac{7\pi}{12}$ D) $\frac{11\pi}{12}$ E) π

14. $\text{Arg}\left(-\frac{i}{\text{cis} 120^\circ}\right) = ?$

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

15. $\text{Arg}(z - 5) = \frac{5\pi}{3}$

$$\text{Arg}(z + 1) = -\frac{\pi}{6}$$

$$z = ?$$

- A) $3\sqrt{3} + 8i$ B) $8 - 3\sqrt{3}i$
C) $3\sqrt{3} - 8i$ D) $8 + 3\sqrt{3}i$
E) $3 + 3\sqrt{3}i$



1. $(1+i)z = \bar{z} + 1$

$z = ?$

- A) $2+3i$ B) $2+i$ C) $3+i$ D) $2-i$ E) $3-i$

(YÖS – 2007)

2. $z_1 = 1 + 2i$

$z_2 = -2 + i$

$\left| \frac{z_1}{z_2} \right| = ?$

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

(YÖS – 2008)

3. $i^2 = -1$

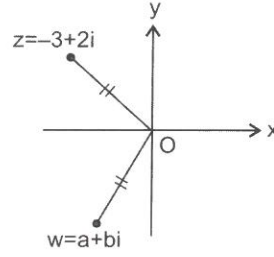
$z = 3(i^{18}) + i^{17} + i^{16}$

$z = ?$

- A) $-2+i$ B) $3+i$ C) $2+3i$ D) $3-i$ E) $4-3i$

(YÖS – 2009)

4.



$a^2 + b^2 = ?$

- A) 7 B) 9 C) 11 D) 13 E) 15

(YÖS – 2009)



1. $z = a + ib$

$$\bar{z} = a - ib$$

$$(1+i) \cdot (a+ib) = (a-ib) + 1$$

$$a+ib+ia+\underbrace{i^2b}_{-b} = a+1-ib$$

$$\underbrace{a-b}_{a-b=a+1} + i(a+b) = a+1-ib$$

$$a-b = a+1$$

$$a+b = -b$$

$$b = -1$$

$$a = -2b$$

$$a = 2$$

$$z = 2 - i$$

Yanıt – Answer : D

2. $z_1 = 1 + 2i$

$$z_2 = -2 + i$$

$$\left| \frac{z_1}{z_2} \right| = \frac{|z_1|}{|z_2|} = \frac{\sqrt{1^2+2^2}}{\sqrt{(-2)^2+1^2}} = \frac{\sqrt{5}}{\sqrt{5}} = 1$$

Yanıt – Answer : C

3. $i^{4n} = 1$ $i^{18} = i^{16+2} = -1$

$$i^{4n+1} = i$$
 $i^{17} = i^{16+1} = +i$

$$i^{4n+2} = -1$$
 $i^{16} = i^{16+0} = 1 \Rightarrow Z = 3 \cdot (-1) + i + 1$

$$i^{4n+3} = -i$$
 $= -2 + i$

Yanıt – Answer : A

4. $|z| = |w| \Rightarrow \sqrt{(-3)^2 + 2^2} = \sqrt{a^2 + b^2}$

$$\sqrt{13} = \sqrt{a^2 + b^2}$$

$$a^2 + b^2 = 13$$

Yanıt – Answer : D

19. BÖLÜM

TOPLAM - ÇARPIM **SEMBOLLERİ**







1. $\sum_{k=1}^6 k = ?$

- A) 42 B) 38 C) 21 D) 18 E) 13

2. $\sum_{k=1}^8 2k = ?$

- A) 96 B) 80 C) 72 D) 64 E) 56

3. $\sum_{k=-2}^{12} (2k - 5) = ?$

- A) 75 B) 70 C) 65 D) 60 E) 55

4. $\sum_{k=-3}^{15} (3k + 8) = ?$

- A) 500 B) 496 C) 494 D) 398 E) 396

5. $\sum_{k=10}^{19} (5k - 8) = ?$

- A) 645 B) 616 C) 600 D) 598 E) 595

6. $\sum_{k=1}^{12} (2k + x) = 240$

$x = ?$

- A) 13 B) 11 C) 9 D) 7 E) 5

7. $\sum_{k=7}^{15} k^2 = ?$

- A) 1149 B) 996 C) 889 D) 624 E) 285

8. $\sum_{k=1}^6 (k^3 - 4) = ?$

- A) 417 B) 396 C) 285 D) 244 E) 196



9. $f(x) = 2x^3 - 3x$

$$\sum_{k=1}^{10} f(k) = ?$$

- A) 5885 B) 5720 C) 5715
D) 5615 E) 5605

10. $\sum_{k=0}^9 (k^2 - 6) = ?$

- A) 225 B) 220 C) 215 D) 210 E) 205

11. $\sum_{k=4}^{16} (k - x) = 26$

$x = ?$

- A) 5 B) 6 C) 7 D) 8 E) 9

12. $\sum_{x=1}^5, \sum_{y=3}^5 (3x - 2y) = ?$

- A) 15 B) 14 C) 13 D) 12 E) 11

13. $\sum_{k=1}^3 \sum_{n=1}^3 2^k \cdot 3^n = ?$

- A) 530 B) 546 C) 558
D) 572 E) 646

14. $\sum_{k=1}^{15} 2k + 1 = x$ $\sum_{k=15}^{24} 2k + 1 = y$

$$\sum_{k=1}^{25} 2k + 2 = ?$$

- A) $x + y - 5$ B) $x + y$ C) $x + y - 25$
D) $x + y + 5$ E) $x + y + 45$

15. $\sum_{k=-8}^{15} 3 = \sum_{k=5}^{n+5} 4(k-2)$

$n = ?$

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



1. $\prod_{k=1}^8 k = ?$

- A) 5! B) 6! C) 7! D) 8! E) 9!

2. $\prod_{k=18}^{55} k = ?$

- A)
- $\frac{55!}{17!}$
- B)
- $\frac{18!}{55!}$
- C)
- $\frac{55! - 18!}{18!}$
-
- D)
- $\frac{55!}{18!}$
- E)
- $\frac{55!}{16!}$

3. $\prod_{k=1}^{19} 2^k = ?$

- A)
- 4^{200}
- B)
- 4^{190}
- C)
- 2^{200}
- D)
- 2^{190}
- E) 190

4. $\prod_{k=1}^{16} 8^k = ?$

- A)
- 8^{408}
- B)
- 8^{378}
- C)
- 2^{408}
- D)
- 4^{136}
- E)
- 4^{108}

5. $\prod_{k=1}^{24} 3 = ?$

- A)
- 27^7
- B)
- 24^3
- C)
- 9^{12}
- D)
- 3^{21}
- E)
- 3^{19}

6. $\prod_{k=3}^{14} 2 = ?$

- A)
- 8^6
- B)
- 8^7
- C)
- 4^7
- D)
- 2^{16}
- E)
- 4^6

7. $\prod_{k=1}^3 2k^2 = ?$

- A) 376 B) 288 C) 268 D) 196 E) 144

8. $\prod_{k=6}^{20} (k+2) = ?$

- A) 27! B) 7! C) 27!.7! D)
- $\frac{22!}{7!}$
- E)
- $\frac{7!}{27!}$



9. $\prod_{k=1}^4 \frac{k^2}{k+2} = ?$

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

10. $\prod_{k=4}^{15} (\sqrt{3})^{k-3} = ?$

- A) 9^{39} B) 3^{40} C) 3^{39} D) 3^{30} E) 3^{29}

11. $\prod_{k=-2}^{26} \log_{k+5} (k+3) = ?$

- A) 1150 B) 1080 C) 960 D) 720 E) 0

12. $\prod_{m=3}^4 \prod_{n=1}^2 (m+n) = ?$

- A) 600 B) 460 C) 240 D) 145 E) 129

13. $\sum_{k=1}^3 \prod_{t=1}^2 (k+t) = ?$

- A) 38 B) 36 C) 34 D) 32 E) 30

14. $\prod_{k=4}^6 \prod_{t=3}^5 3^{3k-2t} = ?$

- A) 27^{10} B) 9^{35} C) 3^{63} D) 3^{60} E) 3^{24}

15. $\sum_{n=1}^3 \prod_{m=1}^2 (m \cdot n) = ?$

- A) 54 B) 48 C) 36 D) 28 E) 16



1. $\prod_{k=2}^{63} \log_k(k+1) = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

2. $\sum_{n=2}^{32} \log_2\left(1 - \frac{1}{n}\right) = ?$

- A) -2 B) -5 C) 1 D) 5 E) 10

3. $\sum_{n=3}^5 \sum_{k=1}^3 (k+n) = ?$

- A) 32 B) 36 C) 42 D) 48 E) 54

4. $\sum_{m=1}^4 \prod_{k=1}^3 \left(\frac{k}{2}\right) = ?$

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

5. $\sum_{k=3}^7 (k^2 - k - 1) = ?$

- A) 85 B) 90 C) 95 D) 100 E) 105

6. $x^2 - 3x + 7 = 0$

$\sum_{k=1}^2 (x_k)^2 = ?$

- A) -23 B) -14 C) -7 D) -5 E) 4

7. $\sum_{x=-1}^4 \left(\frac{x-2}{3}\right) = ?$

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

8. $\sum_{n=1}^3 n^m = 36$

$m = ?$

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



9. $\prod_{k=-6}^6 2^k = ?$

- A) 2^{-12} B) 2^{-6} C) 1 D) 2^6 E) 2^{12}

10. $\sum_{n=1}^{99} \left(\frac{1}{n^2 + n} \right) = ?$

- A) $\frac{1}{99}$ B) $\frac{99}{100}$ C) 1 D) $\frac{99}{98}$ E) $\frac{100}{99}$

11. $\sum_{k=1}^8 e^{\ln k} = ?$

- A) 8 B) 10 C) 18 D) 36 E) 72

12. $\prod_{k=0}^{20} \frac{k^2 + 2k - 3}{k^2 + 3k - 4} = ?$

- A) $\frac{1}{16}$ B) $\frac{1}{8}$ C) $\frac{1}{4}$ D) $\frac{1}{2}$ E) 1

13. $\sum_{k=1}^n 2k^3 = an^4 + bn^3 + cn^2 + dn + e$

$a + e = ?$

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

14. $1 \cdot 4 + 2 \cdot 5 + 3 \cdot 6 + \dots + 9 \cdot 12 = ?$

- A) 420 B) 440 C) 450 D) 480 E) 515

15. $\sum_{k=1}^n \prod_{m=1}^{n-1} m = 24$

$n = ?$

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

16. $\sum_{n=3}^{14} (\sqrt{n+2} - \sqrt{n+1}) = ?$

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



1. $\sum_{k=-1}^2 (10k - 5) = ?$

- A) -5 B) 0 C) 15 D) 20 E) 30

(YÖS – 2006)

4. $\sum_{k=1}^5 \ln\left(\frac{k+1}{k}\right) = ?$

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

(YÖS – 2009)

2. $\sum_{k=1}^{78} \log_3\left(\frac{k+3}{k+2}\right) = ?$

- A) 1 B) 3 C) 9 D) 78 E) 81

(YÖS – 2007)

3. $f: x \rightarrow \sum_{n=1}^x n$

$g: x \rightarrow \sum_{n=1}^x n^2$

$(f \circ g)(2) = ?$

- A) 3 B) 6 C) 10 D) 15 E) 21

(YÖS – 2008)



$$1. \sum_{k=-1}^2 (10k - 5) = ?$$

$$\begin{array}{lcl} k = -1 & \Rightarrow & -15 \\ k = 0 & \Rightarrow & -5 \\ k = 1 & \Rightarrow & 5 \\ k = 2 & \Rightarrow & 15 \\ \hline & & = 0 \end{array}$$

Yanıt – Answer : B

$$3. (f \circ g)(2) = f(g(2))$$

$$g(2) = \sum_{n=1}^2 n^2 = 1^2 + 2^2 = 5$$

$$\Rightarrow f(g(2)) = f(5)$$

$$f(5) = \sum_{n=1}^5 n = \frac{5 \cdot 6}{2} = 15$$

$$\Rightarrow (f \circ g)(2) = 15$$

Yanıt – Answer : D

$$2. \sum_{k=1}^{78} \log_3 \left(\frac{k+3}{k+2} \right)$$

$$= \log_3 \frac{4}{3} + \log_3 \frac{5}{4} + \dots + \log_3 \frac{80}{79} + \log_3 \frac{81}{80}$$

$$= \log_3 \frac{\cancel{4} \cdot \cancel{5} \cdot \cancel{6} \dots \cancel{80} \cdot 81}{\cancel{3} \cdot \cancel{4} \cdot \cancel{5} \dots \cancel{79} \cdot \cancel{80}}$$

$$= \log_3 \frac{81}{3}$$

$$= \log_3 27$$

$$= \log_3 3^3$$

$$= 3$$

Yanıt – Answer : B

$$4. \sum_{k=1}^5 \ln \left(\frac{k+1}{k} \right)$$

$$= \ln \left(\frac{2}{1} \right) + \ln \left(\frac{3}{2} \right) + \ln \left(\frac{4}{3} \right) + \ln \left(\frac{5}{4} \right) + \ln \left(\frac{6}{5} \right)$$

$$= \ln \left(\frac{\cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot \cancel{5} \cdot \cancel{6}}{\cancel{1} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot \cancel{5}} \right) = \ln 6$$

Yanıt – Answer : E

20. BÖLÜM

LİMİT







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

- A)
- $-\infty$
- B)
- -2
- C)
- 2
- D)
- 3
- E)
- $\emptyset$

2. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin 3x + \cos x}{\cot 2x} = ?$

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

3. $\lim_{x \rightarrow 1} \frac{x^3 - x}{x^2 + 2x - 3} = ?$

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

4. $\lim_{x \rightarrow 3} \frac{x-3}{\sqrt{x+1}-2} = ?$

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

5. $\lim_{x \rightarrow 0} \frac{\sin 3x}{\tan 5x} = ?$

- A)
- 0
- B)
- $\frac{3}{5}$
- C)
- $\frac{4}{5}$
- D)
- $\frac{5}{3}$
- E)
- $\frac{5}{4}$

6. $\lim_{x \rightarrow -5} \frac{3\sin^2(x+5)}{4(x+5)^2} = ?$

- A)
- $\frac{3}{32}$
- B)
- $\frac{1}{8}$
- C)
- $\frac{3}{4}$
- D)
- $\frac{4}{3}$
- E)
- 8

7. $\lim_{x \rightarrow 2} \frac{x^3 - 2x + a}{x-2} = b \in \mathbb{R}$
 $a = ?$

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

8. $\lim_{x \rightarrow \infty} \frac{3x^2 - 5x}{x - x^2} = ?$

- A)
- $-\infty$
- B)
- -3
- C)
- 0
- D)
- 3
- E)
- ∞



9. $\lim_{x \rightarrow -\infty} \frac{5x^2 + 2}{7x^3 + 5x + 3} = ?$

- A) $-\infty$ B) 0 C) $\frac{5}{7}$ D) $\frac{7}{5}$ E) ∞

10. $\lim_{x \rightarrow -\infty} \frac{-x^7 + 3x - 2}{x^5 + 4x} = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

11. $\lim_{x \rightarrow \infty} \frac{(3m-2)x^3 + (n+1)x^2 - 5x + 1}{x-2} = -5$

$m + n = ?$

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

12. $\lim_{x \rightarrow \infty} \frac{(m+2)x^2 - nx + 1}{-x + 2} = 2$

$m - n = ?$

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

13. $\lim_{x \rightarrow \infty} \frac{\sqrt[3]{x^3 + 2} - 3}{2x - 1} = ?$

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

14. $\lim_{x \rightarrow \infty} \frac{\sqrt{9x^2 + 3x - 1} - 5x}{2x + 3} = ?$

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

15. $f: \mathbb{R} - \{2\} \rightarrow \mathbb{R}$

$$f(x) = \begin{cases} \frac{x^2 - 4}{x - 2}, & x \neq 2 \\ 2, & x = 2 \end{cases}$$

$\lim_{x \rightarrow 2} f(x) = ?$

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



1. $\lim_{x \rightarrow 3} (2x^2 + |x+5|) = ?$

- A) 26 B) 18 C) 12 D) 6 E) 5

2. $\lim_{x \rightarrow 7} \log_3 (x+2) = ?$

- A) $\emptyset$ B) 0 C) 1 D) 2 E) ∞

3. $\lim_{x \rightarrow 4} \log_5 (1-x) = ?$

- A) $\emptyset$ B) -1 C) 1 D) 4 E) ∞

4. $\lim_{x \rightarrow \frac{2\pi}{3}} \frac{\cos 3x - 2}{\sin 2x + \sqrt{3}} = ?$

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

5. $\lim_{x \rightarrow -3} \frac{2x+6}{x^2-9} = ?$

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

6. $\lim_{x \rightarrow 2} \frac{x^2 + 3x - 10}{x^2 - 4} = ?$

- A) $\frac{4}{7}$ B) 1 C) $\frac{7}{4}$ D) 2 E) $\frac{9}{4}$

7. $\lim_{x \rightarrow 3} \frac{|x-3|}{x+1} = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

8. $\lim_{x \rightarrow 0} \frac{3 \sin^2 x}{4 \tan^2 3x} = ?$

- A) $\frac{\sqrt{3}}{6}$ B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{1}{12}$ E) $\frac{1}{24}$



9. $\lim_{x \rightarrow 1} \frac{x^3 - 5x + a + 1}{x - 1} = b \in \mathbb{R}$

$a = ?$

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

10. $\lim_{x \rightarrow -4} \frac{2x^2 + 3x + ax - 2}{x + 4} = b \in \mathbb{R}$

$a = ?$

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

11. $\lim_{x \rightarrow 4} \frac{\sqrt{3x + 4} - 4}{x - 4} = ?$

- A) 0 B) $\frac{3}{8}$ C) $\frac{3}{4}$ D) 1 E) $\frac{5}{4}$

12. $\lim_{x \rightarrow \infty} \frac{5x^7 - 3x^3 + 2}{5x^2 - 6x^3 - x^7} = ?$

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

13. $\lim_{x \rightarrow \infty} \frac{\sqrt{16x^2 - 5x} + x}{7x - 2} = ?$

- A) $-\infty$ B) 0 C) $\frac{5}{7}$ D) $\frac{7}{5}$ E) ∞

14. $\lim_{x \rightarrow -\infty} \frac{\sqrt{9x^2 - 2x + 1} - 2x}{5x - 3} = ?$

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

15. $\lim_{x \rightarrow \infty} \frac{(m+2)x^3 + (2n-6)x^2 - 3}{(m+2)x^3 - 5x^2 - 4} = \frac{3}{4}$

$n = ?$

- A) -2 B) $-\frac{1}{8}$ C) $\frac{3}{4}$ D) $\frac{9}{8}$ E) 3



1. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{1 - \cot x} = ?$

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

2. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin 2x}{\pi - 2x} = ?$

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

3. $\lim_{x \rightarrow -\infty} \frac{5x - \sqrt[3]{x^3 + 3x + 1}}{-4x + \sqrt{x^2 + 2}} = ?$

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

4. $\lim_{x \rightarrow \frac{\pi}{2}} \left(x - \frac{\pi}{2} \right) \cdot \tan x = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

5. $\lim_{x \rightarrow \infty} \sqrt{x^2 + 2x + 3} - x = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

6. $\lim_{x \rightarrow -\infty} \left(\sqrt{x^2 + 4x + 7} - \sqrt{x^2 - 3x + 2} \right) = ?$

- A) $-\frac{7}{2}$ B) $-\frac{3}{2}$ C) $-\frac{1}{2}$ D) 0 E) ∞

7. $\lim_{x \rightarrow 2} \frac{x - 2}{\sqrt{x} - \sqrt{2}} = ?$

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

8. $\lim_{x \rightarrow m} \frac{x^5 - m^5}{x^4 - m^4} = ?$

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



9. $\lim_{x \rightarrow 1} \frac{5^x - 5}{5^{2x} - 25} = ?$

- A) $\frac{1}{10}$ B) $\frac{1}{2}$ C) $\frac{2}{5}$ D) $\frac{3}{10}$ E) 0

10. $\lim_{x \rightarrow 1} \frac{(x^2 - x)^4 \cdot (x^3 + x + 14)}{(x^2 - 1)^4 \cdot (2x - 1)} = ?$

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

11. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin^2 x} = ?$

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

12. $\lim_{x \rightarrow 4} \frac{x^2 - 2x - 8}{\sqrt{x^3 + 2x + 1}} = ?$

- A) 0 B) 2 C) 4 D) 6 E) 8

13. $\lim_{x \rightarrow 1} \frac{(x-1)^2 + 2 \sin(x-1)}{2 \cdot (e^{(x-1)} - e^{(x-1)^2})} = ?$

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

14. $\lim_{x \rightarrow 0} \frac{\sin^2 \frac{x}{4}}{x^2} = ?$

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

15. $\lim_{x \rightarrow 0} \frac{\sin^2 x + \sin x^2}{x^2} = ?$

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



1. $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x^2 - 2x - 3} = ?$

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

5. $\lim_{x \rightarrow a} \frac{\sin(3x - 3a)}{a - x} = ?$

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

2. $\lim_{x \rightarrow -1} \frac{x^2 - 3x - 4}{x^2 - 1} = ?$

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

6. $\lim_{y \rightarrow 1} \frac{\sin 4\pi y}{y - 1} = ?$

- A) $-\frac{2\pi}{3}$ B) $-\frac{\pi}{2}$ C) π D) 2π E) 4π

3. $\lim_{x \rightarrow 0} \frac{2 \cos 4x - 2}{x^2} = ?$

- A) -16 B) -4 C) -2 D) 4 E) 6

7. $\lim_{x \rightarrow \infty} \frac{e^x + 3x - 1}{e^{3x} + 2x + 4} = ?$

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

4. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{4x - 8} = ?$

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

8. $\lim_{x \rightarrow 0} \frac{e^{x^3} - e^{-x}}{\sin x + x^3} = ?$

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



9. $\lim_{x \rightarrow 0} \frac{6^x - 2^x}{x} = ?$

- A) $\ln 2$ B) $\ln 3$ C) $\ln 4$ D) $\ln 5$ E) $\ln 6$

10. $\lim_{x \rightarrow \infty} \frac{3x^3 - 1}{2x^3 + 1} = ?$

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

11. $\lim_{x \rightarrow 0} \frac{2x + \tan 6x}{x - \sin 3x} = ?$

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

12. $\lim_{x \rightarrow 0} \frac{\tan^2 2x}{\sin^2 3x} = ?$

- A) $\frac{4}{3}$ B) $\frac{2}{3}$ C) $\frac{5}{9}$ D) $\frac{4}{9}$ E) $\frac{1}{3}$

13. $\lim_{x \rightarrow \infty} \frac{2x^3 - 4x^2 + 1}{x^2 + 2x - 3} = ?$

- A) $-\infty$ B) -1 C) 0 D) 2 E) $+\infty$

14. $\lim_{x \rightarrow -\infty} \frac{x+2}{x^2} = ?$

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

15. $\lim_{x \rightarrow 0} \frac{x \cdot \tan 3x \cdot \cos 2x}{\sin^2 3x} = ?$

- A) $\frac{1}{3}$ B) $\frac{4}{9}$ C) $\frac{1}{2}$ D) $\frac{5}{9}$ E) $\frac{2}{3}$



1. $\lim_{x \rightarrow \infty} \left(1 - \frac{2}{3x-2}\right)^{6x+1} = ?$

- A) e^{-4} B) e^{-2} C) 1 D) e^2 E) e^4

2. $\lim_{x \rightarrow \infty} \frac{2^x + 2^{-x}}{2^{-x} - 2^x} = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞

3. $\lim_{x \rightarrow \infty} \frac{2 \cdot 5^x - 4^x}{3^x - 5^x} = ?$

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

4. $\lim_{x \rightarrow -\infty} \left(-2 \cdot 4^x - 3^{\frac{4}{x}} - 3\right) = ?$

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

5. $\lim_{x \rightarrow \infty} \left(\frac{3x+2}{3x+1}\right)^{2x-4} = ?$

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

6. $\lim_{x \rightarrow \infty} \left(\frac{2}{3^x + 4^{-x} + 1}\right) = ?$

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

7. $\lim_{x \rightarrow \infty} (\sqrt{x+1} - \sqrt{x-2}) = ?$

- A) $-\infty$ B) 0 C) 1 D) 2 E) ∞

8. $\lim_{x \rightarrow \infty} (\sqrt{4x^2 + 2x - 1} - \sqrt{x^2 - 2x + 3}) = ?$

- A) $-\infty$ B) -1 C) 0 D) 1 E) ∞



9. $\lim_{x \rightarrow \infty} \left(\frac{2x^2 - 3}{2x^2 + 1} \right)^{4x^2 + 3} = ?$

- A) e^{-8} B) 1 C) e^2 D) e^4 E) ∞

10. $\lim_{x \rightarrow \infty} \frac{2^x + 3^{x+1}}{4^{x-1} - 2 \cdot 3^x} = ?$

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

11. $\lim_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{4}{x^2-4} \right) = ?$

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

12. $\lim_{x \rightarrow \infty} \left(1 + \frac{a}{x-2} \right)^{2ax+1} = e^{32}$

$\prod a = ?$

- A) -16 B) -8 C) 0 D) 8 E) 16

13. $\lim_{x \rightarrow 2} \sqrt{\frac{x^2 - 4}{x^3 - 8}} = ?$

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

14. $\lim_{x \rightarrow \infty} \left(1 - \frac{2}{x^2} \right)^x = ?$

- A) e^{-2} B) 0 C) 1 D) e^2 E) e^4

15. $\lim_{x \rightarrow -\infty} \left(\sqrt{4x^2 - 3x + 3} - \sqrt{4x^2 - 2x - 3} \right) = ?$

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

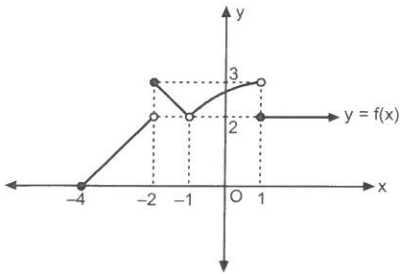
16. $\lim_{x \rightarrow +\infty} \left(\sqrt{x^2 - ax + 2} - x - 1 \right) = 3$

$a = ?$

- A) 4 B) 0 C) -2 D) -4 E) -8



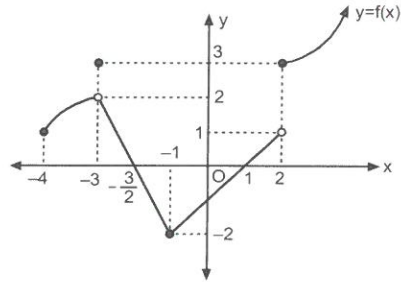
1. $f: [-4, \infty) \rightarrow [0, 3)$



$$\lim_{x \rightarrow -2^+} f(x) + \lim_{x \rightarrow -1} f(x) - \lim_{x \rightarrow 1^-} f(x) = ?$$

- A) -6 B) -3 C) 0 D) 2 E) 5

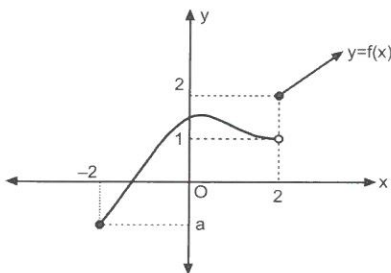
3. $f: (-4, \infty) \rightarrow [-2, \infty)$



$$\frac{\lim_{x \rightarrow -3} f(x) + \lim_{x \rightarrow 1^+} f(x)}{f(-3) + \lim_{x \rightarrow 2^-} f(x)} = ?$$

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

2. $f: [-2, \infty) \rightarrow [a, \infty)$



$$\lim_{x \rightarrow 2} f(x) = ?$$

- A) 0 B) 1 C) 2 D) 3 E)
- $\emptyset$

4.
$$f(x) = \begin{cases} x^3 - 2x, & x \geq 3 \\ 8x - 3, & x < 3 \end{cases}$$

$$\lim_{x \rightarrow 4} f(x) - \lim_{x \rightarrow 3} f(x) - \lim_{x \rightarrow 1} f(x) = ?$$

- A) 25 B) 30 C) 35 D) 42 E) 56

5.
$$\lim_{x \rightarrow 5} \frac{|x^2 - 4x + 1|}{3 - x} = ?$$

- A) -3 B) -2 C) 2 D) 3 E) 5



6. $\lim_{x \rightarrow 4} (\operatorname{sgn}(5-x) + |2-x|) = ?$

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

7. $f(x) = \begin{cases} x^2 - 3a, & x > 2 \\ 3 - x^3, & x \leq 2 \end{cases}$

$\lim_{x \rightarrow 2} f(x) = b \in \mathbb{R}$

$a + b = ?$

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

8. $\lim_{x \rightarrow 3^-} ([x-2] - |x-2|) = ?$

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

9. $\lim_{x \rightarrow -2^-} \left(\frac{|x+2|}{x+2} + \operatorname{sgn}(x+2) \right) = ?$

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

10. $\lim_{x \rightarrow \left(\frac{4}{3}\right)^+} ([3x-2] - \operatorname{sgn}(7-x)) = ?$

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

11. $\lim_{x \rightarrow \left(\frac{3\pi}{2}\right)^+} [\operatorname{sgn}(\cos x) - \operatorname{sgn}(\sin x)] = ?$

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

12. $\lim_{x \rightarrow -2} \operatorname{sgn}(x+2) = ?$

- A) -1 B) 0 C) 1 D) 2 E) $\emptyset$

13. $\lim_{x \rightarrow 4^+} (\operatorname{sgn}(x^2 - 3x - 4) \cdot |x-5|) = ?$

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

14. $\lim_{x \rightarrow 1^+} [x^2 - x - 2] = ?$

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

15. $\lim_{x \rightarrow 3} \frac{x^2 - 2}{x - 3} = ?$

- A) $-\infty$ B) 6 C) 7 D) $\emptyset$ E) ∞



LİMİT

ÇIKMIŞ SORULAR

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

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

(YÖS - 1983)

2. $\lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{3x^2 - 12} = ?$

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

(YÖS - 1984)

3. $\lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1} = ?$

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

(YÖS - 1985)

4. $\lim_{x \rightarrow 3} \sqrt{\frac{x^3 - 27}{x^2 - 9}} = ?$

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

(YÖS - 1986)

5. $\lim_{x \rightarrow 3} \frac{x^2 - 6x + 9}{x^2 - 8x + 15} = ?$

- A) $-\frac{9}{13}$ B) 0 C) 1 D) $\frac{9}{13}$ E) $\frac{3}{5}$

(YÖS - 1987)

6. $\lim_{x \rightarrow a} \frac{x^3 - a^3}{x^2 - a^2} = ?$

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

(YÖS - 1988)

7. $\lim_{x \rightarrow 0} \frac{x^2 + 2 \cdot \sin x}{\frac{1}{2} \cdot (e^x - e^{-x^2})} = ?$

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

(YÖS - 1994)

8. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\pi - 2x}{\sin 8x} = ?$

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

(YÖS - 1995)



LİMİT

ÇIKMIŞ SORULAR

9. $\lim_{x \rightarrow -1} \frac{x^{15} + 1}{x^6 - 1} = ?$

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

(YÖS - 1997)

10. $\lim_{x \rightarrow -1} \frac{x^{36} - 1}{2x^9 + 2} = ?$

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

(YÖS - 1998)

11. $\lim_{x \rightarrow 4} \frac{x^2 + x - 20}{x^2 - 16} = ?$

- A) $\frac{1}{4}$ B) $\frac{3}{7}$ C) $\frac{4}{7}$ D) $\frac{7}{8}$ E) $\frac{9}{8}$

(YÖS - 1999)

12. $\lim_{x \rightarrow 81} \frac{\sqrt{x} - 9}{\sqrt[4]{x} - 3} = ?$

- A) 3 B) 4 C) 5 D) 6 E) $4\sqrt{3}$

(YÖS - 1999)

13. $\lim_{x \rightarrow 0} \frac{\sin(1 - \cos 2x)}{\sin^2 x} = ?$

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

(YÖS - 2000)

14. $\lim_{x \rightarrow a} \frac{x^2 - a^2}{x^2 - x - ax + a} = ?$

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

(YÖS - 2001)

15. $f: \mathbb{R} \rightarrow \mathbb{R}$

$f(x) = x^2 - 2x + 2$

$\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1} = ?$

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

(YÖS - 2001)

16. $\lim_{x \rightarrow 0} \left(\frac{\tan^2 3x}{25x^2} \right) = ?$

- A) $\frac{3}{25}$ B) $\frac{6}{25}$ C) $\frac{9}{25}$ D) 6 E) 9

(YÖS - 2002)



17. $\lim_{x \rightarrow -\infty} \left(\frac{3}{5^x} + 4^x + 3 \right) = ?$

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

(YÖS - 2002)

18. $\lim_{x \rightarrow \frac{1}{3}} \left(\frac{x^3 - \frac{1}{27}}{x^2 - \frac{1}{9}} \right) = ?$

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

(YÖS - 2002)

19. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin 2x}{\cos x} = ?$

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

(YÖS - 2003)

20. $\lim_{x \rightarrow \infty} \frac{x^2 - x + 3}{-x^5 + x^2} = ?$

- A) 0 B) 1 C) $\frac{1}{3}$ D) $\frac{1}{5}$ E) $+\infty$

(YÖS - 2003)

21. $\lim_{x \rightarrow 1} \frac{2x^3 + x^2 - 1}{x^3 + 3} = ?$

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

(YÖS - 2004)

22. $\lim_{x \rightarrow 0} \frac{\pi \sin \frac{\pi x}{6}}{3x \cos \frac{\pi x}{3}} = ?$

- A) $\frac{\pi}{9}$ B) $\frac{\pi}{19}$ C) $\frac{\pi^2}{18}$ D) 2π E) $3\pi + 1$

(YÖS - 2004)

23. $\lim_{x \rightarrow \infty} \frac{2x^3 + 5x^2 - 7x}{3x^2 + 5} = ?$

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

(YÖS - 2005)

24. $\lim_{x \rightarrow 3} \frac{\sin(7x - 21)}{2x - 6} = ?$

- A) $\frac{7}{2}$ B) $\frac{5}{2}$ C) $\frac{3}{2}$ D) 0 E) 1

(YÖS - 2005)



25. $\lim_{x \rightarrow 3^+} \frac{|x-3|}{x-3} = ?$

- A) -1 B) 0 C) 1 D) 3 E) $+\infty$

(YÖS - 2005)

28. $\lim_{x \rightarrow 0} \frac{3x + \sin 2x}{2x + \sin 3x} = ?$

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

(YÖS - 2006)

26. $\lim_{x \rightarrow -2} \frac{x^3 + 8}{4 - x^2} = ?$

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

(YÖS - 2006)

29. $\lim_{x \rightarrow a^-} \frac{|x-a|}{x-a} = ?$

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

(YÖS - 2007)

27. $\lim_{x \rightarrow (-3)^-} \frac{x^2 + x - 6}{|x+3|} = ?$

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

(YÖS - 2006)

30. $\lim_{x \rightarrow 0} \left[\tan \left(1 - \frac{\sin x}{x} \right) \right] = ?$

- A) $-\pi$ B) π C) 0 D) -1 E) 1

(YÖS - 2007)



31. $\lim_{x \rightarrow 0} \frac{\sqrt[3]{x+27} - 3}{x} = ?$

- A) $-\frac{1}{27}$ B) $-\frac{1}{9}$ C) $-\frac{1}{3}$ D) $\frac{1}{27}$ E) $\frac{1}{3}$

(YÖS - 2007)

34. $\lim_{x \rightarrow -\infty} \frac{3^{-x} - 3^x}{3^{-x} + 3^x} = ?$

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

(YÖS - 2009)

32. $f(x) = \begin{cases} x+8 & x \leq 3 \\ 2+ax^2 & x > 3 \end{cases}$

$\lim_{x \rightarrow 3^-} f(x) = \lim_{x \rightarrow 3^+} f(x)$

$a = ?$

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

(YÖS - 2008)

33. $\lim_{x \rightarrow 5} \frac{\sqrt{x+11} - 4}{\sqrt{x-1} - 2} = ?$

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

(YÖS - 2008)



$$1. \quad \lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} = \lim_{x \rightarrow 1} \frac{(x-1)(x+1)}{x-1}$$
$$= 1 + 1 = 2$$

Yanıt – Answer: C

$$2. \quad \lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{3x^2 - 12} = \lim_{x \rightarrow 2} \frac{(x-2)(x-2)}{3(x^2 - 4)}$$
$$= \lim_{x \rightarrow 2} \frac{(x-2)(x-2)}{3(x-2)(x+2)}$$
$$= \frac{2-2}{3(2+2)}$$
$$= 0$$

Yanıt – Answer: A

$$3. \quad \lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1} = \lim_{x \rightarrow -1} \frac{(x+1)(x^2 - x + 1)}{x + 1}$$
$$= (-1)^2 - (-1) + 1$$
$$= 1 + 1 + 1$$
$$= 3$$

Yanıt – Answer: E

$$4. \quad \lim_{x \rightarrow 3} \sqrt{\frac{x^3 - 27}{x^2 - 9}} = \lim_{x \rightarrow 3} \sqrt{\frac{(x-3)(x^2 + 3x + 9)}{(x-3)(x+3)}}$$
$$= \sqrt{\frac{3^2 + 3 \cdot 3 + 9}{3 + 3}}$$
$$= \sqrt{\frac{27}{6}} = \sqrt{\frac{9}{2}} = \frac{3}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

Yanıt – Answer: A

$$5. \quad \lim_{x \rightarrow 3} \frac{x^2 - 6x + 9}{x^2 - 8x + 15} = \lim_{x \rightarrow 3} \frac{(x-3)(x-3)}{(x-3)(x-5)}$$
$$= \frac{3-3}{3-5}$$
$$= 0$$

Yanıt – Answer: B

$$6. \quad \lim_{x \rightarrow a} \frac{x^3 - a^3}{x^2 - a^2} = \lim_{x \rightarrow a} \frac{(x-a)(x^2 + ax + a^2)}{(x-a)(x+a)}$$
$$= \frac{a^2 + a^2 + a^2}{a + a} = \frac{3a^2}{2a}$$
$$= \frac{3a}{2}$$

Yanıt – Answer: A

$$7. \quad \lim_{x \rightarrow 0} \frac{x^2 + 2 \sin x}{\frac{1}{2}(e^x - e^{x^2})} = \frac{0}{0}$$

$$\lim_{x \rightarrow 0} \frac{x^2 + 2 \sin x}{\frac{1}{2}(e^x - e^{x^2})} = \lim_{x \rightarrow 0} \frac{2x + 2 \cos x}{\frac{1}{2}(e^x - e^{x^2}) \cdot 2x}$$
$$= \frac{2}{\frac{1}{2}} = 4$$

Yanıt – Answer: C

$$8. \quad \lim_{x \rightarrow \frac{\pi}{2}} \frac{\pi - 2x}{\sin 8x} = \frac{0}{0}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{\pi - 2x}{\sin 8x} = \lim_{x \rightarrow \frac{\pi}{2}} \frac{-2}{(\cos 8x) \cdot 8}$$
$$= \frac{-2}{(\cos 4\pi) \cdot 8} = -\frac{2}{8} = -\frac{1}{4}$$

Yanıt – Answer: B



$$9. \quad \lim_{x \rightarrow -1} \frac{x^{15} + 1}{x^6 - 1} = \frac{(-1)^{15} + 1}{(-1)^6 - 1} = \frac{0}{0}$$

$$\lim_{x \rightarrow -1} \frac{x^{15} + 1}{x^6 - 1} = \lim_{x \rightarrow -1} \frac{15x^{14}}{6x^5} = \frac{15 \cdot (-1)^{14}}{6 \cdot (-1)^5} \\ = -\frac{5}{2}$$

Yanıt – Answer: E

$$10. \quad \lim_{x \rightarrow -1} \frac{x^{36} - 1}{2x^9 + 2} = \lim_{x \rightarrow -1} \frac{(x^{18})^2 - 1^2}{2 \cdot (x^9 + 1)} \\ = \lim_{x \rightarrow -1} \frac{(x^{18} - 1)(x^{18} + 1)}{2 \cdot (x^9 + 1)} \\ = \lim_{x \rightarrow -1} \frac{(x^9 - 1)(x^9 + 1)(x^{18} + 1)}{2 \cdot (x^9 + 1)} \\ = \frac{((-1)^9 - 1) \cdot ((-1)^{18} + 1)}{2} \\ = -2$$

Yanıt – Answer: C

$$11. \quad \lim_{x \rightarrow 4} \frac{x^2 + x - 20}{x^2 - 16} = \lim_{x \rightarrow 4} \frac{(x-4)(x+5)}{(x-4)(x+4)} \\ = \frac{4+5}{4+4} \\ = \frac{9}{8}$$

Yanıt – Answer: E

$$12. \quad \lim_{x \rightarrow 81} \frac{\sqrt{x} - 9}{\sqrt[4]{x} - 3} = \lim_{x \rightarrow 81} \frac{(\sqrt{x} - 3)(\sqrt{x} + 3)}{(\sqrt[4]{x} - 3)} \\ = \sqrt[4]{81} + 3 \\ = 3 + 3 \\ = 6$$

Yanıt – Answer: D

$$13. \quad \lim_{x \rightarrow 0} \frac{\sin(1 - \cos 2x)}{\sin^2 x} = \frac{0}{0} \\ \lim_{x \rightarrow 0} \frac{\cos(1 - \cos 2x) \cdot (\sin 2x)(2)}{2 \sin x \cdot \cos x} \\ = \frac{\cos(1-1) \cdot 2}{1} = \frac{1 \cdot 2}{1} = 2$$

Yanıt – Answer: D

$$14. \quad \lim_{x \rightarrow a} \frac{x^2 - a^2}{x^2 - x - ax + a} = \lim_{x \rightarrow a} \frac{(x-a)(x+a)}{(x-a)(x-1)} \\ = \frac{2a}{a-1}$$

Yanıt – Answer: E

$$15. \quad f(1) = 1 - 2 + 2 = 1$$

$$\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1} = \lim_{x \rightarrow 1} \frac{x^2 - 2x + 2 - 1}{x - 1} \\ = \lim_{x \rightarrow 1} \frac{x^2 - 2x + 1}{x - 1} = \lim_{x \rightarrow 1} \frac{(x-1)(x-1)}{(x-1)} = 0$$

II. yol

$\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1}$ ifadesi $f(x)$ 'in $x = 1$ noktasındaki türevi demektir.

$$f(x) = x^2 - 2x + 2 \\ f'(x) = 2x - 2 \\ f'(1) = 2 \cdot 1 - 2 \\ f'(1) = 0$$

Yanıt – Answer: B



16. Kural: $\lim_{x \rightarrow 0} \frac{\tan ax}{bx} = \frac{a}{b}$

$$= \lim_{x \rightarrow 0} \left(\frac{\tan^2 3x}{25x^2} \right)$$

$$= \lim_{x \rightarrow 0} \frac{\tan 3x}{5x} \cdot \lim_{x \rightarrow 0} \frac{\tan 3x}{5x}$$

$$= \frac{3}{5} \cdot \frac{3}{5} = \frac{9}{25}$$

Yanıt – Answer: C

17. $\lim_{x \rightarrow -\infty} \left(\frac{3}{5^x + 4^x + 3} \right) = \left(\frac{3}{5^{-\infty} + 4^{-\infty} + 3} \right) =$

$$= 5^0 + 0 + 3 = 4$$

Yanıt – Answer: E

18. $\lim_{x \rightarrow \frac{1}{3}} \left(\frac{x^3 - \frac{1}{27}}{x^2 - \frac{1}{9}} \right)$

$$= \lim_{x \rightarrow \frac{1}{3}} \frac{\left(x - \frac{1}{3}\right) \cdot \left(x^2 + \frac{x}{3} + \frac{1}{9}\right)}{\left(x - \frac{1}{3}\right) \cdot \left(x + \frac{1}{3}\right)}$$

$$= \frac{\frac{1}{9} + \frac{1}{9} + \frac{1}{9}}{\frac{1}{3} + \frac{1}{3}} = \frac{1}{2}$$

Yanıt – Answer: A

19. $\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin 2x}{\cos x} = \frac{\sin 2 \cdot \frac{\pi}{3}}{\cos \frac{\pi}{3}} = \frac{\sin 120}{\cos 60}$

$$= \frac{\sin 60}{\cos 60} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

Yanıt – Answer: C

20. $\lim_{x \rightarrow \infty} \frac{x^2 - x + 3}{-x^5 + x^2} = \lim_{x \rightarrow \infty} \frac{x^2}{-x^5}$

$$= \lim_{x \rightarrow \infty} \frac{-1}{x^3} = \frac{-1}{\infty} = 0$$

Yanıt – Answer: A

21. $\lim_{x \rightarrow 1} \frac{2x^3 + x^2 - 1}{x^3 + 3} = \frac{2 \cdot 1^3 + 1^2 - 1}{1^3 + 3}$

$$= \frac{2 + 1 - 1}{1 + 3} = \frac{2}{4} = \frac{1}{2}$$

Yanıt – Answer: A

22. $\lim_{x \rightarrow 0} \frac{\pi \sin \frac{\pi x}{6}}{3x \cos \frac{\pi x}{3}} = \frac{\pi \sin \frac{\pi \cdot 0}{6}}{3 \cdot 0 \cos \frac{\pi \cdot 0}{3}} = \frac{0}{0}$

$$\Rightarrow \left(\pi \cdot \sin \frac{\pi x}{6} \right)' = \pi \cdot \frac{\pi}{6} \cdot \cos \frac{\pi \cdot x}{6}$$

$$\Rightarrow \left(3x \cdot \cos \frac{\pi x}{3} \right)' = 3 \cdot \cos \frac{\pi x}{3} - \frac{\pi}{3} \cdot \sin \frac{\pi x}{3} \cdot 3x$$

$$= 3 \cos \frac{\pi x}{3} - \pi x \sin \frac{\pi x}{3}$$

$$= \frac{\pi \cdot \frac{\pi}{6} \cdot \cos \frac{\pi \cdot 0}{6}}{3 \cos \frac{\pi \cdot 0}{3} - \pi \cdot 0 \cdot \sin \frac{\pi \cdot 0}{3}} = \frac{\frac{\pi^2}{6}}{3} = \frac{\pi^2}{18}$$

Yanıt – Answer: C



23. $\lim_{x \rightarrow \infty} \frac{2x^3 + 5x^2 - 7x}{3x^2 + 5} = ?$

Kural:

$$d[P(x)] > d[Q(x)] \lim_{x \rightarrow \infty} \frac{P(x)}{Q(x)} = \infty$$

$$d[2x^3 + 5x^2 - 7x] = 3$$

$$d[3x^2 + 5] = 2$$

$$\lim_{x \rightarrow \infty} \frac{2x^3 + 5x^2 - 7x}{3x^2 + 5} = \infty$$

Yanıt – Answer: B

24. $\lim_{x \rightarrow 3} \frac{\sin(7x - 21)}{2x - 6} = \frac{0}{0}$

$$\lim_{x \rightarrow 3} \frac{7 \cdot \cos(7x - 21)}{2} = \frac{7 \cdot \cos 0}{2} = \frac{7}{2}$$

Yanıt – Answer: A

25. $\lim_{x \rightarrow 3^+} \frac{|x - 3|}{x - 3} = \lim_{x \rightarrow 3^+} \frac{x - 3}{x - 3} = 1$

Yanıt – Answer: C

26. $\lim_{x \rightarrow -2} \frac{x^3 + 8}{4 - x^2} = \frac{(-2)^3 + 8}{4 - (-2)^2} = \frac{0}{0}$

$$\lim_{x \rightarrow -2} \frac{3x^2}{-2x} = \frac{3 \cdot (-2)^2}{-2 \cdot (-2)} = \frac{12}{4} = 3$$

Yanıt – Answer: C

27. $\lim_{x \rightarrow (-3)^-} \frac{x^2 + x - 6}{|x + 3|} = \lim_{x \rightarrow (-3)^-} \frac{(x + 3)(x - 2)}{-(x + 3)}$

$$= -(-3 - 2) = 5$$

Yanıt – Answer: E

28. $\lim_{x \rightarrow 0} \frac{3x + \sin 2x}{2x + \sin 3x} = \frac{0}{0}$

$$\lim_{x \rightarrow 0} \frac{3 + 2 \cos 2x}{2 + 3 \cos 3x} = \frac{3 + 2 \cos 2 \cdot 0}{2 + 3 \cos 3 \cdot 0}$$

$$= \frac{3 + 2}{2 + 3}$$

$$= \frac{5}{5} = 1$$

Yanıt – Answer: C



$$29. \lim_{x \rightarrow a^-} \frac{|x-a|}{x-a} = \lim_{x \rightarrow a^-} \frac{-(x-a)}{x-a} = -1$$

Yanıt – Answer : A

$$30. \lim_{x \rightarrow 0} \left[\tan \left(1 - \frac{\sin x}{x} \right) \right]$$

$$= \lim_{x \rightarrow 0} [\tan(1-1)]$$

$$= \tan 0$$

$$= 0$$

$$\left(\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1 \right)$$

Yanıt – Answer : C

$$31. \lim_{x \rightarrow 0} \frac{\sqrt[3]{x+27} - 3}{x}$$

$$= \lim_{x \rightarrow 0} \frac{\sqrt[3]{0+27} - 3}{0}$$

$$= \frac{0}{0}$$

$$\lim_{x \rightarrow 0} \frac{\frac{1}{3\sqrt[3]{(x+27)^2}}}{1} = \frac{1}{3.9} = \frac{1}{27}$$

Yanıt – Answer : D

$$32. \lim_{x \rightarrow 3^-} f(x) = 3 + 8 = 11$$

$$\lim_{x \rightarrow 3^+} f(x) = 2 + a \cdot (3)^2 = 2 + 9a$$

$$\lim_{x \rightarrow 3^-} f(x) = \lim_{x \rightarrow 3^+} f(x)$$

$$11 = 2 + 9a \Rightarrow a = 1$$

Yanıt – Answer : C

$$33. \lim_{x \rightarrow 5} \frac{\sqrt{x+11} - 4}{\sqrt{x-1} - 2} = \frac{\sqrt{16} - 4}{\sqrt{4} - 2} = \frac{4 - 4}{2 - 2} = \frac{0}{0}$$

$$\lim_{x \rightarrow 5} \frac{\frac{1}{2\sqrt{x+11}}}{\frac{1}{2\sqrt{x-1}}} = \frac{\frac{1}{2\sqrt{16}}}{\frac{1}{2\sqrt{4}}} = \frac{\frac{1}{4}}{\frac{1}{2}} = \frac{1}{2}$$

Yanıt – Answer : D

$$34. \lim_{x \rightarrow -\infty} \frac{3^{-x} - 3^x}{3^{-x} + 3^x} = \lim_{x \rightarrow -\infty} \frac{3^{-x}(1 - 3^{2x})}{3^{-x}(1 + 3^{2x})} = 1$$

Yanıt – Answer : C

21. BÖLÜM

TÜREV







1. $f(x) = x^3 - 2x + 5$

$$\lim_{x \rightarrow 2} \frac{f(x) - f(2)}{x - 2} = ?$$

- A) 6 B) 7 C) 8 D) 9 E) 10

2. $f(x) = x^2 \cdot e^x$

$$\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1} = ?$$

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

3. $f(x) = \sin 2x$

$$\lim_{h \rightarrow 0} \frac{f\left(\frac{\pi}{3} + h\right) - f\left(\frac{\pi}{3}\right)}{h} = ?$$

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

4. $f(x) = \sin x \cdot \cos x - 2 \cos^2 x$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{f(x) - f\left(\frac{\pi}{2}\right)}{x - \frac{\pi}{2}} = ?$$

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

5. $f(x) = \begin{cases} x^2 + 1, & x \leq 1 \\ 2x, & x > 1 \end{cases}$

$$f'(1) = ?$$

- A) -1 B) 0 C) 1 D) 2 E) $\emptyset$

6. $f(x) = \begin{cases} 18x - 1, & x \geq 3 \\ 3x^2 - 1, & x < 3 \end{cases}$

$$f'(3) = ?$$

- A) 1 B) 3 C) 18 D) 19 E) $\emptyset$

7. $f(x) = \begin{cases} 2x^2 - 3, & x < -2 \\ 4x - 1, & x \geq -2 \end{cases}$

$$f'(-2) = ?$$

- A) -8 B) -4 C) 1 D) 4 E) $\emptyset$

8. $a \in \mathbb{R}$

$$f(x) = (x-a) \cdot (x-2a) \cdot (x-3a)$$

$$f'(a) = ?$$

- A) a^2 B) $2a^2$ C) $3a^2$ D) $4a^2$ E) $5a^2$



9. $f(x) = \frac{1}{3}(x^2 - x)^5$

$f'(2) = ?$

- A) 80 B) 90 C) 100 D) 110 E) 120

10. $f(x) = \cos\left(\frac{\pi}{6} \tan x\right)$

$f'\left(\frac{3\pi}{4}\right) = ?$

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

11. $f(x) = \text{ArcSin} \frac{2}{\sqrt{x}}$

$\frac{df(x)}{dx} = f'(x) = ?$

A) $\frac{1}{2x\sqrt{x-1}}$

B) $\frac{1}{x\sqrt{x-1}}$

C) $-\frac{1}{x\sqrt{x-4}}$

D) $\frac{1}{x\sqrt{x-4}}$

E) $-\frac{1}{x\sqrt{x-2}}$

12. $f(x) = x^2 \cdot e^x$

$f'(-1) = ?$

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

13. $f(x) = \ln(\sin x)$

$\frac{df(x)}{dx} = f'(x) = ?$

- A) $\cot x$ B) $\tan x$ C) $\ln(\cos x)$ D) $-\tan x$ E) $-\cot x$

14. $f(x) = \left(x + \sqrt{x^2 - 1}\right)^n$

$\frac{df(x)}{dx} = f'(x) = ?$

A) $\frac{n \cdot f(x)}{\sqrt{x^2 - 1}}$

B) $n \cdot f(x) \cdot \sqrt{x^2 - 1}$

C) $\left(1 + \frac{x}{\sqrt{x^2 - 1}}\right)^n$

D) $2f(x) \cdot n$

E) $\frac{f(x)}{(x^2 - 1)^n}$

15. $f(x) = x \cdot (3x + 5)^3 - 3x^2 (3x + 5)^2$

$f'(-1) = ?$

- A) -40 B) -30 C) -20 D) -10 E) 0



1. $f(x) = 8x^5 + 3x^2 - 3$

$f'(-1) = ?$

- A) -46 B) -34 C) 30 D) 34 E) 46

2. $f(x) = (4x^3 + 2)^2$

$f'(1) = ?$

- A) 100 B) 112 C) 124 D) 140 E) 144

3. $f(x) = (3x^2 + 1) \cdot (5x - 2)$

$f'(0) = ?$

- A) 0 B) 2 C) 4 D) 5 E) 6

4. $f(x) = \frac{5x+3}{2x-3}$

$f'(1) = ?$

- A) -21 B) -19 C) -17 D) -15 E) -13

5. $f(x) = \sin 6x - \cos 2x$

$f'\left(\frac{\pi}{12}\right) = ?$

- A) 1 B) $\sqrt{3}$ C) 2 D) 6 E) 7

6. $f(x) = \text{Arc tan}(x^2 + 1)$

$f'(2) = ?$

- A) $\frac{1}{13}$ B) $\frac{2}{13}$ C) $\frac{3}{13}$ D) $\frac{4}{13}$ E) $\frac{5}{13}$

7. $f(x) = x^2 \cdot 3^{2x}$

$f'(1) = ?$

- A) 18 B) $18 \cdot \ln 3$ C) $\ln 3$
D) $18(1 - \ln 3)$ E) $18(1 + \ln 3)$

8. $f(x) = \sqrt{x^3 - 2} + 3$

$f'(3) = ?$

- A) $\frac{9}{10}$ B) $\frac{5}{2}$ C) $\frac{27}{10}$ D) 3 E) $\frac{31}{10}$



9. $f(x) = \frac{3x+a}{x-1}$, $f'(0) = -4$

$f'(-1) = ?$

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

10. $f(x) = (6x+a) \cdot (3x^2 - 2)$

$f'(0) = ?$

- A) $a - 12$ B) $a + 12$ C) -12 D) 0 E) 12

11. $f(3x+5) = 2x^2 - 2x + 1$

$f'(-1) = ?$

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

12. $f(4x) = 2x^3 - 7$

$f'(2) = ?$

- A) $\frac{3}{16}$ B) $\frac{3}{8}$ C) $\frac{1}{2}$ D) $\frac{3}{4}$ E) 1

13. $f(5x-2) = 5x^2 - 3$

$f'(3) = ?$

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

14. $f(x) = 5x + 1$, $g(x) = 6x - 3$

$(f \circ g)'(3) = ?$

- A) 10 B) 20 C) 30 D) 40 E) 50

15. $f(x) = x^2 - 2x$, $g(x) = x + 1$

$(f \circ g)'(x) = ?$

- A) $x^2 - 1$ B) $1 - x^2$ C) $-2x$ D) $2x$ E) 2



1. $f(x) = \sin x \cdot \cos 3x$

$f'\left(\frac{\pi}{3}\right) = ?$

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

2. $f(x) = \log_3 (x^2 + x)$

$\frac{df(x)}{dx} = f'(x) = ?$

A) $\frac{2x+1}{x^2+x} \cdot \log_3 (2x+1)$

B) $\frac{2x}{x^2+x} \cdot \log_3 (2x+1)$

C) $\frac{2x+1}{x^2+x} \cdot \log_3 (x^2+x)$

D) $\frac{2x+1}{x^2+x} \cdot \log_3 e$

E) $\frac{2x+1}{x^2+x} \cdot \log_e 3$

3. $4xy^2 - 3xy - x + y - 3 = 0$

$\frac{dy}{dx} = ?$

A) $\frac{-4y^2 + 3y + 1}{8xy - 3x + 1}$

B) $\frac{4y^2 - 3y + 1}{8y - 3x - 1}$

C) $\frac{-4y^2 + 3y - 1}{8xy - 1}$

D) $\frac{8xy - 3y - 1}{4xy - 1}$

E) $\frac{8xy + 3y + 1}{8xy - 3x - 1}$

4. $f(x) = x \cdot \text{Arc tan } x$

$f'(1) = ?$

A) $\frac{\pi+4}{4}$

B) $\frac{\pi+1}{4}$

C) $\frac{\pi+2}{4}$

D) $\frac{\pi}{4}$

E) $\frac{3\pi}{4}$

5. $x = \sin t$ $y = \cos 2t$

$\frac{dy}{dx} = ?$

- A) $4\cos t$ B) $-4\sin t$ C) $\sin t$ D) $\cos t$ E) $\sin 2t$

6. $x = 2\sin t - 1$, $y = \cos 2t + 3$

$\frac{dy}{dx} = ?$

- A) $-2\sin t$ B) $2\sin t$ C) $\tan t$ D) $2\cos t$ E) $-2\cos t$

7. $f(x, y) = x^2 + y^2 - 2xy + y - 6$

$f'(1, -2) = ?$

A) $-\frac{3}{2}$

B) $-\frac{2}{3}$

C) $\frac{6}{5}$

D) $\frac{1}{2}$

E) $\frac{3}{4}$

8. $x = \cos t$, $y = \cos 2t$

$\frac{d^2y}{dx^2} = ?$

- A) $\sin t$ B) -4 C) 4 D) $4\sin t$ E) $-\frac{1}{2}\cos 2t$



9. $f(x) = e^{-x} \cdot \ln x$
 $f'(1) = ?$

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

10. $f(x) = x \cdot e^x$
 $f^{(15)}(-1) = ?$

- A) $\frac{13}{e}$ B) $\frac{14}{e}$ C) $\frac{15}{e}$ D) $\frac{16}{e}$ E) 10

11. $f(x) = x^2 \cdot \ln x$
 $f^{(9)}(x) = ?$

- A) $-\frac{720}{x^7}$ B) $-\frac{120}{x^7}$ C) $\frac{720}{x^6}$
D) $\frac{1440}{x^7}$ E) $\frac{1440}{x^8}$

12. $f(x) = \cos\left(\frac{\pi}{3} \sin x\right)$
 $f'\left(\frac{\pi}{6}\right) = ?$

- A) $-\frac{\sqrt{3}}{4\pi}$ B) $-\frac{\sqrt{3}\pi}{6}$ C) $\frac{\sqrt{3}\pi}{8}$
D) $-\frac{\sqrt{3}\pi}{12}$ E) $\frac{\sqrt{3}}{6\pi}$

13. $\frac{d}{dx}(\sin(\ln x)) = ?$

- A) $\frac{\cos(\ln x)}{x}$ B) $\frac{\sin(\ln x)}{x}$ C) $\frac{\sin x}{x}$
D) $\frac{\cos x}{x}$ E) $\frac{1}{x}$

14. $f(x) = \tan x$, $g(x) = 2x^3$

$(g \circ f)\left(\frac{\pi}{4}\right) = ?$

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

15. $f(x) = x \cdot \ln x + 5x^2$

$f'(e) = ?$

- A) 7 B) $2 + 10e$ C) $5 + 2e$ D) $7e$ E) 3



1. $f(x) = x^{x^3}$

$f'(1) = ?$

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

2. $f(x) = (x-1)^{x^2}$

$f'(2) = ?$

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

3. $y = x^{\ln x}$

$y' = ?$

- A)
- $2x^{\ln x}$
- B)
- $2x^{\ln ex}$
- C)
- $2 \ln x \cdot x^{\frac{\ln x}{e}}$
-
- D)
- $x^{\frac{\ln x}{e}}$
- E)
- $2x^{\frac{\ln e}{x}}$

4. $f(x) = (x+3)^{\tan x}$

$f'(0) = ?$

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

5. $f(x) = 3^{\ln(2x-1)}$

$f'(1) = ?$

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

6. $y = (2x)^{x^2}$

$y'(1) = ?$

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

7. $\frac{d}{dx}(\sin x)^x = ?$

- A)
- $\ln(\sin x) \cdot x^2 \cdot \cot x$
-
- B)
- $\sin(\ln(\sin x) + x \cdot \cot x)$
-
- C)
- $(\sin x)^x \cdot (\ln(\cos x) + x \cdot \cot x)$
-
- D)
- $(\sin x)^x \cdot (\ln(\sin x) + x \cdot \tan x)$
-
- E)
- $(\sin x)^x \cdot (\ln(\sin x) + x \cdot \cot x)$

8. $\frac{d}{dx}(x^{4x}) = ?$

- A)
- $x^{4x} \cdot \ln x \cdot e^4$
- B)
- $x^{4x} \cdot \ln x^4 \cdot e$
-
- C)
- $4x \cdot \ln 4x$
- D)
- $4 \cdot \ln 4ex$
-
- E)
- $x^{4x} \cdot \ln x^4 e^4$



9. $f(x) = \log_2(x+3)$

$$\frac{df^{-1}}{dx} = ?$$

- A) $2^x \cdot \ln 3$ B) $2^x + \ln 3$ C) $2^x \cdot \ln 2$
D) $3 \cdot 2^x \ln 2$ E) $6^x \cdot \ln 2$

10. $f: \left[\frac{5}{2}, \infty\right) \rightarrow \mathbb{R}^+$

$$f(x) = \sqrt{2x+4} - 3$$

$$\left. \frac{df^{-1}}{dx} \right|_{x=0} = ?$$

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

11. $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x) = x^3 + 5x$$

$$(f^{-1})'(6) = ?$$

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

12. $f: [-2, +\infty) \rightarrow [-2, +\infty)$

$$f(x) = \sqrt{x+2} - 2$$

$$(f^{-1})'(1) = ?$$

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

13. $f: \mathbb{R} \rightarrow \mathbb{R}$

$$f(x) = x^3 + 4$$

$$(f^{-1})'(-4) = ?$$

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

14. $f: \left[0, \frac{\pi}{4}\right] \rightarrow [0, 1]$

$$f(x) = \sin 2x$$

$$(f^{-1})'\left(\frac{1}{2}\right) = ?$$

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

15. $f(x) = 2^{\ln \sqrt{x}}$

$$f'(e^2) = ?$$

- A) e B) e^2 C) $\ln 2$ D) $\frac{\ln 2}{e^2}$ E) $e \cdot \ln 2$



1. $f(x) = \begin{cases} x^2 - 3x, & x \leq -2 \\ 2x + 3, & x > -2 \end{cases}$

$f'(-1) - f'(-3) = ?$

- A) 15 B) 11 C) 7 D) -4 E) -9

2. $f(x) = \cos 5x$

$f'\left(\frac{\pi}{10}\right) = ?$

- A) -5 B) -1 C) 0 D) 1 E) 5

3. $f(x) = \sqrt{\sin x}$

$f'\left(\frac{\pi}{2}\right) = ?$

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

4. $f(x) = \sqrt{2x+1}$

$f''(x) = ?$

- A) $\frac{1}{2\sqrt{2x+1}}$ B) $-\frac{1}{\sqrt{2x+1}}$
C) $-\frac{1}{\sqrt{(2x+1)^3}}$ D) $-\sqrt{(2x+1)^3}$
E) $\frac{1}{\sqrt[3]{2x+1}}$

5. $f(x) = \sec x$

$f'\left(\frac{\pi}{4}\right) = ?$

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

6. $f(x) = \sin^2(3x-2)$

$f'(x) = ?$

- A) $\sin(6x-4)$ B) $3\sin(6x-4)$
C) $3 \cdot \sin(3x-2) \cos(3x-2)$ D) $2\sin(6x-4)$
E) $\cos(6x-4)$

7. $f(x) = \ln\left(\sqrt{\frac{x+1}{x-1}}\right)$

$f'(2) = ?$

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

8. $f(x) = \begin{cases} x^2 - 3x + 1, & x \leq 3 \\ 2x - 5, & x > 3 \end{cases}$

$f'(3) = ?$

- A) 0 B) 1 C) 2 D) 5 E) $\emptyset$



9. $f(x) = \left\lfloor \frac{x-1}{4} \right\rfloor + \text{sgn}(x+1)$

$f'(6) = ?$

- A) $\emptyset$ B) 0 C) $\frac{1}{4}$ D) 1 E) $\frac{5}{4}$

10. $f(x) = \cos^4 x - \sin^4 x$

$f'\left(\frac{\pi}{4}\right) = ?$

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

11. $f(x) = \cot^n x$

$f'\left(\frac{\pi}{4}\right) = -4$

$n = ?$

- A) -8 B) -4 C) -2 D) 2 E) 4

12. $f(x) = \left\lfloor \frac{x+2}{3} - 1 \right\rfloor$

$f'(4) = ?$

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

13. $f(x) = x^3 \cdot \text{sgn}(x+2) - |2x|$

$f'(1) = ?$

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

14. $f(x) = \begin{cases} 2x^2 + ax - 5, & x \leq 2 \\ x^3 - x + 3, & x > 2 \end{cases}$

$f'(2) = m \in \mathbb{R}$

$a = ?$

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

15. $f(x) = |x^2 - 3x| + x$

$f'(1) + f'(3) = ?$

- A) 3 B) 4 C) 5 D) 6 E) 7

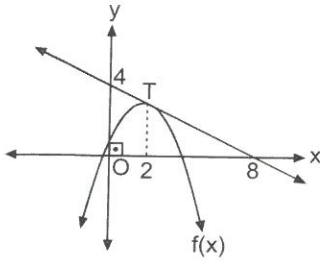
16. $f(x) = \lfloor x+3 \rfloor \cdot \text{sgn}(x-2) + |x^2 - 1|$

$f'\left(\frac{3}{2}\right) = ?$

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



1.

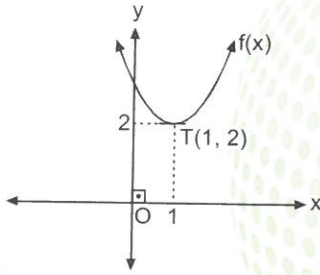


$$g(x) = f^3(x)$$

$$g'(2) = ?$$

- A) $-\frac{27}{2}$ B) -9 C) $\frac{3}{2}$ D) $\frac{9}{2}$ E) 5

2.

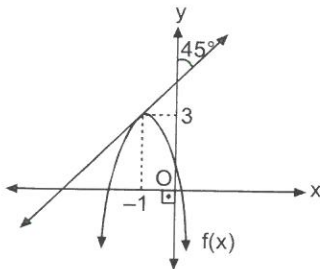


$$g(x) = x^2 \cdot f(x)$$

$$g'(1) = ?$$

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

3.

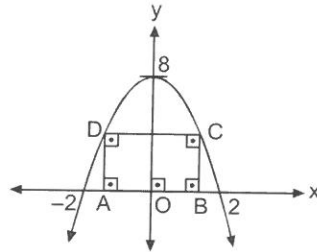


$$g(x) = x^2 \cdot f^3(x)$$

$$g'(-1) = ?$$

- A) -27 B) 0 C) 21 D) 27 E) 33

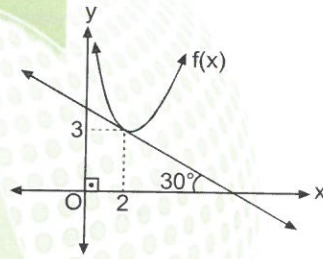
4.



$$\max(S(ABCD)) = ? \text{ br}^2$$

- A) $\frac{9\sqrt{3}}{4}$ B) $\frac{32\sqrt{3}}{9}$ C) $\frac{64\sqrt{3}}{9}$
D) $\frac{32\sqrt{3}}{3}$ E) $\frac{64\sqrt{3}}{3}$

5.

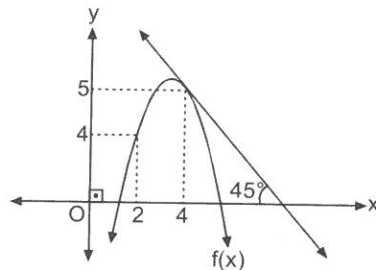


$$g(x) = \frac{f(x)}{x}$$

$$g'(2) = ?$$

- A) $\frac{\sqrt{3}-1}{3}$ B) $-\frac{2\sqrt{3}+9}{12}$ C) $\frac{2\sqrt{3}-9}{12}$
D) $\frac{2\sqrt{3}+9}{12}$ E) $\frac{2\sqrt{3}-11}{12}$

6.



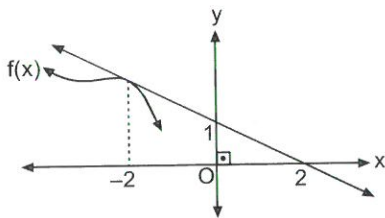
$$g(x) = (x+1)f(2x)$$

$$g'(2) = ?$$

- A) -3 B) -1 C) 0 D) 5 E) 11



7.

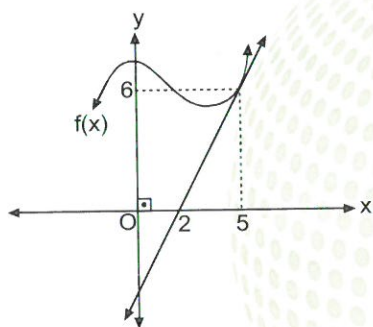


$$g(x) = \frac{(3x-2)}{f(x)}$$

$$g'(-2) = ?$$

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

8.

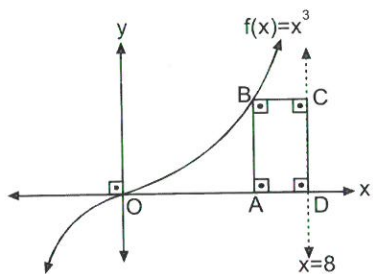


$$g(x) = \frac{f(x)}{2x-1}$$

$$g'(5) = ?$$

- A) $\frac{2}{3}$ B) $\frac{2}{9}$ C) $\frac{1}{9}$ D) $\frac{2}{27}$ E) $\frac{1}{27}$

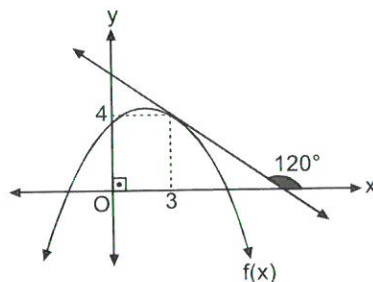
9.



$$\max[S(ABCD)] = ? \text{ br}^2$$

- A) 36 B) 108 C) 216 D) 432 E) 1024

10.

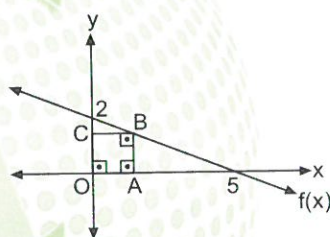


$$g(x) = f(x) \cdot (x\sqrt{3} - 5)$$

$$g'(3) = ?$$

- A) $3(\sqrt{3}-1)$ B) $5(\sqrt{3}-1)$ C) $6(\sqrt{3}-1)$
D) $6(\sqrt{3}+1)$ E) $9(\sqrt{3}-1)$

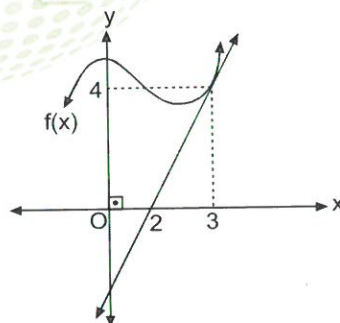
11.



$$\max[S(OABC)] = ? \text{ br}^2$$

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

12.



$$g(x^2 - 4) = \frac{f(x)}{x}$$

$$g'(5) = ?$$

- A) $\frac{2}{27}$ B) $\frac{1}{9}$ C) $\frac{4}{27}$ D) $\frac{8}{27}$ E) $\frac{10}{27}$



1. $f(x) = \frac{2x^2 - 1}{x}$

$$\frac{df(x)}{dx} = f'(x) = ?$$

- A) $2 + \frac{1}{x^2}$ B) $6 + \frac{1}{x^2}$ C) $6 - \frac{1}{x^2}$
D) $2x - \frac{1}{x}$ E) $4x - \frac{1}{x}$

(YÖS - 1983)

2. $f(x) = \frac{1}{(x-1)^2}$

$$\frac{df(x)}{dx} = f'(x) = ?$$

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

(YÖS - 1984)

3. $f(x) = \sqrt{x^2 + 3}$

$$\frac{df(x)}{dx} = f'(x) = ?$$

- A) $\frac{1}{2\sqrt{x^2 + 3}}$ B) $\sqrt{2x}$
C) $\sqrt{2x+3}$ D) $\frac{x}{\sqrt{x^2 + 3}}$
E) $\frac{2x}{\sqrt{x^2 + 3}}$

(YÖS - 1985)

4. $f: \mathbb{R} \rightarrow \mathbb{R}$
 $f(x) = \sqrt{x^2 + 4x + 3}$

$$\frac{df(x)}{dx} = f'(x) = ?$$

- A) $\frac{2x+4}{\sqrt{2x+4}}$ B) $\frac{2x+4}{\sqrt{x^2 + 4x + 3}}$
C) $\frac{x+2}{\sqrt{x^2 + 4x + 3}}$ D) $(x+2) \cdot \sqrt{x^2 + 4x + 3}$
E) $(x^2 + 4x + 3) \cdot \sqrt{2x+4}$

(YÖS - 1986)

5. $f(x) = e^{x^3 + x}$

$$\frac{df(x)}{dx} = f'(x) = ?$$

- A) $e^{x^3 + x} \ln(3x^2 + 1)$ B) $e^{3x+1} \ln(3x^2 + 1)$
C) $e^{x^3 + x} \ln(x^3 + x)$ D) $e^{x^3 + x} (3x^2 + 1)$
E) $e^{3x^2 + 1} \ln(x^3 + x)$

(YÖS - 1987)

6. $f(x) = \frac{ax^2 + b}{bx + a} \Rightarrow \frac{df(x)}{dx} = f'(x)$

$$f'(0) = -4$$

$$\frac{b^2}{a^2} = ?$$

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

(YÖS - 1987)



7. $f(x) = ax^2 - bx$, $\frac{df(x)}{dx} = f'(x)$

$f'(0) = -3$

$f'(b) = ?$

- A) $2a - 3$ B) $3a - 2$ C) $2a + 3$
D) $3a + 2$ E) $6a - 3$

(YÖS - 1988)

8. $f(x) = \frac{\sin x}{1 + \cos x}$

$\frac{df(x)}{dx} = f'(x) = ?$

- A) $\frac{1}{\cos x + 1}$ B) $\frac{\cos x}{1 + \sin x}$ C) $\frac{1}{\sin x}$
D) $\cos x$ E) $\sin x$

(YÖS - 1988)

9. $f(x) = 2 \sin x - \cos x$

$\frac{d}{dx} f\left(\frac{\pi}{4}\right) = f'\left(\frac{\pi}{4}\right) = ?$

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

(YÖS - 1988)

10. $f(x) = (2x^3 + 3x^2) \cdot e^{-2x}$

$e^{2x} \frac{df(x)}{2dx} = ?$

- A) $3(x^2 + x)$ B) $x^3 + x^2$
C) $3x - 2x^3$ D) $6 \cdot (x^2 + x) \cdot e^{-2x}$
E) $6 \cdot (x^2 + x) \cdot e^{2x}$

(YÖS - 1990)

11. $x = 3t^2 + 6t$, $y = 2t^3 - 6t$

$\frac{dy}{dx} = ?$

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

(YÖS - 1990)

12. $x = e^{3t} \cdot \cos t$, $y = e^{3t} \cdot \sin t$

$\frac{dy}{dx} \left(\frac{\pi}{4} \right) = ?$

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

(YÖS - 1991)

13. $f(x) = x \cdot \sqrt{x^2 + 2x - 3}$

$\sqrt{5} f'(2) = ?$

- A) -3 B) -2 C) 8 D) 10 E) 11

(YÖS - 1993)



14. $x = t + \frac{1}{t}, \quad y = t^2 - \frac{2}{t}, \quad t = 2$

$$\frac{dy}{dx} = ?$$

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

(YÖS - 1993)

15. $\frac{1}{\sin 2x} \cdot \frac{d}{dx} (\sin^2 x) = ?$

- A) $\sin x$ B) $\cos x$ C) $\cos 2x$ D) -1 E) 1

(YÖS - 1993)

16. $x = 2t - \frac{1}{2}, \quad y = t^2 + 2$

$$\frac{d^2 y}{dx^2} = ?$$

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

(YÖS - 1994)

17. $y = e^{2t}, \quad x = \cos e^{2t}$

$$\frac{dy}{dx} = ?$$

- A) $\cos 2x$ B) $\sin 2x$ C) $\sin x$

D) $\frac{1}{\sin(\arcsin x)}$ E) $-\frac{1}{\sin(\arccos x)}$

(YÖS - 1995)

18. $f(x) = x \cos x$

$$\left. \frac{d^2 f(x)}{dx^2} \right|_{x=\frac{\pi}{2}} = ?$$

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

(YÖS - 1997)

19. $x = 4 \sin \alpha, \quad y = 3 \cos \alpha$

$$\frac{dy}{dx} = ?$$

- A) $-\frac{9x}{16y}$ B) $-\frac{16y}{9x}$ C) $-\frac{9x}{8y}$

D) $-\frac{3y}{4x}$ E) $-\frac{4x}{3y}$

(YÖS - 1999)

20. $f(x) = \sin\left(\frac{\pi}{6} \tan x\right), \quad f'(x) = \frac{df}{dx}$

$$f'\left(\frac{3\pi}{4}\right) = ?$$

- A) $\frac{\pi}{\sqrt{2}}$ B) $\frac{\pi}{3}$ C) $\frac{\pi\sqrt{3}}{6}$

D) $\sqrt{3}\pi$ E) $\sqrt{2}\pi$

(YÖS - 1999)

21. $f: \mathbb{R}^+ \rightarrow \mathbb{R}, \quad f(x) = x^{\sin x}$

$$f'\left(\frac{\pi}{2}\right) = \frac{df}{dx}\left(\frac{\pi}{2}\right) = ?$$

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

(YÖS - 2000)



22. $y = -3x^2 + 2x + 4$

$\max(y) = ?$

- A) 2 B) 3 C) $\frac{13}{3}$ D) $\frac{9}{16}$ E) $\frac{1}{8}$

(YÖS – 2000)

23. $f(x) = \frac{x^2 - 5x - 6}{x^2 - 5x + 6}$

$\frac{df}{dx}(0) = f'(0) = ?$

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

(YÖS – 2001)

24. $y = x \cdot e^{-x} - \ln 2$

$\frac{dy}{dx} = ?$

A) $x \cdot e^{-x} - e^{-x}$

B) $e^{-x} - x \cdot e^{-x}$

C) $e^{-x} - x \cdot e^{-x} - \frac{1}{2}$

D) $e^{-x} - \frac{1}{2}$

E) $x \cdot e^{-x} - 2$

(YÖS – 2001)

25. $f(x) = \sqrt{x}(x^3 - 3)$

$\frac{df}{dx}(1) = f'(1) = ?$

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

(YÖS – 2002)

26. $f(x) = \ln(\cos x)$

$\frac{df}{dx}\left(\frac{\pi}{4}\right) = f'\left(\frac{\pi}{4}\right) = ?$

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

(YÖS – 2002)

27. $f(x) = \ln(\sqrt{x^3 - 4})$

$f'(2) = ?$

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

(YÖS – 2003)

28. $f(x) = (x - 2)^4$

$f''(3) = ?$

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

(YÖS – 2003)

29. $f(x) = x|9 - x^2|$

$f'(4) = ?$

- A) 39 B) 28 C) 7 D) -7 E) -39

(YÖS – 2004)



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ÇIKMIŞ SORULAR

30. $f(x) = \ln(\cos e^x)$

$$f' = \left(\ln \frac{\pi}{4} \right) = ?$$

A) $-\frac{\pi}{4}$ B) $-\frac{\pi}{2}$ C) $\frac{\pi}{4}$ D) $e^{\frac{\pi}{4}}$ E) $e^{\frac{\pi}{2}}$

(YÖS – 2004)

31. $f(x) = x^3 + 2x^2 + \ln x - 1$

$$\left. \frac{d^2 f(x)}{dx^2} \right|_{x=1} = f''(1) = ?$$

A) 1 B) 4 C) 6 D) 8 E) 9

(YÖS – 2005)

32. $f(x) = \sin(\ln x)$

$$\left. \frac{df}{dx} \right|_{x=e^\pi} = f'(e^\pi) = ?$$

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

(YÖS – 2005)

33. $x = \ln t$

$$y = t^3 - 3t^2 - 3t$$

$$\left. \frac{dy}{dx} \right|_{x=0} = ?$$

A) -6 B) -3 C) 1 D) 3 E) 9

(YÖS – 2005)

34. $f(x) = x^2 - 1$

$$g(x) = x^3$$

$$(g \circ f)(x) = ?$$

A) $6x$ B) $x^3(x^2 - 1)$
C) $2x(x^2 - 1)^3$ D) $3x(x^2 - 1)^2$
E) $6x(x^2 - 1)^2$

(YÖS – 2006)

35. $f(x) = \ln^2(2x^2 - 6)$

$$f'(3) = ?$$

A) 0 B) $\ln 6$ C) $\ln 12$
D) $2\ln 6$ E) $2\ln 12$

(YÖS – 2006)

36. $f(x) = \arcsin x$

$$(f^{-1})\left(\frac{\pi}{4}\right) = ?$$

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

(YÖS – 2006)

37. $f(1) = 9$

$$f'(x) = 6x + 4$$

$$f(0) = ?$$

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

(YÖS – 2006)



38. $f(x) = \sin^3 x$

$$f'\left(\frac{\pi}{3}\right) = ?$$

- A) $\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{3}}{4}$ C) $\frac{3}{4}$ D) $\frac{3}{8}$ E) $\frac{9}{8}$

(YÖS – 2007)

41. $f: [1, \infty) \rightarrow [-4, \infty)$

$$f(x) = 2\sqrt{x-1} - 4$$

$$(f^{-1})'(0) = ?$$

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

(YÖS – 2008)

39. $f(x) = \arctan \frac{1}{x^2}$

$$f'(1) = ?$$

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

(YÖS – 2007)

42. $f(x) = x^3 + 2\sqrt{x}$

$$\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1} = ?$$

- A) 3 B) 4 C) 5 D) 6 E) 7

(YÖS – 2009)

40. $f(x) = \tan \frac{x}{2}$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{f(x) - f\left(\frac{\pi}{2}\right)}{x - \frac{\pi}{2}} = ?$$

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

(YÖS – 2008)

43. $f(x) = \cos 2x + \sin^2 x$

$$f'\left(\frac{\pi}{4}\right) = ?$$

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

(YÖS – 2009)



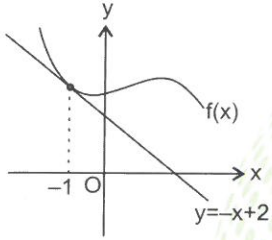
44. $f(x) = \frac{x}{x^2 - 1}$

$f'(0) = ?$

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

(YÖS - 2009)

45.



$g(x) = x \cdot f(x)$

$g'(-1) = ?$

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

(YÖS - 2009)

46. $2x^2 - x - y^2 = 0$

$\frac{dy}{dx} \Big|_{\substack{x=1 \\ y=1}} = ?$

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

(YÖS - 2009)



1. $f(x) = \frac{2x^2 - 1}{x}$

$$\begin{aligned}\frac{df(x)}{dx} &= f'(x) = \frac{4x \cdot x - 1 \cdot (2x^2 - 1)}{x^2} \\ &= \frac{4x^2 - 2x^2 + 1}{x^2} \\ &= \frac{2x^2 + 1}{x^2} \\ &= 2 + \frac{1}{x^2}\end{aligned}$$

Yanıt - Answer : A

2. $f(x) = \frac{1}{(x-1)^2} = (x-1)^{-2}$

$$\begin{aligned}\frac{df(x)}{dx} &= f'(x) = -2 \cdot (x-1)^{-3} \\ &= -\frac{2}{(x-1)^3}\end{aligned}$$

Yanıt - Answer : C

3. $f(x) = \sqrt{x^2 + 3}$

$$\begin{aligned}\frac{df(x)}{dx} &= f'(x) = \frac{2x}{2\sqrt{x^2 + 3}} \\ &= \frac{x}{\sqrt{x^2 + 3}}\end{aligned}$$

Yanıt - Answer : D

4. $f(x) = \sqrt{x^2 + 4x + 3}$

$$\frac{df(x)}{dx} = f'(x) = \frac{2x + 4}{2\sqrt{x^2 + 4x + 3}}$$

$$\begin{aligned}&= \frac{2 \cdot (x + 2)}{2\sqrt{x^2 + 4x + 3}} \\ &= \frac{x + 2}{\sqrt{x^2 + 4x + 3}}\end{aligned}$$

Yanıt - Answer : C

5. $f(x) = e^{x^3 + x}$

$$\frac{df(x)}{dx} = f'(x) = e^{x^3 + x} (3x^2 + 1)$$

Yanıt - Answer : D

6. $f(x) = \frac{ax^2 + b}{bx + a}$

$$\frac{df(x)}{dx} = f'(x) = \frac{2ax \cdot (bx + a) - b \cdot (ax^2 + b)}{(bx + a)^2}$$

$$f'(0) = \frac{2 \cdot a \cdot 0 \cdot (b \cdot 0 + a) - b \cdot (a \cdot 0 + b)}{(b \cdot 0 + a)^2}$$

$$\frac{-b^2}{a^2} = -4 \Rightarrow \frac{b^2}{a^2} = 4$$

Yanıt - Answer : E

7. $f(x) = ax^2 - bx$

$$\frac{df(x)}{dx} = f'(x) = 2ax - b$$

$$f'(0) = 2 \cdot a \cdot 0 - b$$

$$\begin{aligned}-b &= -3 \\ b &= 3\end{aligned}$$

$$\begin{aligned}f'(b) &= f'(3) \\ &= 2 \cdot a \cdot 3 - 3 \\ &= 6a - 3\end{aligned}$$

Yanıt - Answer : E



$$\begin{aligned} 8. \quad f(x) &= \frac{\sin x}{1 + \cos x} \\ \frac{df(x)}{dx} &= f'(x) = \frac{\cos x(1 + \cos x) - (-\sin x) \cdot \sin x}{(1 + \cos x)^2} \\ &= \frac{\cos x + \cos^2 x + \sin^2 x}{(1 + \cos x)^2} \\ &= \frac{\cos x + 1}{(1 + \cos x)^2} \\ &= \frac{1}{1 + \cos x} \end{aligned}$$

Yanıt - Answer : A

$$\begin{aligned} 9. \quad f(x) &= 2 \sin x - \cos x \\ f'(x) &= 2 \cdot \cos x - (-\sin x) \\ &= 2 \cdot \cos x + \sin x \\ f'\left(\frac{\pi}{4}\right) &= 2 \cdot \cos \frac{\pi}{4} + \sin \frac{\pi}{4} \\ &= 2 \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \\ &= \frac{3\sqrt{2}}{2} \end{aligned}$$

Yanıt - Answer : C

$$\begin{aligned} 10. \quad f(x) &= (2x^3 + 3x^2) \cdot e^{-2x} \\ \frac{df(x)}{dx} &= (6x^2 + 6x) \cdot e^{-2x} + e^{-2x} \cdot (-2) \cdot (2x^3 + 3x^2) \\ &= (6x^2 + 6x) \cdot e^{-2x} - 2 \cdot (2x^3 + 3x^2) \cdot e^{-2x} \\ &= e^{-2x} \cdot (6x^2 + 6x - 4x^3 - 6x^2) \\ &= e^{-2x} \cdot (6x - 4x^3) \\ e^{2x} \cdot \frac{df(x)}{2dx} &= \frac{e^{2x} \cdot e^{-2x} \cdot (6x - 4x^3)}{2} \\ &= \frac{6x - 4x^3}{2} \\ &= \frac{2(3x - 2x^3)}{2} \\ &= 3x - 2x^3 \end{aligned}$$

Yanıt - Answer : C

$$\begin{aligned} 11. \quad \left. \begin{aligned} x &= 3t^2 + 6t \\ y &= 2t^3 - 6t \end{aligned} \right\} \Rightarrow \frac{dy}{dx} &= \frac{\frac{dy}{dt}}{\frac{dx}{dt}} \\ &= \frac{6t^2 - 6}{6t + 6} \\ &= \frac{6(t^2 - 1)}{6 \cdot (t + 1)} \\ &= \frac{(t - 1) \cdot (t + 1)}{(t + 1)} \\ &= t - 1 \end{aligned}$$

Yanıt - Answer : B

$$\begin{aligned} 12. \quad \left. \begin{aligned} x &= e^{3t} \cdot \cos t \\ y &= e^{3t} \cdot \sin t \end{aligned} \right\} \Rightarrow \frac{dy}{dx} &= \frac{\frac{dy}{dt}}{\frac{dx}{dt}} \\ \frac{dy}{dx} &= \frac{\frac{dy}{dt}}{\frac{dx}{dt}} \\ &= \frac{e^{3t} \cdot 3 \cdot \sin t + \cos t \cdot e^{3t}}{e^{3t} \cdot 3 \cdot \cos t - \sin t \cdot e^{3t}} \\ &= \frac{e^{3t} \cdot (3 \cdot \sin t + \cos t)}{e^{3t} \cdot (3 \cdot \cos t - \sin t)} \\ \frac{dy}{dx} \left(\frac{\pi}{4} \right) &= \frac{3 \cdot \sin \frac{\pi}{4} + \cos \frac{\pi}{4}}{3 \cos \frac{\pi}{4} - \sin \frac{\pi}{4}} \\ &= \frac{3 \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}}{3 \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}} = \frac{\frac{4\sqrt{2}}{2}}{\frac{2\sqrt{2}}{2}} = 2 \end{aligned}$$

Yanıt - Answer : C



13. $f(x) = x \cdot \sqrt{x^2 + 2x - 3}$

$$f'(x) = 1 \cdot \sqrt{x^2 + 2x - 3} + \frac{2x + 2}{2\sqrt{x^2 + 2x - 3}} \cdot x$$

$$f'(x) = \sqrt{x^2 + 2x - 3} + \frac{2(x+1) \cdot x}{2\sqrt{x^2 + 2x - 3}}$$

$$f'(x) = \sqrt{x^2 + 2x - 3} + \frac{(x+1) \cdot x}{\sqrt{x^2 + 2x - 3}}$$

$$f'(2) = \sqrt{2^2 + 2 \cdot 2 - 3} + \frac{(2+1) \cdot 2}{\sqrt{2^2 + 2 \cdot 2 - 3}}$$

$$f'(2) = \sqrt{5} + \frac{6}{\sqrt{5}}$$

$$\sqrt{5} \cdot f'(2) = \sqrt{5} \cdot \left(\sqrt{5} + \frac{6}{\sqrt{5}} \right) = 5 + 6 = 11$$

Yanıt - Answer : E

14. $\left. \begin{array}{l} x = t + \frac{1}{t} \\ y = t^2 - \frac{2}{t} \end{array} \right\} \Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

$$= \frac{2t + \frac{2}{t^2}}{1 - \frac{1}{t^2}}$$

$$= \frac{\frac{2t^3 + 2}{t^2}}{\frac{t^2 - 1}{t^2}}$$

$$= \frac{2t^3 + 2}{t^2 - 1}$$

$$t = 2 \Rightarrow \frac{dy}{dx} = \frac{2 \cdot 2^3 + 2}{2^2 - 1} = \frac{18}{3} = 6$$

Yanıt - Answer : A

15. $\frac{1}{\sin 2x} \cdot \frac{d}{dx}(\sin^2 x) = \frac{1}{\sin 2x} \cdot 2 \sin x \cdot \cos x$
 $= \frac{1}{\sin 2x} \cdot \sin 2x$
 $= 1$

Yanıt - Answer : E

16. $\left. \begin{array}{l} x = 2t - \frac{1}{2} \\ y = t^2 + 2 \end{array} \right\} \Rightarrow \frac{d^2 y}{dx^2} = \frac{d}{dx} \left(\frac{dy}{dx} \right)$

$$= \frac{d}{dx} \left(\frac{\frac{dy}{dt}}{\frac{dx}{dt}} \right)$$

$$= \frac{d}{dx} \left(\frac{2t}{2} \right)$$

$$= \frac{d}{dx}(t) = \left(\frac{1}{2} \right)$$

Yanıt - Answer : B

17. $\left. \begin{array}{l} y = e^{2t} \\ x = \cos e^{2t} \end{array} \right\} \Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

$$= \frac{e^{2t} \cdot 2}{-\sin e^{2t} \cdot e^{2t} \cdot 2}$$

$$= -\frac{1}{\sin e^{2t}}$$

$$x = \cos y \quad = -\frac{1}{\sin y}$$

$$y = \arccos x \quad = -\frac{1}{\sin(\arccos x)}$$

Yanıt - Answer : E



$$\begin{aligned}
 18. \quad \frac{d}{dx} \left(\frac{df(x)}{dx} \right) &= \frac{d}{dx} (\cos x - \sin x \cdot x) \\
 &= -\sin x - (\cos x \cdot x + \sin x) \\
 &= -\sin x - x \cdot \cos x - \sin x \\
 &= -2\sin x - x \cdot \cos x \\
 x = \frac{\pi}{2} &\Rightarrow -2 \cdot \sin \frac{\pi}{2} - \frac{\pi}{2} \cdot \cos \frac{\pi}{2} = -2 \cdot 1 - \frac{\pi}{2} \cdot 0 \\
 &= -2
 \end{aligned}$$

Yanıt - Answer : B

$$\begin{aligned}
 19. \quad \begin{cases} x = 4 \sin \alpha \\ y = 3 \cos \alpha \end{cases} &\Rightarrow \frac{dy}{dx} = \frac{\frac{dy}{d\alpha}}{\frac{dx}{d\alpha}} = \frac{-3 \cdot \sin \alpha}{4 \cos \alpha} \\
 &= \frac{-3 \cdot \frac{x}{4}}{4 \cdot \frac{y}{3}} \\
 &= \frac{-3x}{4} \cdot \frac{3}{4y} \\
 &= -\frac{9x}{16y}
 \end{aligned}$$

Yanıt - Answer : A

$$\begin{aligned}
 20. \quad f(x) &= \sin \left(\frac{\pi}{6} \tan x \right) \\
 f'(x) &= \cos \left(\frac{\pi}{6} \tan x \right) \cdot \left(\frac{\pi}{6} \cdot (1 + \tan^2 x) \right) \\
 f' \left(\frac{3\pi}{4} \right) &= \cos \left(\frac{\pi}{6} \cdot \tan \left(\frac{3\pi}{4} \right) \right) \cdot \left(\frac{\pi}{6} \cdot (1 + \tan^2 \frac{3\pi}{4}) \right) \\
 &= \cos \left(\frac{\pi}{6} \cdot (-1) \right) \cdot \left(\frac{\pi}{6} \cdot (1 + (-1)^2) \right) \\
 &= \cos \left(\frac{\pi}{6} \right) \cdot \left(\frac{\pi}{6} \cdot 2 \right) \\
 &= \frac{\sqrt{3}}{2} \cdot \frac{\pi}{3} = \frac{\sqrt{3}\pi}{6}
 \end{aligned}$$

Yanıt - Answer : C

21. Bilgi:

$$y = [f(x)]^{g(x)} \Rightarrow \ln y = \ln [f(x)]^{g(x)}$$

$$\ln y = g(x) \cdot \ln f(x)$$

$$\frac{y'}{y} = g'(x) \cdot \ln f(x) + \frac{f'(x)}{f(x)} \cdot g(x)$$

$$y' = y \cdot \left[g'(x) \cdot \ln f(x) + \frac{f'(x)}{f(x)} \cdot g(x) \right]$$

$$f(x) = x^{\sin x} \rightarrow \ln f(x) = \sin x \cdot \ln x$$

$$\frac{f'(x)}{f(x)} = \cos x \cdot \ln x + \frac{\sin x}{x}$$

$$f'(x) = f(x) \cdot \left[\cos x \cdot \ln x + \frac{\sin x}{x} \right]$$

$$f' \left(\frac{\pi}{2} \right) = \left(\frac{\pi}{2} \right)^{\sin \frac{\pi}{2}} \cdot \left[\cos \frac{\pi}{2} \cdot \ln \frac{\pi}{2} + \frac{\sin \frac{\pi}{2}}{\frac{\pi}{2}} \right]$$

$$= \frac{\pi}{2} \cdot \left[0 + \frac{1}{\frac{\pi}{2}} \right] = \frac{\pi}{2} \cdot \frac{2}{\pi} = 1$$

Yanıt - Answer : B

$$22. \quad y = -3x^2 + 2x + 4$$

$$y' = -6x + 2$$

$$-6x + 2 = 0$$

$$x = \frac{1}{3}$$

$$\max(y) = -3 \cdot \left(\frac{1}{3} \right)^2 + 2 \cdot \frac{1}{3} + 4$$

$$= -\frac{1}{3} + \frac{2}{3} + 4$$

$$= \frac{1}{3} + 4$$

$$= \frac{13}{3}$$

Yanıt - Answer : C



23. $f(x) = \frac{x^2 - 5x - 6}{x^2 - 5x + 6}$

$$f'(x) = \frac{(x^2 - 5x + 6)(2x - 5) - (x^2 - 5x - 6)(2x - 5)}{(x^2 - 5x + 6)^2}$$
$$f'(0) = \frac{(0 - 0 + 6)(0 - 5) - (0 - 0 - 6)(0 - 5)}{(0 - 0 + 6)^2}$$
$$= \frac{6 \cdot (-5) - (6 \cdot 5)}{36}$$
$$= \frac{-30 - 30}{36} = \frac{-60}{36} = \frac{-5}{3}$$

Yanıt - Answer : A

24. $f'(x) = 1 \cdot (e^{-x}) + x \cdot (-e^{-x})$

$$= e^{-x} - x \cdot e^{-x}$$

Yanıt - Answer : B

25. $f(x) = \sqrt{x} (x^3 - 3)$

$$f'(x) = \frac{1}{2\sqrt{x}} \cdot (x^3 - 3) + 3x^2 \cdot (\sqrt{x})$$
$$f'(1) = \frac{1}{2} \cdot (-2) + 3 \cdot 1 = -1 + 3 = 2$$

Yanıt - Answer : E

26. $f(x) = \ln(\cos x)$

$$f'(x) = \frac{-\sin x}{\cos x} = -\tan x$$
$$f'\left(\frac{\pi}{4}\right) = -\tan \frac{\pi}{4} = -1$$

Yanıt - Answer : B

27.

$$f(x) = \ln u \Rightarrow f'(x) = \frac{u'}{u}$$

$$u = \sqrt{x^3 - 4} \Rightarrow u' = \frac{3x^2}{2\sqrt{x^3 - 4}}$$

$$f(x) = \ln(\sqrt{x^3 - 4}) \Rightarrow f'(x) = \frac{3x^2}{2\sqrt{x^3 - 4}}$$

$$f'(x) = \frac{3x^2}{2(x^3 - 4)} \Rightarrow f'(2) = \frac{3 \cdot 2^2}{2 \cdot (2^3 - 4)} = \frac{3 \cdot 4}{2 \cdot 4} = \frac{3}{2}$$

Yanıt - Answer : A

28. $f(x) = (x - 2)^4$

$$f'(x) = 4(x - 2)^3$$
$$f''(x) = 12(x - 2)^2$$
$$f''(3) = 12 \cdot (3 - 2)^2$$
$$f''(3) = 12$$

Yanıt - Answer : E

29. $f(x) = x|9 - x^2|$

$$f'(x) = x \cdot |-2x| + 1 \cdot |9 - x^2|$$
$$f'(4) = 4 \cdot |-2 \cdot 4| + 1 \cdot |9 - 4^2|$$
$$f'(4) = 4 \cdot 8 + 1 \cdot 7$$
$$f'(4) = 39$$

Yanıt - Answer : A



$$30. f'(x) = \frac{-e^x \cdot \sin e^x}{\cos e^x} = -e^x \cdot \tan e^x$$

$$f'\left(\ln \frac{\pi}{4}\right) = -e^{\ln \frac{\pi}{4}} \cdot \tan e^{\ln \frac{\pi}{4}}$$

$$= -\frac{\pi}{4} \cdot \tan \frac{\pi}{4}$$

$$= -\frac{\pi}{4} \cdot 1$$

$$= -\frac{\pi}{4}$$

Yanıt - Answer : A

$$31. f(x) = x^3 + 2x^2 + \ln x - 1$$

$$f'(x) = 3x^2 + 4x + \frac{1}{x}$$

$$f''(x) = 6x + 4 - \frac{1}{x^2}$$

$$f''(1) = 6 + 4 - 1 = 9$$

Yanıt - Answer : E

$$32. f(x) = \sin(\ln x)$$

Kural:

$$(\sin u)' = u' \cdot \cos u$$

$$f'(x) = \frac{1}{x} \cdot \cos(\ln x)$$

$$f'(e^\pi) = \frac{1}{e^\pi} \cdot \cos(\ln e^\pi)$$

$$= \frac{1}{e^\pi} \cdot \cos(\pi \cdot \ln e)$$

$$= \frac{1}{e^\pi} \cdot \cos \pi = \frac{-1}{e^\pi}$$

Yanıt - Answer : A

$$33. x = \ln t$$

$$y = t^3 - 3t^2 - 3t$$

$$\frac{dy}{dx} = \frac{3t^2 - 6t - 3}{\frac{1}{t}} = 3t^3 - 6t^2 - 3t$$

$$x = 0 \Rightarrow 0 = \ln t$$

$$t = 1$$

$$\frac{dy}{dx} \Big|_{t=1} = 3 - 6 - 3 = -6$$

$$t = 1$$

Yanıt - Answer : A

$$34. f(x) = x^2 - 1$$

$$g(x) = x^3$$

$$(g \circ f)(x) = \left[(x^2 - 1)^3 \right]'$$

$$= 3 \cdot (x^2 - 1)^2 \cdot 2x$$

$$= 6x(x^2 - 1)^2$$

Yanıt - Answer : E

$$35. f(x) = \ln^2(2x^2 - 6)$$

$$f'(x) = 2 \cdot \ln(2x^2 - 6) \cdot \frac{4x}{2x^2 - 6}$$

$$f'(3) = 2 \cdot \ln(12) \cdot \frac{12}{12}$$

$$= 2 \ln 12$$

Yanıt - Answer : E



36. $f(x) = \arcsin x$

$$f^{-1}(x) = \sin x$$

$$(f^{-1})'(x) = \cos x$$

$$(f^{-1})'\left(\frac{\pi}{4}\right) = \cos \frac{\pi}{4}$$

$$= \frac{\sqrt{2}}{2}$$

Yanıt - Answer : C

38. $f(x) = \sin^3 x$

$$f'(x) = 3 \cdot \sin^2 x \cdot \cos x$$

$$f'\left(\frac{\pi}{3}\right) = 3 \cdot \left(\sin \frac{\pi}{3}\right)^2 \cdot \cos \frac{\pi}{3}$$

$$= 3 \cdot \left(\frac{\sqrt{3}}{2}\right)^2 \cdot \frac{1}{2}$$

$$= 3 \cdot \frac{3}{4} \cdot \frac{1}{2}$$

$$= \frac{9}{8}$$

Yanıt - Answer : E

37. $f'(x) = 6x + 4$

$$\int (6x + 4) dx = f(x)$$

$$3x^2 + 4x + c = f(x)$$

$$3 \cdot 1^2 + 4 \cdot 1 + c = f(1)$$

$$3 + 4 + c = 9$$

$$c = 2$$

$$f(x) = 3x^2 + 4x + 2$$

$$f(0) = 3 \cdot 0^2 + 4 \cdot 0 + 2$$

$$= 2$$

Yanıt - Answer : C

39. $f(x) = \arctan \frac{1}{x^2}$

$$f'(x) = \frac{\left(\frac{1}{x^2}\right)'}{1 + \left(\frac{1}{x^2}\right)^2} = \frac{-2 \cdot x^{-3}}{1 + \frac{1}{x^4}}$$

$$f'(1) = \frac{-2}{2}$$

$$= -1$$

Yanıt - Answer : B



$$40. \lim_{x \rightarrow \frac{\pi}{2}} \frac{f(x) - f\left(\frac{\pi}{2}\right)}{x - \frac{\pi}{2}} = f'\left(\frac{\pi}{2}\right)$$

$$f'(x) = \frac{1}{2} \cdot \left(1 + \tan^2 \frac{x}{2}\right) \Rightarrow f'\left(\frac{\pi}{2}\right) = \frac{1}{2} \left(1 + \tan^2 \frac{\pi}{4}\right)$$

$$= \frac{1}{2}(1+1)$$

$$= 1$$

Yanıt – Answer : A

$$42. \lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x - 1} = f'(1)$$

$$f'(x) = 3x^2 + \frac{2}{2\sqrt{x}}$$

$$= 3x^2 + \frac{1}{\sqrt{x}}$$

$$f'(1) = 3 + 1 = 4$$

Yanıt – Answer : B

$$43. f'(x) = -2 \sin 2x + \frac{\sin 2x}{2 \sin x \cdot \cos x}$$

$$= -2 \sin 2x + \sin 2x = -\sin 2x$$

$$f'\left(\frac{\pi}{4}\right) = -\sin \frac{\pi}{2} = -1$$

Yanıt – Answer : A

$$41. (f^{-1})'(y_0) = \frac{1}{f'(x_0)}$$

$$(f^{-1})'(y_0) = \frac{1}{2} = \sqrt{x_0 - 1}$$

$$\begin{cases} y_0 = 0 \Rightarrow 2\sqrt{x_0 - 1} - 4 = 0 \\ 2\sqrt{x_0 - 1} = 4 \\ x_0 - 1 = 4 \\ x_0 = 5 \end{cases}$$

$$(f^{-1})'(0) = \sqrt{5 - 1} = 2$$

Yanıt – Answer : E

$$44. f'(x) = \frac{\frac{1}{(x)^1} \cdot (x^2 - 1) - \frac{2x}{(x^2 - 1)^1} \cdot x}{(x^2 - 1)^2}$$

$$= \frac{x^2 - 1 - (2x) \cdot x}{(x^2 - 1)^2} = \frac{-x^2 - 1}{(x^2 - 1)^2}$$

$$= f'(0) = \frac{-1}{1} = -1$$

Yanıt – Answer : C



45. $g'(x) = (x)^I \cdot f(x) + x \cdot f'(x)$

$$= f(x) + x \cdot f'(x)$$

$$g'(-1) = f(-1) - f'(-1)$$

$$f(-1) = 3$$

$$f'(-1) = -1$$

$$g'(-1) = 3 - (-1) = 4$$

Yanıt – Answer : E

46. $F(x, y) = 2x^2 - x - y^2 = 0$

$$\frac{dy}{dx} = F'(x, y) = -\frac{F_x}{F_y} = -\frac{4x-1}{-2y} = \frac{4x-1}{2y}$$

$$F'(1, 1) = \frac{3}{2}$$

Yanıt – Answer : B

22. BÖLÜM

İNTEGRAL







1. $\int f(x) dx = 3x^4 - 2x^3 + 2x + 3$

$f(x) = ?$

A) $3x^4 - 2x^3 + 2x + 3$ B) $12x^2 - 6x + 2$

C) $12x^3 - 6x^2 + 2$ D) $3x^4 - 2x^3$

E) $2x + 3$

2. $\int f(x) dx = \sin 2x + 3$

$f(x) = ?$

A) $\sin 2x + 3$ B) $\cos 2x$ C) $-2\cos 2x$

D) $2\cos 2x$

E) $\sin 2x$

3. $\int x \cdot f(x) dx = 2x^3 - 3x^2 + 6x + 1$

$f(2) = ?$

A) 6

B) 7

C) 8

D) 9

E) 10

4. $\int x^2 \cdot f(x) dx = 2x^3 - ax^2 + 3x + b$

$f(-1) = 1$

$a = ?$

A) -5

B) -4

C) -3

D) -2

E) -1

5. $\int x^3 \cdot f(x) dx = 3x^4 - 2ax^2 - b$

$f(1) = 8$

$a = ?$

A) 1

B) 3

C) 5

D) 7

E) 9

6. $\int (5x + 2) dx = f(x)$

$f(2) = 10$

$f(x) = ?$

A) $5x^2 + 2x + 4$

B) $5x^2 + 2x - 4$

C) $\frac{5x^2}{2} + 4x - 4$

D) $\frac{5x^2}{2} + 2x - 4$

E) $\frac{5x^2}{2} - 4x + 4$

7. $\int (3x^2 + 2x + 1) dx = f(x)$

$f(1) = 2$

$f(0) = ?$

A) -2

B) -1

C) 0

D) 1

E) 2

8. $\int x dx = 3f(x) + 4x - 2$

$f(-1) = -\frac{3}{2}$

$f(0) = ?$

A) -4

B) -3

C) -2

D) 1

E) 2



9. $\int (5x + 2a) dx = ax^2 + bx - 2$

$b = ?$

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

10. $\int (4x^3 + 2) d(x^3) = ?$

- A) $x^4 + 2x + c$ B) $2x^4 + 2x + c$
C) $\frac{x^6}{4} + 2x^3 + c$ D) $2x^6 + 2x^3 + c$
E) $2x^6 + 2x + c$

11. $\int 6x d(x^2) = ?$

- A) $3x^2 + c$ B) $x^3 + c$ C) $3x^3 + c$
D) $4x^3 + c$ E) $4x^2 + c$

12. $\int 10x^2 \cdot \sqrt[3]{x} dx = ?$

- A) $10x^3 + c$ B) $\frac{10}{3}x^3 + c$
C) $3x^3 \cdot \sqrt{x} + c$ D) $10x^3 \cdot \sqrt{x} + c$
E) $3x^3 \cdot \sqrt[3]{x} + c$

13. $\int 6 \cdot (3x + 1)^4 dx = ?$

- A) $\frac{6 \cdot (3x + 1)^5}{5} + c$ B) $\frac{3 \cdot (3x + 1)^5}{5} + c$
C) $\frac{2 \cdot (3x + 1)^5}{5} + c$ D) $\frac{2x^5}{5} + c$
E) $\frac{6x^5}{5} + c$

14. $\int 12 \cos 4x dx = ?$

- A) $\sin 4x + c$ B) $3 \sin x + c$ C) $3 \sin 4x + c$
D) $12 \sin 4x + c$ E) $12 \sin x + c$

15. $\int 8 \cos^2 x dx = ?$

- A) $8 \sin 2x + 8x + c$ B) $2 \sin 2x + 2x + c$
C) $2 \cos 2x + 4x + c$ D) $-2 \sin 2x + 4x + c$
E) $2 \sin 2x + 4x + c$



1. $\int 3f'(x) \cdot f(x) dx = ?$

- A) $3f(x) + c$ B) $3f^2(x) + c$ C) $\frac{f^2(x)}{2} + c$
D) $\frac{3f^2(x)}{2} + c$ E) $\frac{3f(x)}{2} + c$

2. $\int 5f'(x) \cdot f^4(x) dx = ?$

- A) $f^5(x) + c$ B) $5f^5(x) + c$ C) $5f^4(x) + c$
D) $\frac{5f^5(x)}{2} + c$ E) $5f^4(x) + c$

3. $\int \frac{\cos x}{\sin^5 x} dx = ?$

- A) $-\frac{1}{4\sin^5 x} + c$ B) $\frac{1}{4\sin^4 x} + c$
C) $-\frac{1}{4\sin^4 x} + c$ D) $\frac{1}{4\cos^4 x} + c$
E) $-4\sin^4 x + c$

4. $\int (\tan x + 1) dx = ?$

- A) $x + \ln \sin x + c$ B) $x - \ln \sin x + c$
C) $x + \ln \cos x + c$ D) $x - \ln \cos x + c$
E) $x + \ln \tan x + c$

5. $\int 3 \cos x \cdot \sin^2 x dx = ?$

- A) $3\sin^3 x + c$ B) $2\sin^3 x + c$ C) $\sin^3 x + c$
D) $\cos^3 x + c$ E) $3\cos^3 x + c$

6. $\int \frac{(1 + \tan^2 x) dx}{\tan^3 x} = ?$

- A) $\frac{1}{2\tan^2 x} + c$ B) $-\frac{1}{2\tan^2 x} + c$
C) $\frac{1}{\tan^2 x} + c$ D) $-\frac{1}{\tan^2 x} + c$
E) $\tan^2 x + c$

7. $\int 2x \cdot e^{x^2+1} dx = ?$

- A) $x^2 \cdot e^{x^2+1} + c$ B) $e^{2x^2-1} + c$
C) $e^{2x^2+1} + c$ D) $e^{x^2-1} + c$
E) $e^{x^2+1} + c$

8. $\int \frac{\ln x \cdot e^{(\ln x)^2}}{x} dx = ?$

- A) $e^x + c$ B) $\frac{1}{2}e^{(\ln x)^2} + c$
C) $\frac{1}{2}(\ln x)^2 + c$ D) $e^{(\ln x)^2} + c$
E) $\frac{1}{2}e \cdot \ln x + c$



9. $\int \frac{dx}{x+5} = ?$

- A) $5\ln(x+5) + c$ B) $\ln(x+5) + c$
C) $\frac{\ln(x+5)}{2} + c$ D) $\frac{\ln(x+5)}{5} + c$
E) $\ln x + c$

10. $\int \frac{5dx}{4x+1} = ?$

- A) $5\ln(4x+1) + c$ B) $4\ln(4x+1) + c$
C) $\frac{5\ln(4x+1)}{4} + c$ D) $\frac{5\ln(4x)}{4} + c$
E) $\frac{5\ln x}{4} + c$

11. $\int \frac{3x-5}{x-2} dx = ?$

- A) $x + \ln|x-2| + c$ B) $3x + \ln|x-2| + c$
C) $x + 3\ln|x-2| + c$ D) $x + \ln|3x-5| + c$
E) $x - \ln|3x-5| + c$

12. $\int \frac{5x+1}{3x-3} dx = ?$

- A) $5x + 6\ln|3x-3| + c$
B) $\frac{5x}{3} + 2\ln|3x-3| + c$
C) $\frac{5x}{3} + 6\ln|3x-3| + c$
D) $\frac{5x}{3} + 6\ln|5x+1| + c$
E) $5x + 6\ln|5x+1| + c$

13. $\int \frac{5x}{2x^2+1} dx = ?$

- A) $5\ln(2x^2+1) + c$ B) $\frac{5}{4}\ln(2x^2+1) + c$
C) $4\ln(2x^2+1) + c$ D) $\frac{5}{2}\ln(5x) + c$
E) $\frac{5}{4}\ln(5x) + c$

14. $\int \frac{5x^2+3x-2}{x+2} dx = ?$

- A) $\frac{5x^2}{2} + 7x + 12\ln|x+2| + c$
B) $\frac{5x^2}{2} - 7x - 12\ln|x+2| + c$
C) $\frac{5x^2}{2} - 7x + 12\ln|x+2| + c$
D) $\frac{5x^2}{2} - 7x + \ln|x+2| + c$
E) $5x^2 - 7x + 12\ln|x+2| + c$

15. $\int \frac{2}{16x^2+1} dx = ?$

- A) $2\arctan 4x + c$ B) $4\arctan 4x + c$
C) $16\arctan 4x + c$ D) $\frac{\arctan 4x}{2} + c$
E) $\frac{\arctan 4x}{4} + c$



1. $f'(x) = 6x^2 - 5x - 2$
 $f(2) = 5$
 $f(-2) = ?$
A) -19 B) -7 C) 1 D) 15 E) 33
2. $f(x) = \int \frac{3}{(x+2)^2} dx$
 $f(1) = 2$
 $f^{-1}(4) = ?$
A) -5 B) -3 C) 0 D) 3 E) 5
3. $\int_a^b (6x+2) dx = 25$
 $a+b = 1$
 $b-a = ?$
A) 1 B) 5 C) 10 D) 15 E) 20
4. $\int_1^e \left[\frac{d}{dx}(\ln x) \right] dx = ?$
A) -1 B) 0 C) 1 D) e E) $\frac{1}{e}$
5. $\frac{d}{dx} \left[\int_{100}^{129} (5x^3 + 2) dx \right] = ?$
A) -2 B) 0 C) 2 D) 100 E) 129
6. $\int_1^2 \frac{5x^5 - 3}{x^4} dx = ?$
A) $\frac{7}{2}$ B) $\frac{53}{8}$ C) $\frac{63}{8}$ D) $\frac{71}{8}$ E) $\frac{81}{8}$
7. $\int_0^1 5x^{a-1} dx = \frac{10}{3a-1}$
 $a = ?$
A) 5 B) 4 C) 3 D) 2 E) 1
8. $\int_{\frac{\pi}{8}}^{\frac{\pi}{6}} (\cos^4 x - \sin^4 x) dx = ?$
A) $\frac{\sqrt{3}-\sqrt{2}}{4}$ B) $\frac{\sqrt{3}-\sqrt{2}}{2}$ C) 0
D) $\frac{\sqrt{3}+\sqrt{2}}{4}$ E) $\frac{\sqrt{3}+\sqrt{2}}{2}$



9. $\int_0^{\frac{\pi}{6}} \frac{\cos x}{(1 + \sin x)^2} dx = ?$

- A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{2}{3}$ E) 0

10. $\int_0^{\frac{\pi}{3}} \tan^2 x \cdot \sec^2 x \cdot dx = ?$

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

11. $\int_1^3 \cos 2x \, dx + \int_1^3 (4 + 2 \sin^2 x) \, dx = ?$

- A) 6 B) 7 C) 8 D) 9 E) 10

12. $\int_0^{\frac{\pi}{6}} \sin 2x \cdot \sin^2 x \, dx = ?$

- A) $\frac{1}{32}$ B) $\frac{\sqrt{3}}{24}$ C) $\frac{2\sqrt{2}}{11}$
D) $\frac{5\sqrt{2}}{12}$ E) $\frac{4\sqrt{3}}{21}$

13. $\int_a^b 3x^2 \, dx = 8$, $\int_a^b dx = 2$

$a^2 + ab + b^2 = ?$

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

14. $\int_4^a \frac{x \, dx}{\sqrt{x^2 - 15}} = 6$

$a^2 = ?$

- A) 1 B) 4 C) 36 D) 64 E) 100

15. $\int_4^9 \frac{(1 + \sqrt{x})^2}{\sqrt{x}} \, dx = ?$

- A) $\frac{74}{3}$ B) $\frac{73}{3}$ C) $\frac{64}{3}$ D) $\frac{32}{3}$ E) $\frac{2}{3}$



1. $\int (x^2 - 4x + 1)^3 \cdot (x - 2) dx = ?$

A) $\frac{1}{2} \cdot (x^2 - 4x + 1)^2 + c$

B) $\frac{1}{4} \cdot (x^2 - 4x + 1)^4 + c$

C) $\frac{1}{8} \cdot (x^2 - 4x + 1)^4 + c$

D) $\frac{1}{16} \cdot (x^2 - 4x + 1)^4 + c$

E) $\frac{1}{32} \cdot (x^2 - 4x + 1)^4 + c$

2. $\int (2x - 4)^2 dx = ?$

A) $\frac{1}{2} (2x - 4)^3 + c$

B) $\frac{1}{3} (2x - 4)^3 + c$

C) $\frac{1}{6} (2x - 4)^2 + c$

D) $\frac{1}{6} (2x - 4)^3 + c$

E) $\frac{1}{8} (2x - 4)^3 + c$

3. $\int \frac{e^{\sqrt{x}}}{2\sqrt{x}} dx = ?$

A) $\frac{1}{4} e^{\sqrt{x}} + c$

B) $\frac{1}{2} e^{\sqrt{x}} + c$

C) $e^{\sqrt{x}} + c$

D) $2e^{\sqrt{x}} + c$

E) $4e^{\sqrt{x}} + c$

4. $\int_1^{e^2} \frac{(\ln x)^3}{x} dx = ?$

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

5. $\int \frac{\cos(\ln x^2)}{x} dx = ?$

A) $\sin(\ln x^2) + c$

B) $2 \sin(\ln x^2) + c$

C) $\frac{1}{2} \sin(\ln x^2) + c$

D) $\frac{1}{4} \sin(\ln x) + c$

E) $\frac{1}{2} \sin(\ln 2x) + c$

6. $\int \frac{x+3}{x-1} dx = ?$

A) $x + \ln|x+1| + c$

B) $2x + \ln|x-1| + c$

C) $\frac{x^2}{2} + 4 \ln|x-1| + c$

D) $x + 4 \ln|x-1| + c$

E) $x - 2 \ln|x-1| + c$

7. $\int \frac{dx}{x^2 - 4x} = ?$

A) $\frac{1}{2} \ln \left| \frac{x-4}{x} \right| + c$

B) $\frac{1}{4} \ln \left| \frac{x-2}{x+2} \right| + c$

C) $\frac{1}{4} \ln \left| \frac{x-4}{x} \right| + c$

D) $\frac{1}{4} \ln|x-4| - \frac{1}{2} \ln|x| + c$

E) $\frac{1}{2} \ln|x-4| - \frac{1}{4} \ln|x| + c$



8. $\int \frac{2x+6}{(x+1)(x-3)} dx = ?$

- A) $3\ln|x-3| - \ln|x+1| + c$
B) $2\ln|x+1| + \frac{3}{2}\ln|x-3| + c$
C) $3\ln|x+1| - \frac{2}{3}\ln|x-3| + c$
D) $2\ln|x-3| + \frac{3}{2}\ln|x+1| + c$
E) $3\ln|x+1| - \frac{2}{3}\ln|x-3| + c$

9. $\int \frac{x+1}{x^2-2x} dx = ?$

- A) $\ln\sqrt{\frac{(x-2)^3}{x}} + c$
B) $\frac{1}{2}\ln\sqrt{x^2-2x} + c$
C) $\frac{1}{2}\ln\sqrt{\frac{x+2}{x}} + c$
D) $\ln\left|\frac{x}{2}\right| + \frac{1}{2}\ln|x+2| + c$
E) $\frac{1}{2}\ln|x| + \ln|x+2| + c$

10. $\int_0^2 \frac{d(x^2)}{x^2+1} = ?$

- A) $\ln 2$ B) $\ln 3$ C) $2\ln 2$ D) $\ln 5$ E) $3\ln 2$

11. $\int_3^5 \frac{dx}{x^2-3x+2} = ?$

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

12. $\int_1^2 \frac{dx}{9x^2-4} = ?$

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

13. $\int \frac{3dx}{x^3+x} = ?$

- A) $\ln|x| - \frac{3}{2}\ln(x^2+1) + c$
B) $3\ln|x| - \frac{1}{2}\ln(x^2+1) + c$
C) $2\ln|x| - \frac{3}{2}\ln(x^2+1) + c$
D) $\ln|x| + \frac{3}{2}\ln(x^2+1) + c$
E) $3\ln|x| - \frac{3}{2}\ln(x^2+1) + c$



1. $\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \frac{2dx}{\pi} = ?$

- A) 0 B) 1 C) 2 D) 3 E) π

2. $a - b = 1$
 $a + b = 5$
 $\int_b^a (3x^2 + 2x + 1) dx = ?$

- A) 10 B) 13 C) 15 D) 20 E) 25

3. $\int_0^5 \text{sgn}(x^2 - x - 6) dx = ?$

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

4. $\int_{-1}^3 3x|x-2| dx = ?$

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

5. $\int_e^{e^2} \frac{dx}{x \ln x} = ?$

- A) 0 B) 1 C) $\ln 2$
D) $\ln 2 - \ln 3$ E) $\ln(\ln 2)$

6. $\int_0^{\frac{\pi}{4}} \sin x d(\sin x) = ?$

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

7. $f(x) = \begin{cases} \text{sgn}(x) & , x \geq 2 \\ \lfloor x \rfloor & , x < 2 \end{cases}$

$\int_1^3 f(x) dx = ?$

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

8. $\frac{d}{dx} \int_2^{x^2} \sqrt{3t-1} dt = ?$

- A) $\sqrt{3x^2-1}$ B) $2\sqrt{3x^2-1}$ C) $x\sqrt{3x^2-1}$
D) $2x\sqrt{3x^2-1}$ E) $3x\sqrt{2x^2-1}$



9. $\int_1^3 a \, dx + \int_{-2}^1 bx \, dx = \int_{-2}^3 a \cdot b \, dx$

$b = ?$

A) $\frac{4a}{10a+3}$

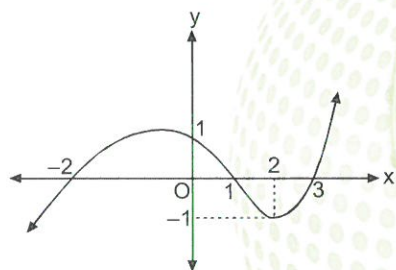
B) $\frac{2a}{5a-3}$

C) $\frac{5a-3}{2a}$

D) $\frac{10a+3}{2a}$

E) $\frac{3a-1}{2a}$

10.



$2 \int_{-2}^2 f'(x) |f(x)| \, dx = ?$

A) -6

B) -3

C) -1

D) 0

E) 1

11. $\int_0^{\ln 7} \frac{e^x}{e^x + 5} \, dx = ?$

A) 0

B) 1

C) $\ln 2$

D) $\ln 12$

E) $2 \ln 6$

12. $\int_0^1 \frac{d}{dx} (x^2 - 3x + k) \, dx = ?$

A) -3

B) -2

C) 0

D) 1

E) 2

13. $\int_{-4}^3 \frac{2x+1}{(x+3)(x-2)} \, dx = ?$

A) 0

B) 1

C) 2

D) $\ln 6$

E) $\ln 2$

14. $\int_0^5 x \operatorname{sgn}(x-3) \, dx = ?$

A) $\frac{1}{2}$

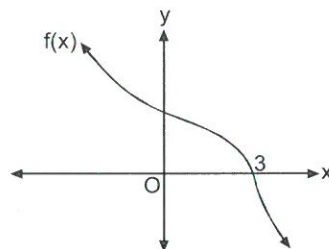
B) 1

C) $\frac{5}{2}$

D) 5

E) $\frac{7}{2}$

15.



$\int_1^3 x \operatorname{sgn}(f(x)) \, dx = ?$

A) -16

B) -20

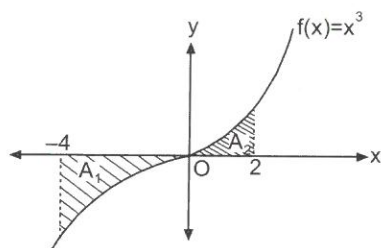
C) -24

D) -28

E) -40



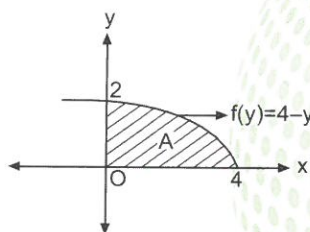
1.



$$A_1 + A_2 = ? br^2$$

- A) 16 B) 32 C) 48 D) 54 E) 68

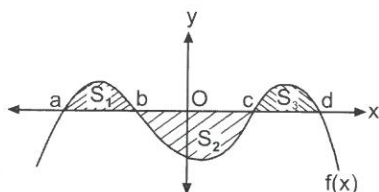
2.



$$A = ? br^2$$

- A) 2 B) $\frac{8}{3}$ C) $\frac{10}{3}$ D) 4 E) $\frac{16}{3}$

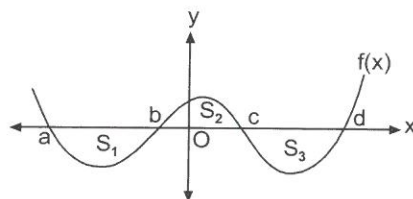
3.



$$\int_a^d f(x) dx = 0 \Rightarrow \frac{S_2}{S_1 + S_3} = ?$$

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

4.

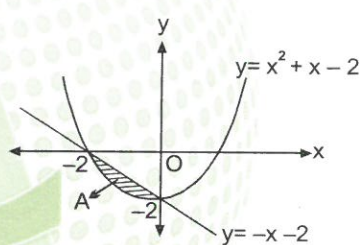


$$S_1 = 4 br^2, \quad S_2 = 2 br^2, \quad \int_a^d f(x) dx = -5$$

$$S_3 = ? br^2$$

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

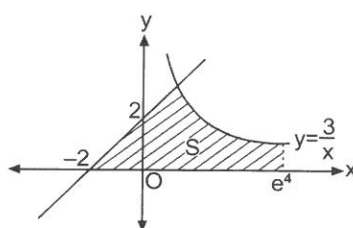
5.



$$A = ? br^2$$

- A) $\frac{4}{3}$ B) $\frac{8}{3}$ C) 4 D) $\frac{16}{3}$ E) $\frac{32}{3}$

6.

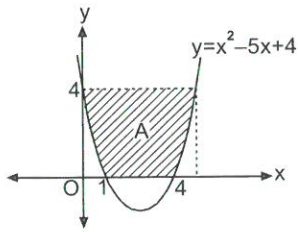


$$S = ? br^2$$

- A) 12 B) $\frac{25}{2}$ C) 13 D) $\frac{27}{2}$ E) $\frac{33}{2}$



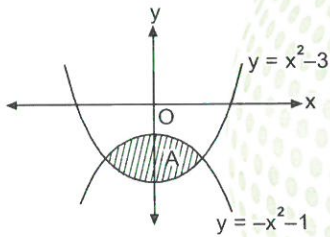
7.



$$A = ? br^2$$

- A) $\frac{49}{3}$ B) $\frac{32}{3}$ C) $\frac{16}{3}$ D) $\frac{8}{3}$ E) $\frac{4}{3}$

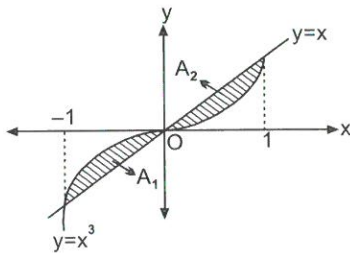
8.



$$A = ? br^2$$

- A) $\frac{4}{3}$ B) 2 C) $\frac{8}{3}$ D) $\frac{16}{3}$ E) $\frac{32}{3}$

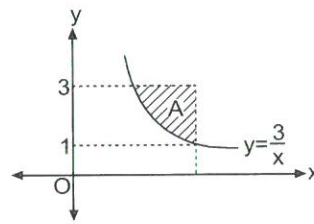
9.



$$A_1 + A_2 = ? br^2$$

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

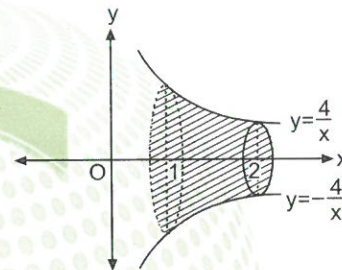
10.



$$A = ? br^2$$

- A) $1 - \ln 3$ B) 1 C) $\ln 3$
D) 2 E) $3(2 - \ln 3)$

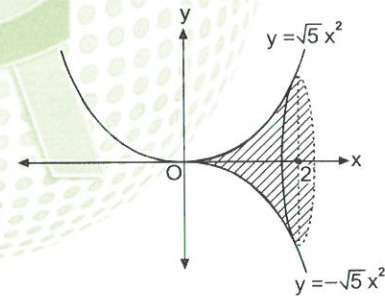
11.



$$V = ? br^3$$

- A) 16π B) 12π C) 8π D) 6π E) 4π

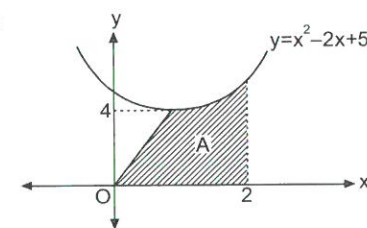
12.



$$V = ? br^3$$

- A) 16π B) 24π C) 28π D) 32π E) 36π

13.



$$A = ? br^2$$

- A) $\frac{11}{3}$ B) $\frac{13}{3}$ C) $\frac{16}{3}$ D) $\frac{17}{3}$ E) $\frac{19}{3}$



İNTEGRAL

ÇIKMIŞ SORULAR

1. $\int_{-1}^0 x(x-a)dx = \frac{4}{3}$

a = ?

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

(YÖS – 1985)

2. $\int_0^{\frac{\pi}{4}} \cos 2x \cdot \sin 2x dx = ?$

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

(YÖS – 1986)

3. $\int_0^{\frac{\pi}{4}} \cos 2x dx = ?$

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

(YÖS – 1987)

4. $\frac{df(x)}{dx} = f'(x) = 3x^2 - 6x + 3$

$f(1) = 2$

$f(-1) = ?$

- A) 0 B) -1 C) -2 D) -3 E) -6

(YÖS – 1988)

5. $\int_0^1 x^2 \cdot e^{x^3} dx = ?$

- A) 1 B) e C) e - 1

- D) $3(e - 1)$ E) $\frac{1}{3}(e - 1)$

(YÖS – 1989)

6. $\int_{-b}^b (ax + b) dx = 4$

b = ?

- A) $\sqrt{2}$ B) $\sqrt{3}$ C) 2 D) 3 E) 4

(YÖS – 1991)

7. $\int_1^a x \cdot e^x dx = 3 \cdot (\ln 3 - 1)$

a = ?

- A) $\ln 3 + 1$ B) $\ln 3$ C) $\ln 3 - 2$

- D) $\ln 3 - 1$ E) $\frac{\ln 3}{2}$

(YÖS – 1991)

8. $8 \int_0^{\frac{\pi}{12}} (\sin x \cos x \cos 2x) dx = ?$

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

(YÖS – 1992)



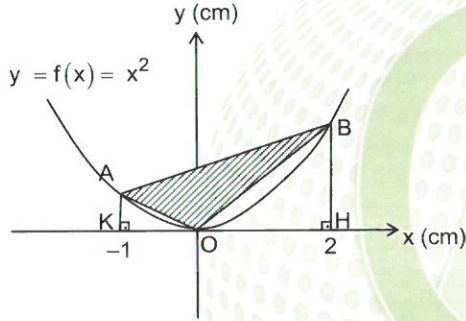
9. $x \in \mathbb{R}$
 $\int_0^x (xt - t) dt = 2$

$x = ?$

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

(YÖS – 1993)

10.



$f(x) = x^2$

$S(AOB) = ? \text{ cm}^2$

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

(YÖS – 1993)

11. $\int_0^1 \frac{5x^2 dx}{\sqrt{1-x^6}} = ?$

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

(YÖS – 1994)

12. $\int \frac{x^2 \cdot \ln(x^3 + 1)}{x^3 + 1} dx = ?$

A) $\frac{[\ln(x^3 + 1)]^2}{6} + c$ B) $\ln(x^3 + 1)^2 + c$

C) $\frac{1}{3} \ln(x^3 + 1) + c$ D) $\frac{1}{12} \ln(x^3 + 1) + c$

E) $\frac{1}{18} \ln(x^3 + 1) + c$

(YÖS – 1995)

13. $\int_1^4 \left(2x - \frac{1}{\sqrt{x}} \right) dx = ?$

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

(YÖS – 1998)

14. $\int_0^{\frac{\pi}{2}} \frac{\sin x - 1}{(x + \cos x)^2} dx = ?$

A) $1 + 2\pi$ B) $1 + \frac{2}{\pi}$ C) $\frac{\pi}{2} + 1$

D) $\frac{2}{\pi} - 1$ E) $\frac{\pi}{2} - 1$

(YÖS – 1999)

15. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin 2x}{\cos x} dx = ?$

A) $5\sqrt{3}$ B) $3\sqrt{3}$ C) $2\sqrt{3}$

D) $\sqrt{3} + 1$ E) $\sqrt{3} - 1$

(YÖS – 2000)



16. $\int \frac{e^x}{3+5e^x} dx = ?$

- A) $\ln(5-e^x) + c$
B) $\ln(3-e^x) + c$
C) $\ln(3+e^x) + c$
D) $\frac{1}{10} \ln(3+e^x) + c$
E) $\frac{1}{5} \ln(3+5e^x) + c$

(YÖS – 2001)

17. $\int \cos(3x-2) dx = ?$

- A) $3 \sin(3x-2) + c$
B) $\frac{1}{3} \cos(3x-2) + c$
C) $\frac{1}{2} \cos 3x + c$
D) $\frac{1}{3} \sin(3x-2) + c$
E) $\frac{1}{3} \sin 3x + c$

(YÖS – 2001)

18. $\int x^3 \cdot f(x) dx = 4x^4 - 3x^2 + c$

$f(x) = ?$

- A) $16 - \frac{6}{x^2}$
B) $16x + \frac{6}{x^2}$
C) $16x - \frac{6}{x^2}$
D) $6 + \frac{6}{x^2}$
E) $8 - \frac{6}{x}$

(YÖS – 2001)

19. $\int \frac{dx}{9+16x^2} = ?$

- A) $\frac{1}{24} \arctan \frac{1}{3}x + c$ B) $\frac{1}{12} \arctan \frac{4}{3}x + c$
C) $\frac{1}{4} \arctan x + c$ D) $3 \arctan x + c$
E) $5 \arctan x + c$

(YÖS – 2002)

20. $\int_1^3 (|x-2|+2) dx = ?$

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

(YÖS – 2002)

21. $\int_a^b (2x+7) dx = 92$

$b - a = 4$

$a + b = ?$

- A) 12 B) 14 C) 16 D) 20 E) 22

(YÖS – 2002)

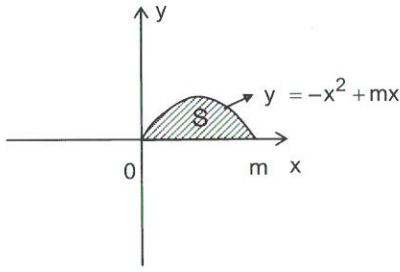
22. $\int_0^{\frac{\pi}{2}} \cos x \cdot \sin x \cdot e^{\sin^2 x} dx = ?$

- A) $e-2$ B) $e+2$ C) $\frac{1}{4}(e-1)$
D) $\frac{1}{2}(e+1)$ E) $\frac{1}{2}(e-1)$

(YÖS – 2003)



23.



$$S = 288 \text{ cm}^3$$

- A) 10 B) 12 C) 13 D) 14 E) 15

(YÖS – 2003)

$$24. \int \frac{x dx}{x^2 - 1} = ?$$

- A) $\frac{1}{2} \ln \left| \frac{x-1}{x+1} \right| + c$ B) $\frac{1}{2} \ln \left| \frac{x+1}{x-1} \right| + c$
C) $\frac{1}{2} \ln |x^2 - x| + c$ D) $\frac{1}{2} \ln |x^2 + 1| + c$
E) $\frac{3}{2} \ln |x^2 - 1| + c$

(YÖS – 2003)

$$25. \int_{-2}^2 |x^2 - 4| dx = ?$$

- A) $\frac{16}{3}$ B) $\frac{29}{3}$ C) $\frac{32}{3}$ D) 8 E) 16

(YÖS – 2004)

$$26. \int \frac{x}{\sqrt{16 - x^2}} dx = ?$$

- A) $\sqrt{4 + x^2} + c$ B) $\sqrt{16 + x^2} + c$
C) $-\sqrt{4 - x^2} + c$ D) $-\sqrt{16 - x^2} + c$
E) $-2\sqrt{16 - x^2} + c$

(YÖS – 2004)

$$27. \int x \cdot f(x) dx = 2x^3 + 4x^2 + c$$

$$f(x) = ?$$

- A) $6x + 4$ B) $6x + 8$
C) $6x + 13$ D) $\frac{2}{3}x^3 + 2x$
E) $\frac{2}{3}x^3 + 2x^2$

(YÖS – 2005)

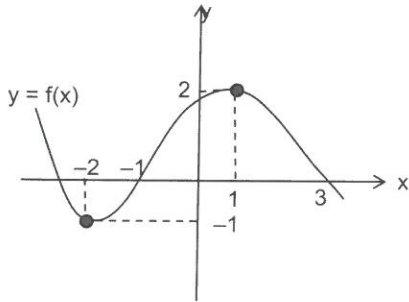
$$28. \int_1^3 (3 - |x - 2|) dx = ?$$

- A) 5 B) 4 C) 2 D) 1 E) 0

(YÖS – 2005)



29.



$$\frac{df}{dx} = f'(x)$$

$$\int_{-2}^1 f'(x) dx = ?$$

- A) 0 B) 1 C) 2 D) 3 E) 5

(YÖS – 2005)

30.

$$\int_0^{\frac{\pi}{4}} e^{\cos 4x} \cdot \sin 4x dx = ?$$

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

(YÖS – 2005)

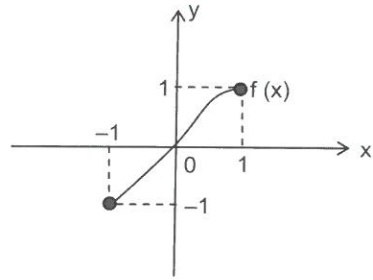
31.

$$\int_{-2}^4 |x| dx = ?$$

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

(YÖS – 2006)

32.

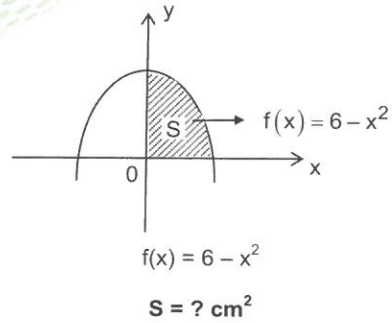


$$\int_{-1}^1 [f(x)] dx = ?$$

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

(YÖS – 2006)

33.



$$S = ? \text{ cm}^2$$

- A) $2\sqrt{6}$ B) $4\sqrt{6}$ C) $6\sqrt{6}$
D) 6 E) 12

(YÖS – 2006)



34. $f(x) = x$

$$\int_1^t d(f^{-1}(x)) = 12$$

$t = ?$

- A) 9 B) 10 C) 11 D) 12 E) 13

(YÖS – 2007)

35. $\int_{\sqrt{2}}^{\sqrt{6}} x\sqrt{x^2-2} dx = ?$

- A) $\frac{4}{3}$ B) $\frac{7}{3}$ C) $\frac{8}{3}$ D) $\frac{5}{4}$ E) $\frac{9}{4}$

(YÖS – 2007)

36. $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sqrt{1-\cos x}} dx = ?$

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

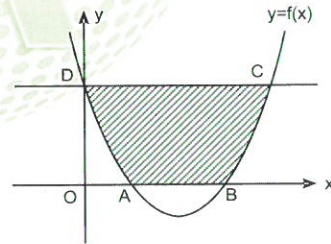
(YÖS – 2007)

37. $\int \frac{dx}{x^2-1} = ?$

- A) $\frac{1}{2} \ln|x-1| - \frac{1}{2} \ln|x+1| + c$
B) $\frac{1}{2} \ln|x-1| - \ln|x+1| + c$
C) $\frac{1}{2} \ln|x-1| + \frac{1}{2} \ln|x+1| + c$
D) $\ln|x-1| + \ln|x+1| + c$
E) $\ln|x-1| - \ln|x+1| + c$

(YÖS – 2007)

38.



$DC \parallel AB$

$$f(x) = x^2 - 5x + 6$$

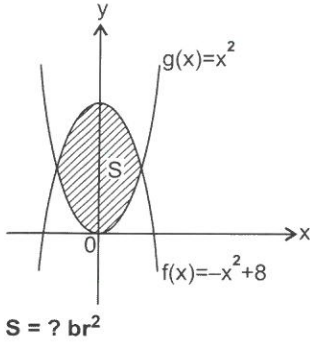
$A(ABCD) = ? br^2$

- A) 16 B) 24 C) $\frac{52}{3}$ D) $\frac{62}{3}$ E) $\frac{82}{3}$

(YÖS – 2007)



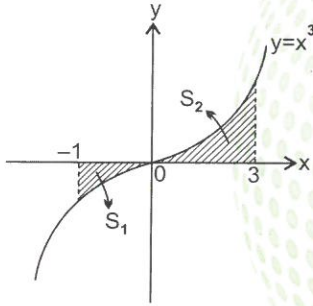
39.



- A) $\frac{32}{3}$ B) $\frac{64}{3}$ C) $\frac{81}{5}$ D) 16 E) 24

(YÖS – 2008)

40.



$$S_1 + S_2 = ? br^2$$

- A) 16 B) 18 C) 20 D) $\frac{41}{2}$ E) $\frac{43}{2}$

(YÖS – 2008)

$$41. \int \frac{x}{x+3} dx = ?$$

- A) $x - 3\ln|x+3| + c$ B) $x - \ln|x+3| + c$
 C) $\frac{x}{\ln|x+3|} + c$ D) $\frac{\ln|x+3|}{x} + c$
 E) $\ln|x+3| - x + c$

(YÖS – 2008)

$$42. \int (x^2 + 4x)^4 (2x + 4) dx = ?$$

- A) $(x^2 + 4x)^4 + c$ B) $4(x^2 + 4x) + c$
 C) $8(x^2 + 4x) + c$ D) $\frac{(x^2 + 4x)^4}{4} + c$
 E) $\frac{(x^2 + 4x)^5}{5} + c$

(YÖS – 2008)

$$43. \int_1^{e^2} \frac{\ln^2 x}{2x} dx = ?$$

- A) $\frac{4}{3}$ B) $\frac{1}{4}$ C) $\frac{3}{5}$ D) $\frac{7}{6}$ E) $\frac{4}{9}$

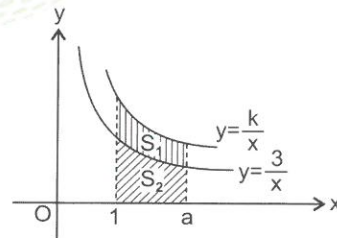
(YÖS – 2009)

$$44. \int_0^1 \frac{4}{x^2 - 4} dx = ?$$

- A) $-\ln 2$ B) $-\ln 3$ C) $2\ln 2$
 D) $\ln 5$ E) $\ln 6$

(YÖS – 2009)

45.



$$S_1 = 8 br^2$$

$$S_2 = 12 br^2$$

$$k = ?$$

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

(YÖS – 2009)



$$\begin{aligned}
 1. \quad \int_{-1}^0 x(x-a) dx &= \int_{-1}^0 (x^2 - ax) dx \\
 &= \int_{-1}^0 x^2 dx - a \cdot \int_{-1}^0 x dx \\
 &= \left(\frac{x^3}{3} - a \cdot \frac{x^2}{2} \right) \Big|_{-1}^0 \\
 &= \frac{0^3}{3} - a \cdot \frac{0^2}{2} - \left(\frac{(-1)^3}{3} - a \cdot \frac{(-1)^2}{2} \right) \\
 &= \frac{1}{3} + \frac{a}{2} \\
 \Rightarrow \frac{1}{3} + \frac{a}{2} &= \frac{4}{3} \\
 \Rightarrow \frac{a}{2} &= \frac{4}{3} - \frac{1}{3} \Rightarrow \frac{a}{2} = 1 \Rightarrow a = 2
 \end{aligned}$$

Yanıt Answer : B

$$\begin{aligned}
 2. \quad \sin 2\alpha &= 2 \cdot \sin \alpha \cdot \cos \alpha \\
 \alpha &= 2x \Rightarrow \sin(2 \cdot 2x) = 2 \cdot \sin 2x \cdot \cos 2x \\
 \sin 4x &= 2 \cdot \sin 2x \cdot \cos 2x \\
 \frac{\sin 4x}{2} &= \sin 2x \cdot \cos 2x \\
 \int_0^{\frac{\pi}{4}} \cos 2x \cdot \sin 2x dx &= \int_0^{\frac{\pi}{4}} \frac{\sin 4x}{2} dx \\
 &= \frac{1}{2} \int_0^{\frac{\pi}{4}} \sin 4x dx \\
 &= \frac{1}{2} \left(-\frac{\cos 4x}{4} \right) \Big|_0^{\frac{\pi}{4}} \\
 &= -\frac{1}{8} \cdot \cos 4x \Big|_0^{\frac{\pi}{4}} \\
 &= -\frac{1}{8} \cdot \left[\cos 4 \cdot \frac{\pi}{4} - \cos 4 \cdot 0 \right] \\
 &= -\frac{1}{8} \cdot [-1 - 1] = -\frac{1}{8} \cdot (-2) \\
 &= \frac{2}{8} = \frac{1}{4}
 \end{aligned}$$

Yanıt Answer : D

$$\begin{aligned}
 3. \quad \int_0^{\frac{\pi}{4}} \cos 2x dx &= \frac{\sin 2x}{2} \Big|_0^{\frac{\pi}{4}} \\
 &= \frac{1}{2} \left[\sin 2 \cdot \frac{\pi}{4} - \sin 2 \cdot 0 \right] \\
 &= \frac{1}{2} \left[\sin \frac{\pi}{2} - \sin 0 \right] \\
 &= \frac{1}{2} [1 - 0] = \frac{1}{2}
 \end{aligned}$$

Yanıt Answer : D

$$\begin{aligned}
 4. \quad f'(x) &= 3x^2 - 6x + 3 \Rightarrow f(x) = \int (3x^2 - 6x + 3) dx \\
 f(x) &= 3 \cdot \frac{x^3}{3} - 6 \cdot \frac{x^2}{2} + 3x + c \\
 f(x) &= x^3 - 3x^2 + 3x + c \\
 f(1) &= 1^3 - 3 \cdot 1^2 + 3 \cdot 1 + c \\
 &= 1 + c \\
 1 + c &= 2 \Rightarrow c = 1 \\
 f(x) &= x^3 - 3x^2 + 3x + 1 \\
 f(-1) &= (-1)^3 - 3 \cdot (-1)^2 + 3 \cdot (-1) + 1 \\
 f(-1) &= -1 - 3 - 3 + 1 \\
 f(-1) &= -6
 \end{aligned}$$

Yanıt Answer : E

$$\begin{aligned}
 5. \quad x^3 &= u \\
 3x^2 dx &= du \\
 x^2 dx &= \frac{du}{3} \\
 \int_0^1 x^2 \cdot e^{x^3} dx &= \int e^u \frac{du}{3} \\
 &= \frac{1}{3} \int e^u du \\
 &= \frac{1}{3} e^u \\
 &= \frac{1}{3} e^{x^3} \Big|_0^1 \\
 &= \frac{1}{3} \cdot (e^1 - e^0) = \frac{1}{3} \cdot (e - 1)
 \end{aligned}$$

Yanıt Answer : E



6.
$$\int_{-b}^b (ax + b) dx = a \int_{-b}^b x dx + \int_{-b}^b b dx$$
$$= \left(a \cdot \frac{x^2}{2} + bx \right) \Big|_{-b}^b$$
$$= a \cdot \frac{b^2}{2} + b^2 - \left(a \cdot \frac{b^2}{2} - b^2 \right)$$
$$= \frac{ab^2}{2} + b^2 - \frac{ab^2}{2} + b^2 = 2b^2$$
$$2b^2 = 4$$
$$b^2 = 2$$
$$b = \sqrt{2}$$

Yanıt Answer : A

7.
$$\int u \cdot dv = u \cdot v - \int v \cdot du$$
$$x = u \quad e^x dx = dv$$
$$dx = du \quad e^x = v$$
$$\int_1^a x \cdot e^x dx = x \cdot e^x - \int_1^a e^x dx$$
$$= \left(x \cdot e^x - e^x \right) \Big|_1^a$$
$$= ae^a - e^a - (e - e)$$
$$= ae^a - e^a$$
$$\Rightarrow ae^a - e^a = 3 \cdot (\ln 3 - 1)$$
$$e^a \cdot (a - 1) = 3 \cdot (\ln 3 - 1)$$
$$e^a = 3$$
$$a = \ln 3$$

Yanıt Answer : B

8.
$$\sin x \cdot \cos x = \frac{\sin 2x}{2}$$
$$\frac{\sin 2x}{2} \cdot \cos 2x = \frac{1}{2} \cdot \sin 2x \cdot \cos 2x$$
$$= \frac{1}{2} \cdot \frac{\sin 4x}{2}$$
$$= \frac{1}{4} \cdot \sin 4x$$
$$8 \int_0^{\frac{\pi}{12}} (\sin x \cdot \cos x \cdot \cos 2x) dx = 8 \int_0^{\frac{\pi}{12}} \frac{1}{4} \cdot \sin 4x dx$$
$$= 2 \int_0^{\frac{\pi}{12}} \sin 4x dx$$

$$= 2 \cdot \left(-\frac{\cos 4x}{4} \right) \Big|_0^{\frac{\pi}{12}}$$
$$= -\frac{1}{2} \left(\cos 4 \cdot \frac{\pi}{12} - \cos 4 \cdot 0 \right)$$
$$= -\frac{1}{2} \left(\cos \frac{\pi}{3} - \cos 0 \right)$$
$$= -\frac{1}{2} \left(\frac{1}{2} - 1 \right)$$
$$= \frac{1}{4}$$

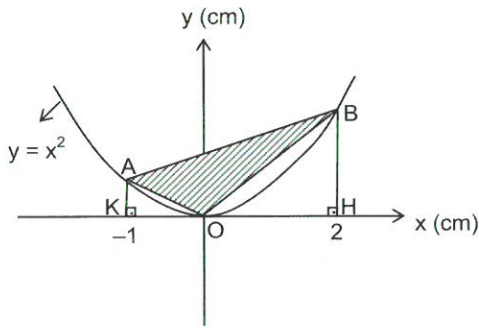
Yanıt Answer : A

9.
$$\int_0^x (xt - t) dt = x \int_0^x t dt - \int_0^x t dt$$
$$= \left(x \cdot \frac{t^2}{2} - \frac{t^2}{2} \right) \Big|_0^x$$
$$= x \cdot \frac{x^2}{2} - \frac{x^2}{2}$$
$$= \frac{x^3}{2} - \frac{x^2}{2} = 2$$
$$\Rightarrow x^3 - x^2 = 4$$
$$x = 2$$

Yanıt Answer : A



10.



$$x = 2 \Rightarrow f(2) = 2^2$$

$$f(2) = 4, \quad B(2, 4)$$

$$|HB| = 4$$

$$x = -1 \Rightarrow f(-1) = (-1)^2$$

$$f(-1) = 1, \quad A(-1, 1)$$

$$|AK| = 1$$

$$A(AKHB) = \frac{(4+1) \cdot 3}{2} \Rightarrow A(AKHB) = \frac{15}{2}$$

$$A(AKO) = \frac{1}{2}, \quad A(OHB) = 4$$

$$A(AOB) = \frac{15}{2} - \left(\frac{1}{2} + 4 \right) = 3$$

Yanıt Answer : C

11.

$$\int_0^1 \frac{5x^2 dx}{\sqrt{1-x^6}} = \int \frac{5x^2 dx}{\sqrt{1-(x^3)^2}}$$

$$x^3 = u$$

$$3x^2 dx = du$$

$$x^2 dx = \frac{du}{3}$$

$$= \int \frac{5 \cdot \frac{du}{3}}{\sqrt{1-u^2}}$$

$$= \frac{5}{3} \int \frac{du}{\sqrt{1-u^2}}$$

$$= \frac{5}{3} \arcsin u$$

$$= \frac{5}{3} \arcsin x^3 \Big|_0^1$$

$$= \frac{5}{3} (\arcsin 1 - \arcsin 0)$$

$$= \frac{5}{3} \left(\frac{\pi}{2} - 0 \right)$$

$$= \frac{5\pi}{6}$$

Yanıt Answer : E

12.

$$\int \frac{x^2 \cdot \ln(x^3 + 1)}{x^3 + 1} dx = \int \frac{\ln u}{u} \cdot \frac{du}{3}$$

$$x^3 + 1 = u$$

$$3x^2 dx = du$$

$$x^2 dx = \frac{du}{3}$$

$$\ln u = t$$

$$\frac{1}{u} du = dt$$

$$= \frac{1}{3} \int \frac{\ln u}{u} du$$

$$= \frac{1}{3} \int t dt$$

$$= \frac{1}{3} \cdot \frac{t^2}{2}$$

$$= \frac{1}{6} \cdot t^2$$

$$= \frac{1}{6} \cdot (\ln u)^2$$

$$= \frac{1}{6} \cdot (\ln(x^3 + 1))^2 + c$$

Yanıt Answer : A

13.

$$\int_1^4 \left(2x - \frac{1}{\sqrt{x}} \right) dx = 2 \int_1^4 x dx - \int_1^4 x^{-\frac{1}{2}} dx$$

$$= 2 \cdot \frac{x^2}{2} - \frac{x^{\frac{1}{2}}}{\frac{1}{2}}$$

$$= (x^2 - 2\sqrt{x}) \Big|_1^4$$

$$= 4^2 - 2\sqrt{4} - (1 - 2\sqrt{1})$$

$$= 16 - 4 + 1$$

$$= 13$$

Yanıt Answer : E



14. $\int_0^{\frac{\pi}{2}} \frac{\sin x - 1}{(x + \cos x)^2} dx$

$$\begin{aligned} u &= x + \cos x \\ du &= 1 - \sin x \\ -du &= \sin x - 1 \end{aligned}$$

$$\int_0^{\frac{\pi}{2}} \frac{\sin x - 1}{(x + \cos x)^2} dx = \int \frac{-du}{u^2} = - \int u^{-2} du$$

$$= - \frac{u^{-1}}{-1}$$

$$= \frac{1}{u}$$

$$= \frac{1}{x + \cos x} \Big|_0^{\frac{\pi}{2}}$$

$$= \frac{1}{\frac{\pi}{2} + \cos \frac{\pi}{2}} - \frac{1}{0 + \cos 0} = \frac{2}{\pi} - 1$$

Yanıt - Answer : D

15. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin 2x}{\cos x} dx = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{2 \sin x \cos x}{\cos x} dx$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} 2 \sin x dx$$

$$= -2 \cos x \Big|_{\frac{\pi}{6}}^{\frac{\pi}{3}}$$

$$= -2 \left(\cos \frac{\pi}{3} - \cos \frac{\pi}{6} \right)$$

$$= -2 \left(\frac{1}{2} - \frac{\sqrt{3}}{2} \right)$$

$$= -2 \cdot \left(\frac{1 - \sqrt{3}}{2} \right) = \sqrt{3} - 1$$

Yanıt - Answer : E

16.

$$u = 3 + 5e^x$$

$$du = 5e^x \cdot dx$$

$$e^x \cdot dx = \frac{du}{5} = \frac{1}{5} \ln(3 + 5e^x) + c$$

$$\frac{1}{5} \int \frac{du}{u} = \frac{1}{5} \ln u + c$$

Yanıt - Answer : E

17.

$$u = 3x - 2$$

$$du = 3 dx$$

$$dx = \frac{du}{3}$$

$$= \frac{1}{3} \int \cos u du = \frac{1}{3} \sin u + c$$

$$= \frac{1}{3} \sin(3x - 2) + c$$

Yanıt - Answer : D

18.

$$\int x^3 \cdot f(x) \cdot dx = 4x^4 - 3x^2 + c$$

$$\frac{d}{dx} \left(\int x^3 \cdot f(x) dx \right) = \frac{d}{dx} (4x^4 - 3x^2 + c)$$

$$x^3 \cdot f(x) = 16x^3 - 6x$$

$$f(x) = 16 - \frac{6}{x^2}$$

Yanıt - Answer : A

19.

$$\int \frac{dx}{9 + 16x^2} =$$

$$\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \cdot \arctan \frac{x}{a} + c$$

$$\int \frac{dx}{3^2 + (4x)^2} = \frac{1}{3 \cdot 4} \cdot \arctan \frac{4x}{3} + c$$

$$= \frac{1}{12} \arctan \frac{4}{3} x + c$$

Yanıt - Answer : B



$$\begin{aligned}
 20. \quad & \int_1^3 (|x-2|+2) dx = \\
 & = \int_1^2 (-x+2+2) dx + \int_2^3 (x-2+2) dx \\
 & = \int_1^2 (4-x) dx + \int_2^3 x dx \\
 & = \left(4x - \frac{x^2}{2} \right) \Big|_1^2 + \left(\frac{x^2}{2} \right) \Big|_2^3 \\
 & = \left[\left(8 - \frac{4}{2} \right) - \left(4 - \frac{1}{2} \right) \right] + \left[\frac{9}{2} - \frac{4}{2} \right] \\
 & = 6 - \frac{7}{2} + \frac{5}{2} = 5
 \end{aligned}$$

Yanıt - Answer : D

$$21. \quad \int_a^b (2x+7) dx = 92$$

$$x^2 + 7x \Big|_a^b = 92$$

$$\Rightarrow b^2 + 7b - a^2 - 7a = 92$$

$$\Rightarrow (b-a).(b+a) + 7.(b-a) = 92$$

$$\Rightarrow (b-a).(b+a+7) = 92$$

$$\Rightarrow 4.(b+a+7) = 92$$

$$\Rightarrow b+a+7 = 23$$

$$\Rightarrow b+a = 16$$

Yanıt - Answer : C

22.

$$\sin^2 x = u$$

$$2\sin x \cdot \cos x \cdot dx = du$$

$$\sin x \cdot \cos x \cdot dx = \frac{du}{2}$$

$$x = \frac{\pi}{2} \Rightarrow u = \sin^2 \frac{\pi}{2} = 1$$

$$x = 0 \Rightarrow u = \sin^2 0 = 0$$

$$\begin{aligned}
 & \int_0^{\frac{\pi}{2}} \cos x \cdot \sin x \cdot e^{\sin^2 x} dx = \int_0^1 e^u \frac{du}{2} = \frac{1}{2} \int_0^1 e^u du \\
 & = \frac{1}{2} \cdot e^u \Big|_0^1 = \frac{1}{2} \cdot (e^1 - e^0) = \frac{1}{2} (e - 1)
 \end{aligned}$$

Yanıt - Answer : E

23.

$$\int_0^m (-x^2 + mx) dx = \frac{-x^3}{3} + \frac{mx^2}{2} \Big|_0^m$$

$$= \frac{-m^3}{3} + \frac{m^3}{2} - \left(\frac{0}{3} + \frac{0}{2} \right)$$

$$= \frac{m^3}{6} \Rightarrow \frac{m^3}{6} = 288$$

$$m^3 = 6.288 \Rightarrow m = 12$$

Yanıt - Answer : B

24.

$$x^2 - 1 = u$$

$$2x dx = du$$

$$x dx = \frac{du}{2}$$

$$\begin{aligned}
 \int \frac{x dx}{x^2 - 1} &= \int \frac{\frac{du}{2}}{u} = \frac{1}{2} \int \frac{du}{u} = \frac{1}{2} \ln |u| + c \\
 &= \frac{1}{2} \ln |x^2 - 1| + c
 \end{aligned}$$

Yanıt - Answer : C



$$25. \int_{-2}^2 |x^2 - 4| dx = \left| \int_{-2}^2 (x^2 - 4) dx \right| =$$

$$\left| \left(\frac{x^3}{3} - 4x \right) \right|_{-2}^2 = \left| \left(\frac{8}{3} - 8 \right) - \left(\frac{-8}{3} + 8 \right) \right|$$
$$= \left| \left(\frac{-32}{3} \right) \right| = \frac{32}{3}$$

Yanıt - Answer : C

26.

$$\begin{aligned} 16 - x^2 &= u \\ -2x dx &= du \\ x dx &= -\frac{1}{2} du \end{aligned}$$

$$\int \frac{-\frac{1}{2}}{\sqrt{u}} du = -\frac{1}{2} \int u^{-1/2} du$$
$$= -\frac{1}{2} \cdot \frac{u^{1/2}}{\frac{1}{2}} + c$$
$$= -\sqrt{u} + c$$
$$= -\sqrt{16 - x^2} + c$$

Yanıt - Answer : D

$$27. \int x \cdot f(x) dx = 2x^3 + 4x^2 + c$$

$$\frac{d}{dx} \left(\int x \cdot f(x) dx \right) = \frac{d}{dx} (2x^3 + 4x^2 + c)$$

$$x \cdot f(x) = 6x^2 + 8x$$

$$f(x) = 6x + 8$$

Yanıt - Answer : B

$$28. \int_1^3 (3 - |x - 2|) dx = ?$$

$$\Rightarrow \int_1^2 (3 - |x - 2|) dx + \int_2^3 (3 - |x - 2|) dx$$

$$\Rightarrow \int_1^2 (3 + x - 2) dx + \int_2^3 (3 - x + 2) dx$$

$$\Rightarrow \int_1^2 (x + 1) dx + \int_2^3 (5 - x) dx$$

$$= \left(\frac{x^2}{2} + x \right) \Big|_1^2 + \left(5x - \frac{x^2}{2} \right) \Big|_2^3$$

$$= \left[\left(\frac{4}{2} + 2 \right) - \left(\frac{1}{2} + 1 \right) \right] + \left[\left(15 - \frac{9}{2} \right) - \left(10 - \frac{4}{2} \right) \right]$$

$$= 4 - \frac{3}{2} + \frac{21}{2} - 8 = 5$$

Yanıt - Answer : A

$$29. \int_{-2}^1 f'(x) dx = f(1) - f(-2)$$

$$\Rightarrow 2 - (-1) = 3$$

Yanıt - Answer : D



30. $\int_0^{\pi/4} e^{\cos 4x} \cdot \sin 4x dx = ?$

Kural:
(Rule):

$$\int e^u du = e^u + c$$

$$\cos 4x = u$$

$$-4 \sin 4x dx = du$$

$$-\frac{1}{4} \int e^{\cos 4x} \cdot (-4) \cdot \sin 4x dx$$

$$= -\frac{1}{4} \int e^u du$$

$$= -\frac{1}{4} \left(e^{\cos 4x} \right) \Big|_0^{\pi/4}$$

$$= -\frac{1}{4} (e^{\cos \pi} - e^{\cos 0})$$

$$= -\frac{1}{4} (e^{-1} - e^1) = -\frac{1}{4e} + \frac{e}{4}$$

$$= \frac{e^2 - 1}{4e}$$

Yanıt - Answer : B

31. $\int_{-2}^4 |x| dx = ?$

$$= \int_{-2}^0 -x dx + \int_0^4 x dx = \left(-\frac{x^2}{2} \right) \Big|_{-2}^0 + \left(\frac{x^2}{2} \right) \Big|_0^4$$

$$= \left[0 - \left(-\frac{4}{2} \right) \right] + \left[\frac{4}{2} - 0 \right] = \frac{4}{2} + \frac{4}{2} = 4$$

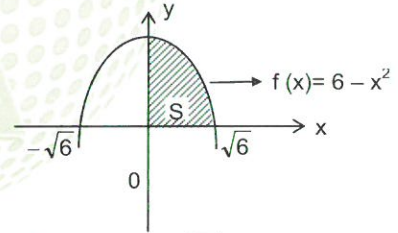
Yanıt - Answer : B

32. $\int_{-1}^1 [f(x)] dx = \int_{-1}^0 -1 dx + \int_0^1 0 dx$

$$= (-x) \Big|_{-1}^0 = 0 - (-1) = -1$$

Yanıt - Answer : B

33.



$$6 - x^2 = 0 \Rightarrow x = \pm \sqrt{6}$$

$$S = \int_0^{\sqrt{6}} (6 - x^2) dx$$

$$S = \left(6x - \frac{x^3}{3} \right) \Big|_0^{\sqrt{6}}$$

$$S = 6\sqrt{6} - \frac{6\sqrt{6}}{3} \Rightarrow \frac{12\sqrt{6}}{3} \Rightarrow S = 4\sqrt{6}$$

Yanıt - Answer : B

34. $f(x) = x \Rightarrow f^{-1}(x) = x$



$$\int_1^t d(f^{-1}(x)) = 12$$

$$\int_1^t d(x) = 12$$

$$x \Big|_1^t = 12$$

$$t - 1 = 12$$

$$t = 13$$

Yanıt – Answer : E

$$35. \quad u = x^2 - 2$$

$$du = 2x dx$$

$$\frac{1}{2} du = x dx$$

$$\int x \cdot \sqrt{x^2 - 2} dx = \int \underbrace{\sqrt{x^2 - 2}}_u \cdot \frac{x dx}{1/2 du}$$

$$= \frac{1}{2} \int \sqrt{u} \cdot du$$

$$= \frac{1}{2} \int u^{\frac{1}{2}} du$$

$$= \frac{1}{2} \cdot \frac{u^{\frac{3}{2}}}{\frac{3}{2}}$$

$$= \frac{1}{3} \sqrt{(x^2 - 2)^3}$$

$$\int_{\sqrt{2}}^{\sqrt{6}} x \cdot \sqrt{x^2 - 2} dx = \frac{1}{3} \sqrt{(x^2 - 2)^3} \Big|_{\sqrt{2}}^{\sqrt{6}}$$

$$= \frac{1}{3} (8 - 0)$$

$$= \frac{8}{3}$$

Yanıt – Answer : C

$$36. \quad u = 1 - \cos x$$

$$du = \sin x dx$$

$$\int \frac{\sin x}{\sqrt{1 - \cos x}} dx = \int \frac{du}{\sqrt{u}}$$

$$= \int u^{-\frac{1}{2}} du$$

$$= \frac{u^{\frac{1}{2}}}{\frac{1}{2}} = 2 \cdot \sqrt{u}$$

$$= 2\sqrt{1 - \cos x}$$

$$\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sqrt{1 - \cos x}} dx = 2\sqrt{1 - \cos x} \Big|_0^{\frac{\pi}{2}}$$

$$= 2 \cdot (1 - 0)$$

$$= 2$$

Yanıt – Answer : B

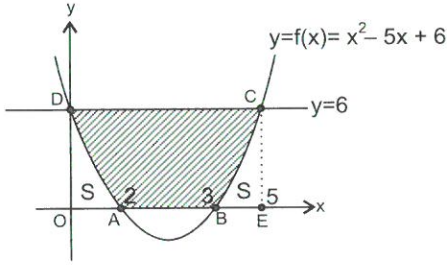
$$37. \quad \frac{1}{x^2 - 1} = \frac{1}{(x - 1)(x + 1)} = \frac{A}{x - 1} + \frac{B}{x + 1}$$

$$\left[A = \frac{1}{2}, B = -\frac{1}{2} \right]$$

$$\int \frac{dx}{x^2 - 1} = \frac{1}{2} \int \frac{1}{x - 1} dx - \frac{1}{2} \int \frac{1}{x + 1} dx$$

$$= \frac{1}{2} \ln|x - 1| - \frac{1}{2} \ln|x + 1| + c$$

Yanıt – Answer : A

**38.**

$$x = 0 \Rightarrow y = 6$$

$$y = 6 \Rightarrow 6 = x^2 - 5x + 6$$

$$0 = x(x - 5)$$

$$x = 0 \vee x = 5$$

$$y = 0 \Rightarrow x^2 - 5x + 6 = 0$$

$$(x - 2)(x - 3) = 0$$

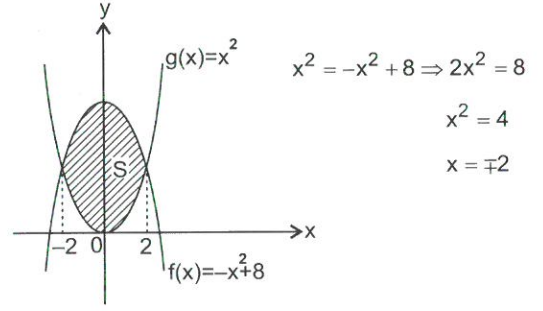
$$x_1 = 2 \quad x_2 = 3$$

$$A(ABCD) = A(OECD) - 2S$$

$$= 30 - 2 \cdot \int_0^2 (x^2 - 5x + 6) dx$$

$$= 30 - 2 \cdot \left(\frac{14}{3} \right)$$

$$= \frac{62}{3}$$

Yanıt - Answer : D**39.**

$$x^2 = -x^2 + 8 \Rightarrow 2x^2 = 8$$

$$x^2 = 4$$

$$x = \pm 2$$

$$S = \int_{-2}^2 [(-x^2 + 8) - (x^2)] dx = \int_{-2}^2 (-2x^2 + 8) dx$$
$$= \left. \frac{-2x^3}{3} + 8x \right|_{-2}^2$$

$$= \left(\frac{-16}{3} + 16 \right) - \left(\frac{16}{3} - 16 \right)$$

$$= 32 - \frac{32}{3} = \frac{64}{3}$$

Yanıt - Answer : B

$$40. \quad S_1 + S_2 = - \int_{-1}^0 x^3 dx + \int_0^3 x^3 dx$$

$$= - \left. \frac{x^4}{4} \right|_{-1}^0 + \left. \frac{x^4}{4} \right|_0^3$$

$$= - \left(0 - \frac{(-1)^4}{4} \right) + \left(\frac{3^4}{4} - 0 \right)$$

$$= \frac{1}{4} + \frac{81}{4}$$

$$= \frac{82}{4} = \frac{41}{2} \text{ br}^2$$

Yanıt - Answer : D



$$41. \int \frac{x}{x+3} dx = \int \left(1 - \frac{3}{x+3}\right) dx$$
$$= x - 3\ln|x+3| + c$$

Yanıt – Answer : A

$$42. \begin{cases} u = x^2 + 4x \\ du = (2x + 4)dx \end{cases}$$
$$\int \left(\frac{x^2 + 4x}{u}\right)^4 \cdot \underbrace{(2x + 4)dx}_{du}$$
$$= \int u^4 du$$
$$= \frac{u^5}{5} + c$$
$$= \frac{(x^2 + 4x)^5}{5} + c$$

Yanıt – Answer : E

$$43. u = \ln x$$
$$du = \frac{1}{x} dx$$
$$\Rightarrow \int \frac{1}{2} \cdot \underbrace{(\ln x)^2}_u \cdot \underbrace{\frac{1}{x} dx}_{du}$$
$$= \frac{1}{2} \int u^2 du = \frac{u^3}{6} = \frac{(\ln x)^3}{6} \Big|_1^{e^2}$$
$$= \frac{1}{6} (8 - 0) = \frac{4}{3}$$

Yanıt – Answer : A

$$44. \frac{4}{x^2 - 4} = \frac{4}{(x-2)(x+2)} = \frac{A}{x-2} + \frac{B}{x+2}$$

$$(A = 1, B = -1)$$

$$\Rightarrow \int_0^1 \frac{4}{x^2 - 4} dx = \int_0^1 \left(\frac{1}{x-2} - \frac{1}{x+2} \right) dx$$

$$= \ln|x-2| - \ln|x+2| \Big|_0^1$$

$$= \ln \left| \frac{x-2}{x+2} \right| \Big|_0^1$$

$$= \ln \frac{1}{3} - \ln 1$$

$$= \ln \frac{1}{3} = -\ln 3$$

Yanıt – Answer : B

$$45. S_1 + S_2 = k \cdot \ln \frac{a}{1}$$

$$S_2 = 3 \cdot \ln \frac{a}{1}$$

$$\frac{20}{12} = \frac{k \cdot \ln a}{3 \cdot \ln a} \Rightarrow \frac{5}{3} = \frac{k}{3} \Rightarrow k = 5$$

Yanıt – Answer : B



23. BÖLÜM

MATRİS – DETERMINANT





1. $\begin{bmatrix} x & 4 \\ x+2 & 5 \end{bmatrix} = \begin{bmatrix} 3 & z \\ y & 5 \end{bmatrix}$

$x+y+z=?$

- A) 12 B) 11 C) 10 D) 9 E) 8

2. $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} - \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

$a+b.c=?$

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

3. $3. \begin{bmatrix} 2 & \frac{1}{3} & 3 \\ 0 & 0 & 0 \\ 1 & 1 & 0 \end{bmatrix} = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & e \end{bmatrix}$

$a+b+e=?$

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

4. $2. \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

$x+y=?$

- A) 16 B) 17 C) 18 D) 19 E) 20

5. $(A+B)^T = \begin{bmatrix} 2 & 1 \\ -3 & -2 \end{bmatrix}$, $A = \begin{bmatrix} -1 & 2 \\ -2 & -1 \end{bmatrix}$

$B=?$

A) $\begin{bmatrix} 3 & 3 \\ -5 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 3 & -5 \\ 3 & -1 \end{bmatrix}$ C) $\begin{bmatrix} -5 & -1 \\ 3 & 3 \end{bmatrix}$

D) $\begin{bmatrix} -5 & 3 \\ -1 & 3 \end{bmatrix}$ E) $\begin{bmatrix} 3 & -5 \\ -3 & 1 \end{bmatrix}$

6. $A = \begin{bmatrix} -x & -4 \\ 4 & y \end{bmatrix}$, $B = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$, $C = \begin{bmatrix} 18 \\ 2x-5 \end{bmatrix}$

$A^T \cdot B = C$

$x+y=?$

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

7. $A = \begin{bmatrix} -1 & -1 \\ 0 & -1 \end{bmatrix}$, $B = \begin{bmatrix} -1 & -1 \\ -1 & -2 \end{bmatrix}$

$A \cdot C = B$

$C=?$

A) $\begin{bmatrix} 0 & 1 \\ -1 & 2 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ C) $\begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}$

D) $\begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$ E) $\begin{bmatrix} 2 & 0 \\ 1 & -1 \end{bmatrix}$

8. $x^2 - 4x - 6 = 0$ $\begin{matrix} \nearrow x_1 \\ \searrow x_2 \end{matrix}$

$A = \begin{bmatrix} 1 & 1 \\ x_1 & x_2 \end{bmatrix} \cdot \begin{bmatrix} x_2 & -1 \\ x_1 & -1 \end{bmatrix}$

$A=?$

A) $\begin{bmatrix} 4 & -2 \\ -6 & -4 \end{bmatrix}$ B) $\begin{bmatrix} 4 & -2 \\ -12 & -4 \end{bmatrix}$ C) $\begin{bmatrix} 4 & -6 \\ -2 & -4 \end{bmatrix}$

D) $\begin{bmatrix} 4 & -12 \\ -2 & -4 \end{bmatrix}$ E) $\begin{bmatrix} -2 & -4 \\ 4 & -12 \end{bmatrix}$



9. $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

$A^{50} = ?$

A) $\begin{bmatrix} 25 & 50 \\ 0 & 25 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 50 \\ 0 & 1 \end{bmatrix}$
D) $2^{50} \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ E) $\begin{bmatrix} 1 & 100 \\ 0 & 1 \end{bmatrix}$

10. $A = \begin{bmatrix} 1 & -1 \\ 3 & 1 \end{bmatrix}$

$A^{15} = ?$

A) $(-2)^{15} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ B) $(-2)^{15} \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$
C) $4^{15} \begin{bmatrix} 1 & -1 \\ 3 & 1 \end{bmatrix}$ D) $4^{15} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
E) $(-2)^{15} \begin{bmatrix} 1 & -1 \\ 1 & 0 \end{bmatrix}$

11. $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$

$A \cdot C = B$

$C^{-1} = ?$

A) $\frac{1}{5} \begin{bmatrix} 1 & 1 \\ 2 & 7 \end{bmatrix}$ B) $-\frac{1}{5} \begin{bmatrix} 1 & -1 \\ 4 & 7 \end{bmatrix}$ C) $\begin{bmatrix} 7 & -1 \\ 3 & 0 \end{bmatrix}$
D) $\frac{1}{2} \begin{bmatrix} 1 & -7 \\ 5 & 3 \end{bmatrix}$ E) $\begin{bmatrix} 1 & -7 \\ 5 & 3 \end{bmatrix}$

12. $A = \begin{bmatrix} 3 & 0 \\ -2 & 1 \end{bmatrix}$

$[A^2]^T = ?$

A) $\begin{bmatrix} 9 & 0 \\ -3 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 9 & -8 \\ 0 & 1 \end{bmatrix}$ C) $\begin{bmatrix} -8 & 1 \\ 9 & 0 \end{bmatrix}$
D) $\begin{bmatrix} 0 & 1 \\ 9 & 8 \end{bmatrix}$ E) $\begin{bmatrix} 1 & 0 \\ 9 & -8 \end{bmatrix}$

13. $A = \begin{bmatrix} 1 & -2 \\ 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 3 & -1 \end{bmatrix}$

$(A \cdot B) \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$a = ?$

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

14. $x^2 - 2x - 4 = 0$

$\begin{bmatrix} x_1 & x_2 \\ -1 & -1 \end{bmatrix} \cdot \begin{bmatrix} 1 & x_1 \\ 1 & x_2 \end{bmatrix} = ?$

A) $\begin{bmatrix} -2 & -1 \\ -1 & 1 \end{bmatrix}$ B) $2 \cdot \begin{bmatrix} 1 & 6 \\ -1 & -1 \end{bmatrix}$ C) $2 \cdot \begin{bmatrix} 1 & -6 \\ 0 & -1 \end{bmatrix}$

D) $-2 \cdot \begin{bmatrix} 1 & 1 \\ 6 & -1 \end{bmatrix}$ E) $\begin{bmatrix} 6 & 1 \\ -1 & 0 \end{bmatrix}$

15. $n \in \mathbb{Z}^+$

$A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} \Rightarrow A^{8n+5} = ?$

A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ B) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ C) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$

D) $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ E) $\begin{bmatrix} 0 & 8 \\ -8 & 0 \end{bmatrix}$



1. $\begin{vmatrix} 1000 & 1001 \\ 1002 & 999 \end{vmatrix} = ?$

- A) -4004 B) -4002 C) 0
D) 2002 E) 4002

2. $\begin{vmatrix} 501 & 502 \\ 499 & 503 \end{vmatrix} = ?$

- A) -1505 B) 1000 C) 0
D) 1505 E) 1507

3. $\begin{vmatrix} m & 3 \\ 4 & 1 \end{vmatrix} = \begin{vmatrix} 4 & n \\ 2 & 1 \end{vmatrix}$

$m + 2n = ?$

- A) 2 B) 4 C) 8 D) 16 E) 32

4. $\begin{vmatrix} m & 2 \\ 3 & n \end{vmatrix} = 2$, $\begin{vmatrix} m+n & 2 \\ 0 & 1 \end{vmatrix} = 5$

$m^2 + n^2 = ?$

- A) 7 B) 9 C) 11 D) 13 E) 14

5. $\begin{vmatrix} 99876 & 99877 \\ 99874 & 99875 \end{vmatrix} = ?$

- A) $(99870)^2$ B) 99872 C) 99882
D) 4 E) 2

6. $\begin{vmatrix} \cos x & \sin x \\ \sin x & \cos x \end{vmatrix} = \frac{1}{2}$

$x = ?$

- A) 75 B) 60 C) 45 D) 30 E) 15

7. $\begin{vmatrix} \sec x & 1 \\ \sin x & \cos x \end{vmatrix} \cdot \begin{vmatrix} \csc x & \sin x \\ -1 & \sin x \end{vmatrix} = ?$

- A) 1 B) $\sin 2x$ C) $\cos 2x$ D) $\sin^2 x$ E) $\cos^2 x$

8. $\begin{vmatrix} \cos x & \sin x \\ \sin x & \cos x \end{vmatrix} \cdot \begin{vmatrix} \cos x & -\cos x \\ \sin x & \sin x \end{vmatrix} = \frac{\sqrt{3}}{4}$

$x = ?$

- A) 105 B) 90 C) 75 D) 45 E) 15



9. $\begin{vmatrix} 2 & 1 & 3 \\ -1 & 4 & 1 \\ 3 & 2 & 1 \end{vmatrix} = ?$

- A) -39 B) -34 C) 5 D) 34 E) 41

10. $\begin{vmatrix} -1 & 0 & -3 \\ 2 & 1 & -2 \\ 3 & -2 & 1 \end{vmatrix} = ?$

- A) 10 B) 12 C) 18 D) 20 E) 24

11. $\begin{vmatrix} a+1 & 1 & 1 \\ 1 & a+1 & 1 \\ 1 & 1 & a+1 \end{vmatrix} = ?$

- A) $(a+1)^3$ B) $a^3 \cdot (a+1)$ C) $a^2 \cdot (a+3)$
D) $a^3 \cdot (a+3)$ E) $a^2 \cdot (a+1)$

12. $\begin{vmatrix} x & 1 & x \\ 2 & 3 & 4 \\ x & 5 & x \end{vmatrix} = 16$

$x = ?$

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

13. $\begin{vmatrix} a & b & c \\ -1 & 1 & 2 \\ 0 & -2 & 3 \end{vmatrix} = x$, $\begin{vmatrix} a & b+1 & c-2 \\ 2 & -2 & -4 \\ 0 & -2 & 3 \end{vmatrix} = 10$

$x = ?$

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

14. $\begin{vmatrix} 1 & -1 & x \\ 2 & 1 & y \\ -1 & 1 & z \end{vmatrix} = k$

$\begin{vmatrix} 1 & -1 & x+1 \\ 2 & 1 & y-1 \\ -1 & 1 & z+2 \end{vmatrix} = ?$

- A) 3k B) 6k C) 9k D) 3 + k E) 9 + k

15. $\begin{vmatrix} x & 1 & x \\ 1 & 2 & 3 \\ 1 & x & 1 \end{vmatrix} = \begin{vmatrix} 1996 & 1995 \\ 1994 & 1993 \end{vmatrix}$

$x = ?$

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



1. $\begin{vmatrix} a & x+a & 3x+a \\ b & x+b & 3x+b \\ c & x+c & 3x+c \end{vmatrix} = ?$

- A) $a+b-x$ B) $a+b+c-x$ C) 0
D) $2x$ E) $a+b+c$

2. $f(x) = \begin{vmatrix} x & x & 0 \\ e^x & 0 & 1 \\ 0 & e^x & 1 \end{vmatrix}$

$\frac{df(x)}{dx} = f'(x) = ?$

- A) $-2xe^x$ B) $-e^x(2x+1)$ C) $-2x(e^x+1)$
D) $-2e^x(x-1)$ E) $-2e^x(x+1)$

3. $\begin{vmatrix} 1 & -2 & 3 \\ 4 & 1 & 5 \\ 0 & 3 & -1 \end{vmatrix} = n$

$\begin{vmatrix} a & -4 & 6 \\ 2a & 1 & 5 \\ 0 & 3 & -1 \end{vmatrix} = ?$

- A) n B) $\frac{a \cdot n}{2}$ C) $2 \cdot a \cdot n$ D) $-a \cdot n$ E) $a \cdot n$

4. $\begin{vmatrix} m & n & t \\ 0 & 1 & 2 \\ 3 & 2 & 1 \end{vmatrix} = x$

$\begin{vmatrix} m-1 & n+1 & t-1 \\ 0 & 1 & 2 \\ 3 & 2 & 1 \end{vmatrix} = ?$

- A) $x+12$ B) $x-10$ C) $x+9$
D) $x-1$ E) $x+8$

5. $\begin{bmatrix} x & -y \\ x+y & y \end{bmatrix} + 3 \begin{bmatrix} y & x \\ x & -1 \end{bmatrix} = \begin{bmatrix} a & -8 \\ b & 2 \end{bmatrix}$

$a \cdot b = ?$

- A) 8 B) 12 C) 14 D) 19 E) 20

6. $A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$

$A^2 - 3A + 2I = ?$

- A) $\begin{bmatrix} -2 & 0 \\ 4 & -2 \end{bmatrix}$ B) $\begin{bmatrix} -3 & -2 \\ 0 & -4 \end{bmatrix}$ C) $\begin{bmatrix} -3 & -3 \\ 0 & -6 \end{bmatrix}$
D) $\begin{bmatrix} 1 & 3 \\ 4 & 0 \end{bmatrix}$ E) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

7. $A = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 27 \\ -9 \end{bmatrix}$

$A \cdot x = B + x$

$x = ?$

- A) $\begin{bmatrix} 3 \\ 7 \end{bmatrix}$ B) $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$ C) $\begin{bmatrix} 3 \\ -8 \end{bmatrix}$ D) $\begin{bmatrix} 2 \\ -5 \end{bmatrix}$ E) $\begin{bmatrix} 5 \\ -4 \end{bmatrix}$

8. $A = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 0 \\ 3 & 3 \end{bmatrix}$

$a \cdot A + b \cdot B = \begin{bmatrix} -2 & 4 \\ -3 & -1 \end{bmatrix}$

$a+b = ?$

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



9. $A = \begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$, $A \cdot B = \begin{bmatrix} 4 \\ 9 \end{bmatrix}$

$B^T \cdot B = ?$

A) [5] B) [10] C) [12] D) [13] E) [18]

10. $A = \begin{bmatrix} 1 & 0 & 1 \\ 2 & 1 & -1 \end{bmatrix}$, $B = \begin{bmatrix} x & 2 \\ 0 & 1 \\ 3 & 4 \end{bmatrix}$

$2A^T + B = \begin{bmatrix} 5 & 6 \\ 0 & c \\ 5 & k \end{bmatrix}$

$x + c + k = ?$

A) 6 B) 7 C) 8 D) 9 E) 10

11. $A = \begin{bmatrix} 2 & 5 \\ -4 & -3 \end{bmatrix}$, $B = A^2 + A + 4I$

$B = ?$

A) $\begin{bmatrix} 4 & -4 \\ 3 & 8 \end{bmatrix}$ B) $\begin{bmatrix} -4 & -5 \\ 4 & 8 \end{bmatrix}$ C) $\begin{bmatrix} 4 & -5 \\ 4 & 9 \end{bmatrix}$

D) $\begin{bmatrix} 4 & 5 \\ -4 & 9 \end{bmatrix}$ E) $\begin{bmatrix} -10 & 0 \\ 0 & -10 \end{bmatrix}$

12. $A = \begin{bmatrix} \tan x & 0 \\ 0 & \cos x \end{bmatrix}$

$A^{-1} = ?$

A) $\begin{bmatrix} \cos x & 0 \\ \tan x & 1 \end{bmatrix}$ B) $\begin{bmatrix} \sec x & 0 \\ 0 & \tan x \end{bmatrix}$

C) $\begin{bmatrix} \cot x & 0 \\ 0 & \sin x \end{bmatrix}$ D) $\begin{bmatrix} \cot x & 0 \\ 0 & \sec x \end{bmatrix}$

E) $\begin{bmatrix} \tan x & 0 \\ 0 & \operatorname{cosec} x \end{bmatrix}$

13. $A = \begin{bmatrix} 5 & 0 \\ 25 & 5 \end{bmatrix}$

$A^{30} = ?$

A) $5^{15} \begin{bmatrix} 1 & 0 \\ 10 & 1 \end{bmatrix}$ B) $5^{15} \begin{bmatrix} 1 & 0 \\ 30 & 1 \end{bmatrix}$

C) $5^{30} \begin{bmatrix} 1 & 0 \\ 10 & 1 \end{bmatrix}$ D) $5^{30} \begin{bmatrix} 1 & 0 \\ 300 & 0 \end{bmatrix}$

E) $5^{30} \begin{bmatrix} 1 & 0 \\ 150 & 1 \end{bmatrix}$

14. $A = \begin{bmatrix} 1 & 1 \\ -3 & 1 \end{bmatrix}$

$A^{1996} = ?$

A) $2^{1995} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ B) $-2^{1995} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

C) $2^{1995} \begin{bmatrix} 1 & 1 \\ -3 & 1 \end{bmatrix}$ D) $-2^{1995} \begin{bmatrix} 1 & 1 \\ -3 & 1 \end{bmatrix}$

E) $2^{1996} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

15. $A^{-1} = \begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$, $A \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

$\begin{bmatrix} x \\ y \end{bmatrix} = ?$

A) $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$ B) $\begin{bmatrix} 2 \\ 5 \end{bmatrix}$ C) $\begin{bmatrix} 3 \\ 4 \end{bmatrix}$ D) $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$ E) $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$



1. $\begin{vmatrix} 2 & 7 & 0 \\ 3 & 4 & 0 \\ -1 & 3 & 0 \end{vmatrix} = ?$

- A) -21 B) -11 C) 0 D) 8 E) 13

2. $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & 2 & -1 \end{bmatrix}$

$\det(A) = k$

$\det(A^T) = ?$

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

3. $\begin{vmatrix} 8 & 12 & 16 \\ 0 & -1 & -2 \\ 16 & 24 & 32 \end{vmatrix} = ?$

- A) 0 B) 12 C) 24 D) 32 E) 48

4. $\begin{vmatrix} i & -1 \\ 1 & i \end{vmatrix}^5 = ?$

- A) -32 B) -16 C) -8 D) -4 E) 0

5. $(A+B)^T = \begin{bmatrix} 0 & 5 \\ 1 & 3 \end{bmatrix}$, $A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$

$B^T = ?$

A) $\begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix}$

B) $\begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$

C) $\begin{bmatrix} -1 & 3 \\ 1 & 2 \end{bmatrix}$

D) $\begin{bmatrix} 0 & 1 \\ 3 & 2 \end{bmatrix}$

E) $\begin{bmatrix} -1 & 1 \\ 3 & 2 \end{bmatrix}$

6. $\begin{vmatrix} a & b & c \\ d & e & f \\ x & y & z \end{vmatrix} = k$

$\begin{vmatrix} 2a & 2b & \frac{2c}{5} \\ 5d & 5e & f \\ x & y & \frac{z}{5} \end{vmatrix} = ?$

- A) $\frac{k}{5}$ B) $\frac{2k}{5}$ C) k D) 2k E) 5k

7. $f(2x+1) = \begin{vmatrix} x & x^2 & -4 \\ 1 & x & -2 \\ -1 & 0 & 2 \end{vmatrix}$

$f(5) = ?$

- A) 36 B) 24 C) 12 D) 0 E) -8

8. $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

$|A^3| = ?$

- A) 216 B) 125 C) 120 D) 100 E) 64



9. $|A.B^T| \in \mathbb{Z}/7$

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 0 & 4 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & 0 \\ 1 & 3 & 4 \end{bmatrix}$$

$$|A.B^T| = ?$$

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

10. $\begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} \cdot X = \begin{bmatrix} 4 & 1 \\ 6 & 2 \end{bmatrix}$

$$X = ?$$

A) $\begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$

B) $\begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix}$

C) $\begin{bmatrix} 0 & -1 \\ 2 & 1 \end{bmatrix}$

D) $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

E) $\begin{bmatrix} -1 & 0 \\ 2 & 1 \end{bmatrix}$

11. $A = \begin{bmatrix} 2 & 3 \\ 1 & 3 \end{bmatrix}$

$$\det(A^{-1} \cdot A^T) = ?$$

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

12. $\begin{vmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ -2 & 2 & -4 \end{vmatrix} = k$

$$\begin{vmatrix} 2 & 4 & -6 \\ 3 & 0 & 6 \\ -2 & 2 & -12 \end{vmatrix} = ?$$

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

13. $\begin{vmatrix} 1 & 0 & a \\ 2 & -1 & 3 \\ 4 & -3 & 2b \end{vmatrix} = 12$

$$\begin{vmatrix} 1 & 0 & a+3 \\ 2 & -1 & 5 \\ 4 & -3 & 2b-1 \end{vmatrix} = ?$$

- A) 12 B) 13 C) 18 D) 21 E) 27

14. $\begin{vmatrix} a & b & c \\ d & e & f \\ 4 & 4 & 5 \end{vmatrix} = k$

$$\begin{vmatrix} b & a+2c & c \\ e & d+2f & f \\ 4 & 14 & 5 \end{vmatrix} = ?$$

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

15. $A = \begin{bmatrix} a & b & c \\ d & e & f \\ x & y & z \end{bmatrix}$

$$\begin{vmatrix} t.a & t.b & 4.t.c \\ \frac{x}{2} & \frac{y}{2} & 2z \\ d & e & 4f \end{vmatrix} = ?$$

- A)
- $-2t \cdot |A|$
- B)
- $-t \cdot |A|$
- C)
- $|A|$
-
- D)
- $t \cdot |A|$
- E)
- $2t \cdot |A|$

16. $f(x) = \begin{vmatrix} \lfloor x+2 \rfloor & \operatorname{sgn} x \\ e & e^{\ln x} \end{vmatrix}$

$$f(e) = ?$$

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



1. $\begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & y \\ x & -1 \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ 2 & 3 \end{bmatrix}$

$x + y = ?$

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

(YÖS – 1985)

2. $A = \begin{bmatrix} 1 & 2 & 1 \\ 6 & 6 & 4 \\ 2 & 1 & 1 \end{bmatrix}$

$\det A = ?$

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

(YÖS – 1985)

3. $X = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}, Y = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \end{bmatrix}, Z = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix}$

$X \cdot Y \cdot Z = ?$

- A) $\begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ C) $\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$
D) $\begin{bmatrix} 4 & 3 \\ 6 & 5 \end{bmatrix}$ E) $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$

(YÖS – 1986)

4. $A = \begin{bmatrix} 3 & 0 & 1 \\ 0 & 2 & 1 \\ -1 & 0 & 2 \end{bmatrix}$

$|A| = \det A = ?$

- A) 14 B) 12 C) 3 D) 2 E) 0

(YÖS – 1986)

5. $A = \begin{bmatrix} 1 & 3 \\ 2 & 2 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 4 & 2 \\ 5 & 4 \end{bmatrix}$

$C = A + 2B$

$|C| = \det C = ?$

- A) $\frac{103}{8}$ B) $\frac{13}{4}$ C) $\frac{5}{2}$ D) 1 E) 0

(YÖS – 1987)

6. $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 3 & 0 \\ -1 & 1 \\ -2 & 0 \end{bmatrix}$

$A \cdot B = ?$

- A) $\begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}$ B) $\begin{bmatrix} 3 \\ -1 \\ -2 \end{bmatrix}$ C) $\begin{bmatrix} 3 & 2 \\ -5 & 1 \end{bmatrix}$
D) $\begin{bmatrix} 3 & -2 \\ -5 & 1 \end{bmatrix}$ E) $\begin{bmatrix} 3 & 0 & -2 \\ 5 & 1 & 0 \\ -2 & 0 & 1 \end{bmatrix}$

(YÖS – 1987)



7. $\det \begin{bmatrix} 2 & -2 \\ a & b \end{bmatrix} = \det \begin{bmatrix} a & 2 \\ b & 2 \end{bmatrix}$

$b = ?$

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

(YÖS – 1988)

8. $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} = ?$

- A) $\begin{bmatrix} 7 & 8 \end{bmatrix}$ B) $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$
D) $\begin{bmatrix} 8 \\ 7 \end{bmatrix}$ E) $\begin{bmatrix} 7 \\ 8 \end{bmatrix}$

(YÖS – 1990)

9. $\begin{bmatrix} 1 & 2 \\ 2 & 0 \\ 1 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 \\ 1 & 1 \\ 0 & 1 \end{bmatrix}^T = ?$

- A) $\begin{bmatrix} 3 & 3 & 2 \\ 2 & 2 & 0 \\ 2 & 2 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 2 & 3 & 0 \\ 1 & 2 & 0 \\ 2 & 1 & 2 \end{bmatrix}$
C) $\begin{bmatrix} 1 & 1 & 0 \\ 2 & 0 & 2 \\ 1 & 2 & 2 \end{bmatrix}$ D) $\begin{bmatrix} 3 & 3 \\ 2 & 3 \\ 2 & 2 \end{bmatrix}$
E) $\begin{bmatrix} 3 & 1 \\ 3 & 1 \\ 2 & 2 \end{bmatrix}$

(YÖS – 1991)

10. $\begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}^{-1} = ?$

- A) $\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ B) $\begin{bmatrix} -2 & 5 \\ 1 & -3 \end{bmatrix}$
C) $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$ D) $\begin{bmatrix} -3 & -5 \\ -1 & -2 \end{bmatrix}$
E) $\begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$

(YÖS – 1992)

11. $\begin{bmatrix} 3! \\ (x-1)! \end{bmatrix} = \begin{bmatrix} 4! \\ x \\ 2y+2 \end{bmatrix}$

$x \cdot y = ?$

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

(YÖS – 1993)

12. $A = \begin{bmatrix} \sin \alpha & \cos \alpha \\ \cos \alpha & \sin \alpha \end{bmatrix}$

$A^2 = ?$

- A) $\begin{bmatrix} -1 & \sin 2\alpha \\ \sin 2\alpha & \sin \alpha \end{bmatrix}$ B) $\begin{bmatrix} -1 & 1 \\ \sin 2\alpha & \cos 2 \end{bmatrix}$
C) $\begin{bmatrix} 2 & \cos \alpha \\ \cos \alpha & 2 \end{bmatrix}$ D) $\begin{bmatrix} 1 & \cos \alpha \\ \sin \alpha & 1 \end{bmatrix}$
E) $\begin{bmatrix} 1 & \sin 2\alpha \\ \sin 2\alpha & 1 \end{bmatrix}$

(YÖS – 1993)



13. $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ $A^n = \begin{bmatrix} 32 & 32 \\ 32 & 32 \end{bmatrix}$

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

(YÖS – 1994)

14. $A = \begin{bmatrix} 2y & 2(y^2 + y + 1) \\ 2 & 2(y + 1) \end{bmatrix}$

$\det A = ?$

- A) -8 B) -4 C) -1 D) 1 E) 2

(YÖS – 1995)

15. $\begin{bmatrix} 10 & -5 \\ 6 & -2 \end{bmatrix} \cdot \begin{bmatrix} 2 & -4 \\ 6 & 0 \end{bmatrix} = \begin{bmatrix} x & y \\ z & t \end{bmatrix}$

$\begin{bmatrix} x & y \\ z & t \end{bmatrix} = ?$

- A) $\begin{bmatrix} -30 & -20 \\ -24 & 0 \end{bmatrix}$ B) $\begin{bmatrix} 30 & 20 \\ 24 & -6 \end{bmatrix}$
C) $\begin{bmatrix} -10 & 20 \\ 0 & 0 \end{bmatrix}$ D) $\begin{bmatrix} -10 & -40 \\ 0 & -24 \end{bmatrix}$
E) $\begin{bmatrix} 5 & 30 \\ 0 & 10 \end{bmatrix}$

(YÖS – 1995)

16. $\begin{bmatrix} 1 & 2 & 3 \\ 4 & a & 10 \\ -10 & 0 & 2 \end{bmatrix} = -56$

$a^2 - 2a + 1 = ?$

- A) 11 B) 13 C) 14 D) 16 E) 17

(YÖS – 1997)

17. $\begin{bmatrix} 3 & 3 \\ 7 & 7 \end{bmatrix} \cdot \begin{bmatrix} a & a \\ 1 & b \end{bmatrix} = \begin{bmatrix} 33 & 33 \\ 77 & 77 \end{bmatrix}$

$a + b = ?$

- A) 7 B) 8 C) 9 D) 10 E) 11

(YÖS – 1998)

18. $\begin{vmatrix} 0 & -1 & 2 \\ 2 & 3 & a \\ 1 & -1 & 1 \end{vmatrix} = -13$

$\begin{vmatrix} a & 4 \\ 1 & a \end{vmatrix} = ?$

- A) 6 B) 9 C) 12 D) 18 E) 21

(YÖS – 1999)

19. $\begin{vmatrix} 3 & x & 0 \\ 1 & 5 & 4 \\ 1 & 6 & -3 \end{vmatrix} = -103$

$x = ?$

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

(YÖS – 2000)



20.
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -2 & 3 & 0 \\ 0 & 0 & 0 & 4 \\ 0 & 0 & 5 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ -4 \\ 10 \end{bmatrix}$$

$(x_1, x_2, x_3, x_4) = ?$

- A) $(-1, -3, 2, 1)$ B) $(-1, 3, 2, 1)$ C) $(1, 3, 2, -1)$
D) $(1, 3, 2, 1)$ E) $(1, 3, -2, 1)$

(YÖS – 2000)

21.
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \\ 6 \end{bmatrix}$$

$x + y + z = ?$

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

(YÖS – 2001)

22. $0 < a$
$$A = \begin{bmatrix} 2 & a & 4 \\ a & 0 & -a \\ 0 & 5 & -1 \end{bmatrix}$$

$\det A = 400$

$a = ?$

- A) 10 B) 12 C) 18 D) 30 E) 40

(YÖS – 2001)

23. $\vec{A} = (1, -16)$

$\vec{B} = (2, k)$

$\vec{A} \perp \vec{B}$

$k = ?$

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

(YÖS – 2002)

24.
$$\begin{vmatrix} 2005 & 2001 \\ 2001 & 2005 \end{vmatrix} = ?$$

- A) 16076 B) 16024 C) 16016
D) 16000 E) 15976

(YÖS – 2002)

25.
$$\begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix} = A \cdot \begin{bmatrix} 2 & 3 \\ -3 & 1 \end{bmatrix} + \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$$

$11 \cdot A = ?$

A) $\begin{bmatrix} 5 & 7 \\ 4 & 10 \end{bmatrix}$ B) $\begin{bmatrix} -5 & 7 \\ 4 & 10 \end{bmatrix}$ C) $\begin{bmatrix} -5 & -6 \\ 10 & 4 \end{bmatrix}$

D) $\begin{bmatrix} 5 & -7 \\ 4 & -10 \end{bmatrix}$ E) $\begin{bmatrix} 5 & 7 \\ 10 & 4 \end{bmatrix}$

(YÖS – 2004)

26.
$$\begin{vmatrix} \log_3 4 & -3 \\ 5 & \log_4 9 \end{vmatrix} = ?$$

- A) 10 B) 12 C) 13 D) 16 E) 17

(YÖS – 2004)

27.
$$\begin{bmatrix} 7 & c \\ 3 & a-b \end{bmatrix} = \begin{bmatrix} a+b & 2 \\ d-c & -1 \end{bmatrix}$$

$a \cdot b \cdot c \cdot d = ?$

- A) 20 B) 40 C) 80 D) 100 E) 120

(YÖS – 2005)



28. $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$

$A^4 = ?$

A) $\begin{bmatrix} 1 & 0 \\ 4 & 1 \end{bmatrix}$

B) $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$

C) $\begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix}$

D) $\begin{bmatrix} 1 & 4 \\ 0 & 1 \end{bmatrix}$

E) $\begin{bmatrix} 4 & 1 \\ 0 & 1 \end{bmatrix}$

(YÖS – 2005)

29. $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

$\begin{vmatrix} a.k & b.k \\ c.t & d.t \end{vmatrix} = ?$

A) $k.t. |A|$

B) $4.k.t. |A|$

C) $k^2.t^2. |A|$

D) $2.k^2.t^2. |A|$

E) $2.(k+t). |A|$

(YÖS – 2005)

30. $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

$I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$A^2 - 5A - 2I = ?$

A) $\begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$

B) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

C) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

D) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$

E) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

(YÖS – 2006)

31. $A = \begin{bmatrix} -5 & 1 \\ 3 & -1 \end{bmatrix}$

$A^{-1} = ?$

A) $\begin{bmatrix} \frac{-1}{2} & \frac{-1}{2} \\ \frac{-3}{2} & \frac{-5}{2} \end{bmatrix}$

B) $\begin{bmatrix} -1 & -1 \\ \frac{-3}{2} & -5 \end{bmatrix}$

C) $\begin{bmatrix} \frac{-1}{2} & \frac{1}{2} \\ -3 & \frac{5}{2} \end{bmatrix}$

D) $\begin{bmatrix} -1 & 2 \\ -3 & -5 \end{bmatrix}$

E) $\begin{bmatrix} 5 & 3 \\ 2 & 1 \end{bmatrix}$

(YÖS – 2006)

32. $A = \begin{bmatrix} 2 & 3 \\ 1 & 1 \\ 4 & 6 \end{bmatrix}$

$B = \begin{bmatrix} -3 & 0 & 5 \\ 4 & 1 & -1 \end{bmatrix}$

$A.B = ?$

A) $\begin{bmatrix} 6 & 3 & 7 \\ 1 & 1 & 4 \\ 12 & 6 & 14 \end{bmatrix}$

B) $\begin{bmatrix} -6 & 3 & 7 \\ 1 & -11 & 4 \\ 12 & 6 & -14 \end{bmatrix}$

C) $\begin{bmatrix} -1 & 2 & 3 \\ 1 & 1 & 4 \\ -2 & 4 & 26 \end{bmatrix}$

D) $\begin{bmatrix} -14 & 5 \\ 21 & -7 \end{bmatrix}$

E) $\begin{bmatrix} 14 & 5 \\ 21 & 7 \end{bmatrix}$

(YÖS – 2007)



33. $\begin{vmatrix} 108765 & 108766 \\ 108763 & 108764 \end{vmatrix} = ?$

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

(YÖS – 2007)

36.

$$A = \begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$$

$$A \cdot B^{-1} = ?$$

A) $\begin{bmatrix} -5 & 3 \\ -6 & 4 \end{bmatrix}$ B) $\begin{bmatrix} 5 & 4 \\ 3 & -6 \end{bmatrix}$ C) $\begin{bmatrix} -4 & 3 \\ 2 & 6 \end{bmatrix}$

D) $\begin{bmatrix} 3 & 4 \\ -2 & -6 \end{bmatrix}$ E) $\begin{bmatrix} 4 & -6 \\ 2 & -3 \end{bmatrix}$

(YÖS – 2009)

34. $\begin{bmatrix} x^2 & 1 \\ x^2 - 9 & 0 \end{bmatrix} = \begin{bmatrix} 6x - 9 & 1 \\ 0 & \cos \frac{\pi x}{2} \end{bmatrix}$

$$x = ?$$

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

(YÖS – 2008)

37. $A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$

$$B = \begin{bmatrix} -1 & 1 \\ -2 & 0 \end{bmatrix}$$

$$\det(A + B) = |A + B| = ?$$

- A) -3 B) -2 C) 0 D) 6 E) 8

(YÖS – 2009)

35. $A = \begin{bmatrix} 3 & 2 \\ 9 & 5 \end{bmatrix}$

$$\det(A^{-1}) = ?$$

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

(YÖS – 2008)



1. $4.1 + 3.x = 4 \Rightarrow 3x = 0$
 $x = 0$
 $4.y + 3.(-1) = 5 \Rightarrow 4y = 8$
 $y = 2$

$$x + y = 2$$

Yanıt – Answer : E

2.

$$\begin{vmatrix} 1 & 2 & 1 \\ 6 & 6 & 4 \\ 2 & 1 & 1 \\ 1 & 2 & 1 \\ 6 & 6 & 4 \end{vmatrix}$$

$$\begin{aligned} &= (1.6.1 + 6.1.1 + 2.2.4) - \\ &\quad (2.6.1 + 1.1.4 + 6.2.1) \\ &= 28 - 28 \\ &= 0 \end{aligned}$$

Yanıt – Answer : C

3.

$$X.Y = \begin{bmatrix} 3 & 4 & 1 \\ 5 & 6 & 1 \end{bmatrix}$$

$$X.Y.Z = \begin{bmatrix} 3 & 4 & 1 \\ 5 & 6 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix}$$

Yanıt – Answer : A

4.

$$\begin{vmatrix} 3 & 0 & 1 \\ 0 & 2 & 1 \\ -1 & 0 & 2 \\ 3 & 0 & 1 \\ 0 & 2 & 1 \end{vmatrix}$$

$$= (3.2.2) - (-1.2.1) = 12 + 2 = 14$$

Yanıt – Answer : A

5.

$$C = \begin{bmatrix} \frac{1}{2} & 3 \\ 4 & 2 \end{bmatrix} + 2 \cdot \begin{bmatrix} \frac{1}{4} & \frac{-3}{2} \\ 5 & \frac{1}{4} \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{2} & 3 \\ 4 & 2 \end{bmatrix} + \begin{bmatrix} \frac{1}{2} & -3 \\ 10 & \frac{1}{2} \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 \\ 14 & \frac{5}{2} \end{bmatrix}$$

$$\det C = \left(1 \cdot \frac{5}{2}\right) - (14 \cdot 0) = \frac{5}{2}$$

Yanıt – Answer : C

6.

$$\begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 2 \end{bmatrix} \begin{bmatrix} 3 & 0 \\ -1 & 1 \\ -2 & 0 \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ -5 & 1 \end{bmatrix}$$

Yanıt – Answer : C

7.

$$\begin{aligned} 2b - (-2a) &= 2a - 2b \\ 2b + 2a &= 2a - 2b \\ 4b &= 0 \Rightarrow b = 0 \end{aligned}$$

Yanıt – Answer : C



$$8. \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 5 & 1 & 3 \\ 4 & 2 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 & 3 \\ 4 & 2 & 3 \end{bmatrix} \cdot \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 7 \\ 8 \end{bmatrix}$$

Yanıt – Answer : E

$$12. A^2 = \begin{bmatrix} \sin \alpha & \cos \alpha \\ \cos \alpha & \sin \alpha \end{bmatrix} \cdot \begin{bmatrix} \sin \alpha & \cos \alpha \\ \cos \alpha & \sin \alpha \end{bmatrix}$$

$$= \begin{bmatrix} 1 & \sin 2\alpha \\ \sin 2\alpha & 1 \end{bmatrix}$$

Yanıt – Answer : E

$$9. \begin{bmatrix} 1 & 2 \\ 2 & 0 \\ 1 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 3 & 2 \\ 2 & 2 & 0 \\ 2 & 2 & 1 \end{bmatrix}$$

Yanıt – Answer : A

$$13. A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

$$A^n = 2^{n-1} \cdot \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

$$A^n = 2^5 \cdot \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \Rightarrow n-1=5$$

$$n=6$$

Yanıt – Answer : E

$$10. \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}^{-1} = \frac{1}{3 \cdot 2 - 5 \cdot 1} \begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$$

$$= \frac{1}{1} \begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$$

Yanıt – Answer : E

$$11. 3! = \frac{4!}{x} \Rightarrow 3! = \frac{4 \cdot 3!}{x} \Rightarrow x = 4$$

$$(x-1)! = 2y+2 \Rightarrow 3! = 2y+2$$

$$6-2=2y$$

$$2=y$$

$$x \cdot y = 4 \cdot 2$$

$$= 8$$

Yanıt – Answer : A

$$14. A = \begin{bmatrix} 2y & 2(y^2 + y + 1) \\ 2 & 2(y+1) \end{bmatrix}$$

$$\Rightarrow \det A = 2y \cdot 2(y+1) - 2 \cdot 2(y^2 + y + 1)$$

$$= 4y^2 + 4y - 4y^2 - 4y - 4$$

$$= -4$$

Yanıt – Answer : B



15.

$$\begin{cases} x = 10 \cdot 2 - 5 \cdot 6 = -10 \\ y = 10 \cdot (-4) + 0 = -40 \\ z = 6 \cdot 2 - 2 \cdot 6 = 0 \\ t = 6 \cdot (-4) + 0 = -24 \end{cases}$$

$$\Rightarrow \begin{bmatrix} x & y \\ z & t \end{bmatrix} = \begin{bmatrix} -10 & -40 \\ 0 & -24 \end{bmatrix}$$

Yanıt – Answer : D

18.

$$\begin{vmatrix} 0 & -1 & 2 \\ 2 & 3 & a \\ 1 & 0 & 2 \end{vmatrix} = -13$$

$$\begin{aligned} \Rightarrow -4 - a - (6 - 2) &= -13 \\ -4 - a - 4 &= -13 \\ -a &= -5 \\ a &= 5 \end{aligned}$$

$$\begin{vmatrix} 5 & 4 \\ 1 & 5 \end{vmatrix} = 25 - 4 = 21$$

Yanıt – Answer : E

16.

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & a & 10 \\ -10 & 0 & 2 \end{vmatrix}$$

$$\begin{aligned} 2a + 0 - 200 - (-30a + 0 + 16) &= -56 \\ 2a - 200 + 30a - 16 &= -56 \\ 32a &= 160 \\ a &= 5 \\ a^2 - 2a + 1 &= (a - 1)^2 \\ &= (5 - 1)^2 \\ &= 16 \end{aligned}$$

Yanıt – Answer : D

19.

$$\begin{vmatrix} 3 & x & 0 \\ 1 & 5 & 4 \\ 1 & 6 & 3 \end{vmatrix} = -103$$

$$\begin{aligned} -45 + 4x - (72 - 3x) &= -103 \\ -45 + 4x - 72 + 3x &= -103 \\ 7x &= -103 + 117 \\ 7x &= 14 \\ x &= 2 \end{aligned}$$

Yanıt – Answer : A

$$17. \begin{bmatrix} 3 & 3 \\ 7 & 7 \end{bmatrix} \cdot \begin{bmatrix} a & a \\ 1 & b \end{bmatrix} = \begin{bmatrix} 3a+3 & 3a+3b \\ 7a+7 & 7a+7b \end{bmatrix} = \begin{bmatrix} 33 & 33 \\ 77 & 77 \end{bmatrix}$$

$$\begin{cases} 3a+3=33 \Rightarrow 3a=30 \Rightarrow a=10 \\ 3a+3b=33 \Rightarrow 30+3b=33 \Rightarrow b=1 \end{cases}$$

$$a+b=10+1=11$$

Yanıt – Answer : E

20.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -2 & 3 & 0 \\ 0 & 0 & 0 & 4 \\ 0 & 0 & 5 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ -4 \\ 10 \end{bmatrix}$$

$$\begin{cases} x_1 = 1 \\ -2x_2 + 3x_3 = 0 \\ 4x_4 = -4 \\ 5x_3 = 10 \end{cases} \Rightarrow (x_1, x_2, x_3, x_4) = (1, 3, 2, -1)$$

Yanıt – Answer : C



21. $1.x + 0.y + 0.z = 3 \Rightarrow x = 3$

$0.x + 2.y + 0.z = 2 \Rightarrow y = 1$

$0.x + 0.y + 3.z = 6 \Rightarrow z = 2$

$\Rightarrow x + y + z = 3 + 1 + 2 = 6$

Yanıt – Answer : C

22.

$$\begin{vmatrix} 2 & a & 4 \\ a & 0 & -a \\ 0 & 5 & -1 \\ 2 & a & 4 \\ a & 0 & -a \end{vmatrix}$$

$20a + 10a + a^2 = 400$

$\Rightarrow a^2 + 30a - 400 = 0$

$(a - 10)(a + 40) = 0$

$0 < a \Rightarrow a = 10$

Yanıt – Answer : A

23. $\vec{A} \perp \vec{B}$

$\vec{A} \cdot \vec{B} = 0$

$(1, -16) \cdot (2, k) = 0$

$2 - 16k = 0$

$\frac{1}{8} = k$

Yanıt – Answer : E

24. $\begin{vmatrix} a & b \\ b & a \end{vmatrix} = a^2 - b^2$

$= (a - b)(a + b)$

$= (2005 - 2001)(2005 + 2001)$

$= 4.4006$

$= 16024$

Yanıt – Answer : B

25. $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ olsun.

$\begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix} - \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} = A \cdot \begin{bmatrix} 2 & 3 \\ -3 & 1 \end{bmatrix}$

$\begin{bmatrix} -1 & 2 \\ -2 & 2 \end{bmatrix} = A \cdot \begin{bmatrix} 2 & 3 \\ -3 & 1 \end{bmatrix}$

$\begin{bmatrix} -1 & 2 \\ -2 & 2 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 \\ -3 & 1 \end{bmatrix}$

$2a - 3b = -1$

$3a + b = 2 \Rightarrow a = \frac{5}{11} \quad b = \frac{7}{11}$

$2c - 3d = -2$

$3c + d = 2 \Rightarrow c = \frac{4}{11} \quad d = \frac{10}{11}$

$A = \begin{bmatrix} \frac{5}{11} & \frac{7}{11} \\ \frac{4}{11} & \frac{10}{11} \end{bmatrix} \Rightarrow 11 \cdot A = \begin{bmatrix} 5 & 7 \\ 4 & 10 \end{bmatrix}$

Yanıt – Answer : A

26. $\begin{vmatrix} \log_3 4 & -3 \\ 5 & \log_4 9 \end{vmatrix} = \log_3 4 \cdot \log_4 9 - (-3) \cdot 5$

$= \log_3 9 + 15$

$= \log_3 3^2 + 15$

$= 2\log_3 3 + 15$

$= 2 + 15$

$= 17$

Yanıt – Answer : E



$$27. \begin{bmatrix} 7 & c \\ 3 & a-b \end{bmatrix} = \begin{bmatrix} a+b & 2 \\ d-c & -1 \end{bmatrix}$$

$$a+b=7 \quad c=2$$

$$d-c=3 \quad a-b=-1$$

$$\begin{array}{lcl} a+b=7 & c=2 & \\ \underline{a-b=-1} & d-c=3 \Rightarrow d=5 & \\ a=3 & & \\ b=4 & & \end{array}$$

$$a \cdot b \cdot c \cdot d = 3 \cdot 4 \cdot 2 \cdot 5 = 120$$

Yanıt – Answer : E

$$28. A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$$

$$A^2 = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$$

$$A^4 = A^2 \cdot A^2 = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 0 & 1 \end{bmatrix}$$

Yanıt – Answer : D

$$29. A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$|A| = a \cdot d - b \cdot c$$

$$\begin{vmatrix} a \cdot k & b \cdot k \\ c \cdot t & d \cdot t \end{vmatrix} = a \cdot d \cdot k \cdot t - b \cdot c \cdot k \cdot t$$

$$= k \cdot t \cdot (a \cdot d - b \cdot c)$$

$$= k \cdot t \cdot |A|$$

Yanıt – Answer : A

$$30. A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$A^2 = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix}$$

$$5A = \begin{bmatrix} 5 & 10 \\ 15 & 20 \end{bmatrix}$$

$$2I = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$

$$A^2 - 5A - 2I =$$

$$= \begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix} - \begin{bmatrix} 5 & 10 \\ 15 & 20 \end{bmatrix} - \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

Yanıt – Answer : C

$$31. A = \begin{bmatrix} -5 & 1 \\ 3 & -1 \end{bmatrix}$$

$$A^{-1} = \frac{1}{|A|} \cdot \begin{bmatrix} -1 & -1 \\ -3 & -5 \end{bmatrix}$$

$$\Rightarrow |A| = 2$$

$$A^{-1} = \frac{1}{2} \cdot \begin{bmatrix} -1 & -1 \\ -3 & -5 \end{bmatrix}$$

$$= \begin{bmatrix} -\frac{1}{2} & -\frac{1}{2} \\ -\frac{3}{2} & -\frac{5}{2} \end{bmatrix}$$

Yanıt – Answer : A



$$32. \quad A.B = \begin{bmatrix} 2 & 3 \\ 1 & 1 \\ 4 & 6 \end{bmatrix} \cdot \begin{bmatrix} -3 & 0 & 5 \\ 4 & 1 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} 6 & 3 & 7 \\ 1 & 1 & 4 \\ 12 & 6 & 14 \end{bmatrix}$$

Yanıt – Answer : A

$$33. \quad 108763 = a$$

$$\begin{vmatrix} 108765 & 108766 \\ 108763 & 108764 \end{vmatrix}$$

$$= \begin{vmatrix} a+2 & a+3 \\ a & a+1 \end{vmatrix}$$

$$= (a+2) \cdot (a+1) - a \cdot (a+3)$$

$$= a^2 + 2a + 2 - a^2 - 3a$$

$$= 2$$

Yanıt – Answer : B

$$34. \quad \begin{bmatrix} x^2 & 1 \\ x^2 - 9 & 0 \end{bmatrix} = \begin{bmatrix} 6x - 9 & 1 \\ 0 & \cos \frac{\pi x}{2} \end{bmatrix}$$

$$\left. \begin{aligned} x^2 &= 6x - 9 \Rightarrow x^2 - 6x + 9 = 0 \\ (x - 3)^2 &= 0 \Rightarrow x = 3 \\ \cos \frac{\pi x}{2} &= 0, \quad x = 3 \Rightarrow \cos \frac{3\pi}{2} = 0 \end{aligned} \right\} x = 3$$

Yanıt – Answer : E

$$35. \quad \det(A^{-1}) = (\det(A))^{-1}$$

$$\det(A) = \begin{vmatrix} 3 & 2 \\ 9 & 5 \end{vmatrix} = 3 \cdot 5 - 2 \cdot 9 = 15 - 18 = -3$$

$$= (\det(A))^{-1} = (-3)^{-1} = -\frac{1}{3}$$

Yanıt – Answer : A

$$36. \quad B = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$$

$$\Rightarrow B^{-1} = \frac{1}{2 \cdot 2 - 3 \cdot 1} \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix}$$

$$A.B^{-1} = \begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} -5 & 3 \\ -6 & 4 \end{bmatrix}$$

Yanıt – Answer : A

$$37. \quad A+B = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} + \begin{bmatrix} -1 & 1 \\ -2 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} 1-1 & 2+1 \\ 0-2 & 3+0 \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ -2 & 3 \end{bmatrix}$$

$$|A+B| = \begin{vmatrix} 0 & 3 \\ -2 & 3 \end{vmatrix} = 0 \cdot 3 - (-2) \cdot 3 = 0 - (-6) = 6$$

Yanıt – Answer : D

CEVAP ANAHTARI – (ANSWERS)

1. Bölüm SAYILAR

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

2. Bölüm RASYONEL SAYILAR

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

3. Bölüm ÜSLÜ SAYILAR

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

4. Bölüm
KÖKLÜ SAYILAR

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

5. Bölüm
BİRİNCİ DERECE DENKLEMLER

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

6. Bölüm
ORAN – ORANTI

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

7. Bölüm

KÜMELER – ARALIKLAR

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

8. Bölüm

BASİT EŞİTSİZLİKLER – MUTLAK DEĞER

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

9. Bölüm

ÇARPANLARA AYIRMA

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

10. Bölüm

POLİNOMLAR

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

11. Bölüm

FONKSİYONLAR

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

12. Bölüm

MODÜLER ARİTMETİK

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

13. Bölüm

İKİNCİ DERECEDEN DENKLEMLER

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

14. Bölüm

EŞİTSİZLİKLER

15. Bölüm

PARABOL

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

16. Bölüm
TRİGONOMETRİ

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

17. Bölüm
LOGARİTMA

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

18. Bölüm
KARMAŞIK SAYILAR

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

19. Bölüm
TOPLAM – ÇARPIM SEMBOLLERİ

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

20. Bölüm

LİMİT

Test - 1

Test - 2

Test - 3

Test - 4

Test - 5

Test - 6

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

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

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

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

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

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

21. Bölüm

TÜREV

Test - 1

Test - 2

Test - 3

Test - 4

Test - 5

Test - 6

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

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

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

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

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

1. A 9. D
2. E 10. E
3. A 11. D
4. C 12. C
5. B
6. B
7. C
8. D

22. Bölüm

İNTEGRAL

Test - 1

Test - 2

Test - 3

Test - 4

Test - 5

Test - 6

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

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

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

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

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

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

MATRİS – DETERMİNANT**Test - 1**

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

Test - 2

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

Test - 3

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

Test - 4

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