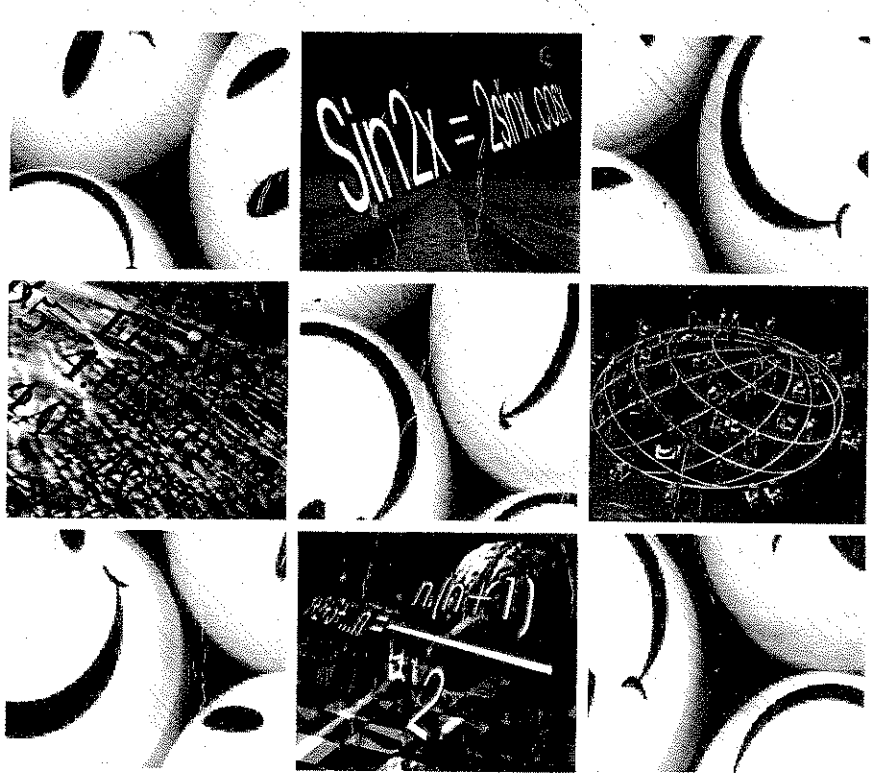
MATEMATİK
MATHEMATICS

Konu Anlatımlı - Örnek Çözümlü

Theory and Practices

YÖS

YABANCI UYRUKLU ÖĞRENCİ SINAVI



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ALTINCI BASKI SIXTH EDITION

METROPOL

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ÖNSÖZ

Sevgili YÖS adayları;

Türkiye'deki üniversitelerde öğrenim görmek isteyen yabancı uyruklu öğrencilerin YÖS'e (Yabancı Uyruklu Öğrenci Sınavı) girmeleri gerekmektedir. **YÖS,** temel öğrenme becerileri testi ve Türkçe testi olmak üzere iki ayrı testten oluşmaktadır. Türkiye'de bir üniversitenin herhangi bir bölümüne başvurabilmeniz için, temel öğrenme becerileri testinden 40 puan barajını geçmeniz gerekmektedir. 80 sorudan oluşan testin 30 sorusunun matematik olduğu düşünülürse, matematik sorularını doğru yanıtlamanız sınavdan yüksek puan almanız da belirleyici olacaktır.

METROPOL, YÖS'e hazırlanan öğrencilere 15 yıldır, kurs, yayın desteği sağlayan ve rehberlik hizmetleri sunan bir eğitim kurumudur.

Bu kitap, **METROPOL**'ün uzman öğretmen kadrosu tarafından hazırlanmış olup, 1200 çözümlü soru, 450 alıştırma sorusu ve 2078 test sorusundan oluşmaktadır. Örnek sorular, 1981 – 2007 tarihleri arasındaki YÖS sorularının çözümlerini içermektedir.

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METROPOL YAYINLARI

PREFACE

Dear YÖS candidates;

Foreign students, who want to study at Turkish universities, to be entered YÖS (foreign student exam) is definitely required. **YÖS,** is composed of two different sections including the basic learning skills test and Turkish language test.

In order to apply for a department of any university in Turkey, you have to succeed in the basic learning skills test with minimum 40 score.

Considering that 30 questions of this test are related to matematik issues, the number of your correct questions will directly determine that you can get a significant high score.

METROPOL is a distinguished educational institution which has provided students a comprehensive training support with both courses and publications 15 years. In paralell to that, **METROPOL** has been in the service of guidance for you.

This book has been prepared by the expert educator staff of **METROPOL DERSHANELERİ.** The book; includes 2078 test questions, 450 exercises and 1200 solved problems. Moreover, examples include all YÖS questions (1981 – 2007).

We, as **METROPOL DERSHANELERİ,** advise you that you get technical educational support from our expert educator staff and that you participate into our preparation courses for YÖS.

We wish you became succesfull in YÖS exam for all our students. **Welcome to TURKEY.**

With our best wishes

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TEŞEKKÜR

Bu kitabın, 6. baskısının genişletilmesinde ve düzeltilmesinde emeği geçen sayın,

İsmail DİLEK,

Ufuk Taner GENEL,

Ramazan KARACA'ya

teşekkür ederiz.

METROPOL YAYINLARI

THANKS TO

Special Regards and Thanks to...

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for the Considerable and valuable efforts they did to get this book's 6th edition to the best of what it could ever be.

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İÇİNDEKİLER

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SAYILAR / NUMBERS

BÖLÜM 1
CHAPTER

TEMEL KAVRAMLAR / *THE BASIC TERMS*

Rakam: 0, 1, 2, 3, 4, 5, 6, 7, 8 ve 9 sayılarını ifade etmek için kullanılan sembollerdir.

Örneğin; 285 sayısında rakamlar; 2, 8 ve 5 tir.

Digit: *Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 wed to write numbers.*

For example, the digits in the number 285 are 2, 8 and 5.

Sayı: Çokluk belirtecek şekilde bir araya getirilen rakamlar grubudur.

Number: *It is a group of digits expressing a quantity.*

$11, 8, 0, -15, \sqrt{3}, \frac{3}{5}$

SAYI KÜMELERİ / *NUMBER SETS*

$N^+ = \{1, 2, 3, 4, \ldots\}$ Sayma sayıları (Pozitif doğal sayılar)

The counting numbers (The positive naturel numbers)

$N = \{0, 1, 2, 3, \ldots\}$ Doğal sayılar / *The natural numbers*

$Z = \{\ldots, -3, -2, -1, 0\ 1, 2, 3, \ldots\}$ Tamsayılar / *The integers*

$Z^+ = \{1, 2, 3, \ldots\}$ Pozitif tamsayılar / *The positive integers*

$Z^- = \{\ldots, -3, -2, -1\}$ Negatif tamsayılar

The negative integers

$Q = \{x \mid x = \frac{a}{b}, a,b \in Z \text{ ve (and) } b \neq 0\}$ Rasyonel sayılar

The rational numbers

SAYILARIN ÖZELLİKLERİ / *PROPERTIES of NUMBERS*

1. $a, b, c \in Z$
   - i. $a = b \Leftrightarrow a + c = b + c$
   - ii. $a = b \Leftrightarrow a \cdot c = b \cdot c$
   - iii. $a = b \Leftrightarrow \frac{a}{c} = \frac{b}{c}, c \neq 0$
   - iv. $a = b$ ve (and) $b = c \Leftrightarrow a = c$
   - v. $a = b \Rightarrow a^n = b^n, n \neq 0$
2. $a < b \Leftrightarrow a + c < b + c$
3. $a < b$ ve (and) $c > 0 \Leftrightarrow a \cdot c < b \cdot c$
4. $a < b$ ve (and) $c < 0 \Leftrightarrow a \cdot c > b \cdot c$
5. $a < b \Leftrightarrow a < \frac{a+b}{2} < b$
6. $a, b \in Z^+$ ve (and) $a < b \Leftrightarrow a^2 < b^2$
7. $a, b \in Z^-$ ve (and) $a < b \Leftrightarrow a^2 > b^2$

FAKTÖRİYEL / *FACTORIAL*

Tanım: 1' den n' ye kadar ardışık doğal sayıların çarpımına n faktöriyel denir.

Definition: *Multiplication of the natural numbers from 1 to n in sequence is called n factorial.*

$n! = 1 \cdot 2 \cdot 3 \cdot 4 \ldots (n-2) \cdot (n-1) \cdot n$

$n! = (n-1)! \cdot n$

$n! = (n-2)! \cdot (n-1) \cdot n$

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

$0! = 1! = 1$

$2! = 1 \cdot 2 = 2$

$3! = 1 \cdot 2 \cdot 3 = 6$

$4! = 1 \cdot 2 \cdot 3 \cdot 4 = 24$

$5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 = 120$

Temel Özellikler / *The Basic Properties*

$\forall n \in N^+ \Rightarrow$

1. $n! + (n+1)! = n!(n+2)$
2. $(n+1)! - n! = n! \cdot n$
3. $n! + (n+1)! + (n+2)! = n! \cdot (n+2)^2$

Örnek / Example 1:

$$\frac{6! + 7! + 8!}{64 \cdot (4! + 5!)} = ?$$

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

Çözüm / Solution:

$$\frac{6! + 7! + 8!}{64 \cdot (4! + 5!)} = \frac{6! \cdot 64}{64 \cdot (4! \cdot 6)} = \frac{4! \cdot 5 \cdot 6}{4! \cdot 6} = 5$$

Yanıt / Answer B

Örnek / Example 2:

$$\frac{(2n)!}{(2n-1)! \cdot (n^2 - n)} = \frac{2}{9} \Rightarrow n = ?$$

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

Çözüm / Solution:

$$\frac{(2n-1)!(2n)}{(2n-1)!n(n-1)} = \frac{2}{9} \Rightarrow \frac{2}{n-1} = \frac{2}{9}$$

$$n - 1 = 9 \Rightarrow n = 10$$

Yanıt / Answer D

Örnek / Example 3:

$$\frac{n! - (n-2)! \cdot n}{(n-2)!} = 63 \Rightarrow \mathbf{n = ?}$$

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

Çözüm / Solution:

$$\frac{(n-2)!(n-1)n - (n-2)!n}{(n-2)!} = 63$$

$$\frac{(n-2)!(n^2 - n - n)}{(n-2)!} = 63$$

$$n^2 - 2n = 63$$

$$n(n-2) = 9 \cdot 7 \Rightarrow n = 9$$

Yanıt / Answer E

PERMÜTASYON / *PERMUTATION*

Tanım: A kümesi, **n** elemanlı bir küme ve **r ≤ n** olmak üzere, A kümesinin birbirinden farklı r elemanının sıralanışına A kümesinin r'li permütasyonu denir. Permütasyon **P** ile gösterilir.

Definition: *Providing that the set A has n elements and r ≤ n, a line up of r distinct elements of the set A is called, a permutation of r out of the set A.*

Permütasyon sayısı / *The Permutations number*

$$P(n, r) = \frac{n!}{(n-r)!}$$

Özellik 1 / *Feature* 1: $P(n, n) = \frac{n!}{(n-n)!} = n!$

Özellik 2 / *Feature* 2: $P(n, 0) = \frac{n!}{(n-0)!} = 1$

KOMBİNASYON / *THE COMBINATION*

Tanım: **n** elemanlı bir kümenin **r** elemanlı alt kümelerinin sayısına n'nin r'li kombinasyonu denir.

Definition: *The number of subsets with r elements of a set with n elements is called the combination of r out of n elements.*

Kombinasyon sayısı / ***The Combinations number***

$$C(n, r) = \frac{n!}{r!(n-r)!}$$

Örnek / Example 4: P(10, 2) = ?

Çözüm / Solution:

$$P(10,2) = \frac{10!}{(10-2)!} = \frac{10!}{8!} = \frac{10 \cdot 9 \cdot 8!}{8!} = 90$$

Örnek / Example 5: C(7,3) = ?

Çözüm / Solution:

$$C(7,3) = \frac{7!}{3! \cdot (7-3)!} = \frac{7!}{3! \cdot 4!} = \frac{7 \cdot 6 \cdot 5 \cdot 4!}{3 \cdot 2 \cdot 1 \cdot 4!} = 35$$

Dizi : Belirli bir kurala göre ilerleyen terimler topluluğudur.

Sequence: *It is a group of terms going forward with a certain rule.*

A = {1, 2, 3, ... n... }, B = {2, 4, 6, ... 2n ...}

Dizi örnekleri / ***Examples of sequences***

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

ii. $2 + 4 + 6 + ...+ 2n = n \cdot (n+1)$

iii. $1 + 3 + 5 + 7 + ... + (2n-1) = n^2$

Örnekler / Examples:

1. $1 + 2 + 3 + ... + 19 = \frac{19 \cdot (19+1)}{2} = 190$
2. $2 + 4 + 6 + ... + 42 = 21 \cdot (21+1) = 462$
3. $1 + 3 + 5 + ... + 37 = 19^2 = 361$

TABAN ARİTMETİĞİ / *THE BASE ARITHMETICS*

Tanım: Sayının tanımlandığı sayma sistemi tabanı oluşturur. Bu tabanda yapılan işlemlere de taban aritmetiği adı verilir.

Definition: *The countion system on which the number is defined forms the base. Operations that are being done in the base are called base arithmetics.*

i. Farklı Tabanda Verilen Bir Sayının Onluk Tabana Dönüştürülmesi / *Converting a number, which is given in a diffirent base to the base 10.*

a, b, c, d birer rakam, $t \in N^+$ ve a, b, c, d < t olmak üzere

Provided that a, b,c,d are numbers , $t \in N^+$ and a,b,c,d < t

$(a\ b\ c\ d)_t = a\cdot t^3 + b\cdot t^2 + c\cdot t + d$

$d \cdot t^0$, $c \cdot t^1$, $b \cdot t^2$, $a \cdot t^3$

$(a\ b,\ c\ d)_t = a\cdot t^1 + b\cdot t^0 + c\cdot t^{-1} + d\cdot t^{-2}$

$d \cdot t^{-2}$, $c \cdot t^{-1}$, $b \cdot t^0$, $a \cdot t^1$

ii. Onluk Tabandan Başka Bir Tabana Çevirme

Conversion from the base 10 to any other base

Örnek / Example 6: $63 = (\ ?\ )_5$

$$\begin{array}{r|l} 63 & 5 \\ -60 & 12 \\ \hline 3 & -10\ \ 2 \\ & 2 \end{array}$$

$63 = (223)_5$

Örnek / Example 7:

$(11011)_2 = (\ ?\ )_{10}$

Çözüm / Solution:

$(1\ 1\ 0\ 1\ 1)_2 = 1 + 2 + 0 + 8 + 16 = 27$

$1\cdot 2^0$, $1\cdot 2^1$, $0\cdot 2^2$, $1\cdot 2^3$, $1\cdot 2^4$

Örnek / Example 8:

$a \in Z^+$,

$a\cdot(xxx)_4 = 147 \Rightarrow \dfrac{a}{x} = ?$

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

Çözüm / Solution:

$a\cdot(xxx)_4 = 147 \Rightarrow a(4^2x + 4x + x) = 147$

$21\cdot a\cdot x = 147 \Rightarrow a\cdot x = 7 \quad (x < 4)$

$x = 1 \wedge a = 7$

$\dfrac{a}{x} = \dfrac{7}{1} = 7$

Yanıt / Answer A

Örnek / Example 9:

$(abc)_6 + (cab)_6 + (bca)_6 = 473,\ b + c = 7 \Rightarrow \mathbf{a = ?}$

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

Çözüm / Solution:

$(abc)_6 + (cab)_6 + (bca)_6 = 473$

$36a + 6b + c + 36c + 6a + b + 36b + 6c + a = 473$

$43a + 43b + 43c = 473$

$a + b + c = 11$

$b + c = 7$

$\Rightarrow a + 7 = 11 \Rightarrow a = 4$

Yanıt / Answer B

Örnek / Example 10:

$(abc)_9 - (321)_4 = (432)_5 \Rightarrow \mathbf{2\cdot a + 3\cdot c = ?}$

A) 13 B) 15 C) 17 D) 21 E) 23

Çözüm / Solution:

$(abc)_9 = (432)_5 + (321)_4$

$= 4\cdot 5^2 + 3\cdot 5 + 2 + 3\cdot 4^2 + 2\cdot 4 + 1$

$= 100 + 15 + 2 + 48 + 9$

$= 174$

$$\begin{array}{r|l} 174 & 9 \\ -\ \ 19 & 9 \\ \hline 3\ \ 18 & 2 \\ 1 & \end{array}$$

$(abc)_9 = (213)_9$ ve (and)

$a = 2,\ b = 1,\ c = 3$

$\Rightarrow 2\cdot a + 3\cdot c = 2\cdot 2 + 3\cdot 3 = 4 + 9 = 13$

Yanıt / Answer A

İŞLEM ÖNCELİĞİ / *THE ORDER of OPERATIONS*

Matematiksel işlemler aşağıdaki sıra izlenerek yapılır.

Mathematical operations are done by following the ordered operations given below.

1. Parantez içindeki işlemler / *Operations in paranthesis*
2. Çarpma ve Bölme / *Multiplication and Division*
3. Toplama ve Çıkarma / *Addition and Substraction*

Örnek / Example 11: $(4 + 3)\cdot 2 - 5 = ?$

$(4 + 3)\cdot 2 - 5 = 7\cdot 2 - 5 = 14 - 5 = 9$

ÇÖZÜMLÜ TEST / *TEST WITH SOLUTIONS*

1. **$-2-3-5\cdot 2+6:2=?$**

A) -12 B) -8 C) -2 D) 3 E) 8

Çözüm / Solution:

$$-2-3-5\cdot 2+6:2=-2-3-10+3$$
$$=-12$$

Yanıt / Answer A

2. **$-1-[3-4\cdot 3]+1-2=?$**

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

Çözüm / Solution:

$$-1-[3-4\cdot 3]+1-2=-1-[3-12]-1$$
$$=-1-(-9)-1$$
$$=7$$

Yanıt / Answer E

3. **$-3-(-8)+1:2=?$**

A) -9 B) $-\frac{21}{4}$ C) $\frac{11}{2}$ D) 9 E) $\frac{23}{2}$

Çözüm / Solution:

$$-3-(-8)+1:2=-3+8+\frac{1}{2}=5+\frac{1}{2}=\frac{11}{2}$$

Yanıt / Answer C

4. **$a-(b+1)-[2-(a+1)]+b-2a=?$**

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

Çözüm / Solution:

$$a-(b+1)-[2-(a+1)]+b-2a$$
$$=a-b-1-[2-a-1]+b-2a$$
$$=a-1-(-a)-2a$$
$$=a-1-1+a-2a$$
$$=-2$$

Yanıt / Answer A

5. **$(a-c+b)-(a+b-c)=?$**

A) 2a B) b C) 0 D) 1 E) c

Çözüm / Solution:

$$(a-c+b)-(a+b-c)=a-c+b-a-b+c$$
$$=0$$

Yanıt / Answer C

6. **$x, y, z \in Z^+$ ve $2x+3y+6z=48 \Rightarrow x_{max}=?$**

A) 12 B) 16 C) 18 D) 24 E) 36

Çözüm / Solution:

$$2x+3y+6z=48$$
$$y=2,\ z=1,\ x=18$$

Yanıt / Answer C

7. **$10+12+14+16+.....+104+106=?$**

A) 2354 B) 2576 C) 2842
D) 3458 E) 3652

Çözüm / Solution:

$$10+12+14+16+....+104+106$$
$$=2\cdot(5+6+7+....+52+53)$$
$$=2\cdot\left(\frac{53\cdot 54}{2}-\frac{4\cdot 5}{2}\right)$$
$$=2\cdot(53\cdot 27-10)$$
$$=2\cdot(1431-10)$$
$$=2\cdot 1421$$
$$=2842$$

Yanıt / Answer C

8.
$$\left.\begin{array}{r} 32a \\ \times\quad \cdot 5 \\ \cdots\cdot \\ +\ bcd \\ \hline 4920 \end{array}\right\} \Rightarrow a+b+c+d=?$$

A) 21 B) 22 C) 23 D) 25 E) 32

Çözüm / Solution:

$$\left.\begin{array}{r} 32a \\ \times\quad \cdot 5 \\ \cdots\cdot \\ +\ bcd \\ \hline 4920 \end{array}\right\} \begin{array}{l} a=8 \\ b=3 \\ c=2 \\ d=8 \end{array} \Rightarrow a+b+c+d=21$$

Yanıt / Answer A

9.

$$\begin{array}{r|l} yxy & yy \\ \hline -\,yxy & yy \\ \hline 000 & \end{array} \quad \Rightarrow \quad \mathbf{x+y=?}$$

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

Çözüm / Solution:

$$yxy = (yy)\,.\,(yy)$$
$$100y + 10x + y = (10y + y)\cdot(10y + y)$$
$$101y + 10x = 11y \cdot 11y$$
$$101y + 10x = 121\,y^2$$
$$\Rightarrow y = 1,\ x = 2$$
$$x + y = 3$$

Yanıt / Answer C

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

$3x + 4y = 24 \Rightarrow \mathbf{x + y = ?}$

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

Çözüm / Solution:

$$3x + 4y = 24$$
$$x = 4,\ y = 3$$
$$x + y = 7$$

Yanıt / Answer C

11. $x, y, z \in Z^+$

$$\left.\begin{array}{l} x \cdot y = 3 \\ x \cdot z = 2 \end{array}\right\} \Rightarrow \mathbf{x + y + z = ?}$$

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

Çözüm / Solution:

$$\left.\begin{array}{l} x\,.\,y = 3 \\ x\,.\,z = 2 \end{array}\right\} \begin{array}{l} x = 1 \\ \Rightarrow y = 3 \\ z = 2 \end{array}$$

$$x + y + z = 6$$

Yanıt / Answer E

12. $a, b \in Z,\ b < 0 < a,$

$(a - b) \cdot (a + b) = -17 \Rightarrow \mathbf{b = ?}$

A) -9 B) -8 C) -6 D) -4 E) -1

Çözüm / Solution:

$$(a - b) \cdot (a + b) = -17$$
$$\begin{array}{r} a - b = 17 \\ +\ a + b = -1 \\ \hline 2a = 16 \\ a = 8 \\ b = -9 \end{array}$$

Yanıt / Answer A

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

$$\left.\begin{array}{l} a^2 \cdot b < 0 \\ b \cdot c < 0 \\ c - a < 0 \end{array}\right\} \Rightarrow \mathbf{? < ? < ?}$$

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

Çözüm / Solution:

$$a^2 \cdot b < 0 \Rightarrow b < 0$$
$$b \cdot c < 0 \Rightarrow c > 0$$
$$c - a < 0 \Rightarrow c < a$$
$$\Rightarrow b < c < a$$

Yanıt / Answer B

14.

$$\begin{array}{r|l} 1A8 & B5 \\ \hline -\,\cdots & 7 \\ \hline 3 & \end{array}, \quad A \neq 0 \Rightarrow \mathbf{A = ?}$$

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

Çözüm / Solution:

$B = 1 \Rightarrow A = 0$
$B = 2 \Rightarrow A = 7$
$A \neq 0 \Rightarrow A = 7$

Yanıt / Answer D

15. $10! + 8! = 91 \cdot n! \Rightarrow n = ?$

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

Çözüm / Solution:

$$10! + 8! = 91 \cdot n!$$
$$8! \cdot (9 \cdot 10 + 1) = 91 \cdot n!$$
$$8! \cdot 91 = 91 \cdot n!$$
$$n = 8$$

Yanıt / Answer C

16. $\frac{15! + 14!}{15! - 14!} = ?$

A) $\frac{14}{13}$ B) $\frac{8}{7}$ C) $\frac{15}{14}$ D) $\frac{15}{4}$ E) $\frac{4}{3}$

Çözüm / Solution:

$$\frac{15!+14!}{15!-14!} = \frac{14! \cdot (15+1)}{14! \cdot (15-1)} = \frac{16}{14} = \frac{8}{7}$$

Yanıt / Answer B

17. $\frac{10! - 5 \cdot 9!}{45 \cdot 8!} = ?$

A) 15 B) 5 C) 3 D) 2 E) 1

Çözüm / Solution:

$$\frac{10!-5 \cdot 9!}{45 \cdot 8!} = \frac{8! \cdot (9 \cdot 10 - 5 \cdot 9)}{8! \cdot 45} = \frac{45}{45} = 1$$

Yanıt / Answer E

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

A) $n + 1$ B) $(n + 1) \cdot (n + 2)$ C) $(n + 1)^2$

D) $n^2 + 3n + 3$ E) $n^2 + 5n + 1$

Çözüm / Solution:

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

Yanıt / Answer B

19. $15! - a \cdot 13! = 105 \cdot 13! \Rightarrow a = ?$

A) 82 B) 90 C) 100

D) 105 E) 130

Çözüm / Solution:

$$15! - a \cdot 13! = 105 \cdot 13!$$
$$13! \, (14 \cdot 15 - a) = 105 \cdot 13!$$
$$210 - a = 105$$
$$a = 105$$

Yanıt / Answer D

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

A) $\frac{n+1}{n+2}$ B) $n + 1$ C) $\frac{n+1}{n!}$

D) n E) $\frac{n+2}{n!}$

Çözüm / Solution:

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

Yanıt / Answer A

21. $C(7, 5) = \binom{7}{5} = ?$

A) 18 B) 21 C) 24 D) 27 E) 30

Çözüm / Solution:

$$C(7, 5) = \binom{7}{5} = \frac{7!}{(7-2)! \, . \, 2!}$$
$$= \frac{7 \, . \, 6 \, . \, 5!}{5! \, . \, 2 \, . \, 1}$$
$$= 21$$

Yanıt / Answer B

YÖS SORULARI / *YÖS QUESTIONS*

1. $25 + 27 + 29 + ... + (2n - 1) = 1456 \Rightarrow$ **n = ?**

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

(YÖS 1998)

Çözüm / Solution:

$N_1 = 1 + 3 + 5 + ... + (2n - 1) = n^2$

$N_2 = 1 + 3 + 5 + ... + 23 = 12^2$

$2n - 1 = 23$

$2n = 24 \Rightarrow$

$N_1 - N_2 = n^2 - 122 = 1456$

$n^2 = 1456 + 144 = 1600 \Rightarrow n = 40$

Yanıt / Answer D

2. **4 + 8 + 12 + ... + 44 + 48 = ?**

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

(YÖS 2001)

Çözüm / Solution:

$4 \cdot (1 + 2 + 3 + ... + 11 + 12)$

$= 4 \cdot \frac{12 \cdot 13}{2} = 312$

Yanıt / Answer A

3.
$$\begin{array}{r} KL \\ \times\ \ L \\ \hline 624 \end{array} \Rightarrow \mathbf{K = ?}$$

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

(YÖS 2001)

Çözüm / Solution:

L 8'e eşit olmalıdır. Buna göre,

L must be equal to 8. Then,

$$\begin{array}{r} K8 \\ \times\ \ 8 \\ \hline 624 \end{array} \Rightarrow 8K + 6 = 62$$

$8K = 56$

$K = 7$

Yanıt / Answer C

4. $P(n, r) = \frac{n!}{(n-r)!}$

$P(4, 2) = 3 \cdot P(k, 1) \Rightarrow$ **k = ?**

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

(YÖS 2001)

Çözüm / Solution:

$P(4, 2) = \frac{4!}{(4-2)!} = \frac{4 \cdot 3 \cdot 2!}{2!} = 12$

$\Rightarrow 12 = 3 \cdot \frac{k!}{(k-1)!} \Rightarrow 4 = \frac{k \cdot (k-1)!}{(k-1)!} \Rightarrow k = 4$

Yanıt / Answer E

5. $C(n, r) = \frac{n!}{r!\,(n-r)!}$

$C(5, 3) = C(k, 2) \Rightarrow$ **k = ?**

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

(YÖS 2002)

Çözüm / Solution:

$C(5, 3) = \frac{5!}{3!\,(5-3)!} = \frac{5 \cdot 4 \cdot 3!}{3!\,2 \cdot 1} = 10$

$\Rightarrow 10 = \frac{k \cdot (k-1)\,(k-2)!}{2 \cdot (k-2)!} \Rightarrow 20 = k\,(k-1)$

$\Rightarrow k = 5$

Yanıt / Answer C

6.
$$\begin{array}{r} KLM \\ KLM \\ KLM \\ KLM \\ +\ KLM \\ \hline 1630 \end{array} \Rightarrow \mathbf{K + L + M = ?}$$

A) 8 B) 9 C) 10 D) 11 E) 12

(YÖS 2003)

Çözüm / Solution:

$500K + 50L + 5M = 1630$

$100K + 10L + M = 326$

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

$K + L + M = 11$

Yanıt / Answer D

7. $a < 0,\ a = 2b,\ b = \frac{c}{3} \Rightarrow ? < ? < ?$

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

(YÖS 2003)

Çözüm / Solution:

$a = -6$

$b = -3$

$-3 = \frac{c}{3} \Rightarrow c = -9 \Rightarrow c < a < b$

Yanıt / Answer D

8. $(35)_{10} = (x)_8 \Rightarrow x = ?$

A) 35 B) 36 C) 40 D) 43 E) 45

(YÖS 2004)

Çözüm / Solution:

35 | 8
− 32 | (4)
(3)

$\Rightarrow x = 43$

Yanıt / Answer D

9. $5 + 10 + 15 + \ldots\ldots\ldots + 40 - 4 - 8 - 12 - \ldots\ldots - 32 = ?$

A) 18 B) 5 C) 36 D) 45 E) 60

(YÖS 2004)

Çözüm / Solution:

$= 5 \cdot (1 + 2 + 3 + \ldots\ldots\ldots + 8) - 4 \cdot (1 + 2 + 3 + \ldots\ldots\ldots + 8)$

$= 5 \cdot \frac{8 \cdot 9}{2} - 4 \cdot \frac{8 \cdot 9}{2} = \frac{8 \cdot 9}{2}$

$= 36$

Yanıt / Answer C

10. $A = 28 + 35 + 42 + \ldots\ldots + 112$

$B = 7 + 14 + 21 + \ldots\ldots + 105$

A − B = ?

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

(YÖS 2005)

Çözüm / Solution:

$$A = 28 + 35 + 42 + \ldots + 112 = \left(\frac{112 - 28}{7} + 1\right) \cdot \left(\frac{112 + 28}{2}\right)$$

$$= 910$$

$$B = 7 + 14 + 21 + \ldots + 105 = \left(\frac{105 - 7}{7} + 1\right) \cdot \left(\frac{105 + 7}{2}\right)$$

$$= 840$$

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

Yanıt / Answer C

11. A | B
− | 24
2

$A - B = 991$

B = ?

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

(YÖS 2006)

Çözüm / Solution:

A | B
− | 24 $\Rightarrow A = 24B + 2$
2

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

$\Rightarrow 23B = 989 \Rightarrow B = 43$

Yanıt / Answer E

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

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

(YÖS 2007)

Çözüm / Solution:

$$\frac{5! - 4!}{12} = \frac{5 \cdot 4! - 4!}{12} = \frac{4!(5 - 1)}{12} = \frac{24 \cdot 4}{12} = 8$$

Yanıt / Answer C

1. $\dfrac{(aa)-(bb)}{(ab)+(ba)}=\dfrac{1}{7} \Rightarrow \dfrac{a}{b}=?$

Yanıt / Answer : $\dfrac{4}{3}$

2. $a, b \in N$

$(a-b)\cdot(a+b)=23 \Rightarrow a\cdot b=?$

Yanıt / Answer : 132

3. $-6-\{3-2\cdot[-5-(3-8)]\}=?$

Yanıt / Answer : –9

4. $8-(4:2+2\cdot(5-7))=?$

Yanıt / Answer : 10

5. $a, b \in Z$

$\left.\begin{array}{l} 2\le a<6 \\ 3\le b\le 8 \end{array}\right\} \Rightarrow \max(a\cdot b)=?$

Yanıt / Answer : 40

6. $a, b \in N$

$a\cdot b=48 \Rightarrow \min(a+b)=?$

Yanıt / Answer : 14

7. $a, b \in Z$

$a\cdot b=56 \Rightarrow \min(a+b)=?$

Yanıt / Answer : –57

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

$a<-8<b<4<c$

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

Yanıt / Answer : –11

9. $\begin{array}{c|c} A & B \\ \hline = & 4 \\ \hline 3 & \end{array}$ $\begin{array}{c|c} B & C \\ \hline = & 2 \\ \hline 3 & \end{array}$ $\Rightarrow$ **C = ?**

Yanıt / Answer : $\frac{A-15}{8}$

10. $\begin{array}{c|c} A & x^3 \\ \hline = & 2 \\ \hline 24 & \end{array}$ $\Rightarrow$ **min(A) = ?**

Yanıt / Answer : 78

11. $\begin{array}{c|c} A & B \\ \hline = & 2 \\ \hline 4 & \end{array}$ $\begin{array}{c|c} C & 6 \\ \hline = & E \\ \hline B & \end{array}$ $\Rightarrow$ **A = ?**

Yanıt / Answer : 14

12. $\begin{array}{c|c} A & B \\ \hline = & 4 \\ \hline 3 & \end{array}$, $\begin{array}{c|c} B & 3 \\ \hline = & C \\ \hline 2 & \end{array}$ $\Rightarrow$ $\begin{array}{c|c} A & 6 \\ \hline = & \\ \hline ? & \end{array}$

Yanıt / Answer : 5

13. $\begin{array}{c|c} A & 3b-5 \\ \hline = & 6 \\ \hline b+4 & \end{array}$ $\Rightarrow$ **min(A) = ?**

Yanıt / Answer : 69

14. $\begin{array}{c|c} A & B \\ \hline = & 4 \\ \hline 3 & \end{array}$, $\begin{array}{c|c} A-3 & B+1 \\ \hline = & 3 \\ \hline 5 & \end{array}$ $\Rightarrow$ **A = ?**

Yanıt / Answer : 35

15. $\frac{10!-9!}{10!+9!} = ?$

Yanıt / Answer : $\frac{9}{11}$

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

Yanıt / Answer : 6

17. $\frac{(n-3)!}{132} = 10! \Rightarrow n = ?$

Yanıt / Answer : 15

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

Yanıt / Answer : 2

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

Yanıt / Answer : $\frac{9}{7}$

20. $5! \cdot x + 6! \cdot x + 7! \cdot x = 7! \cdot 7 \Rightarrow x = ?$

Yanıt / Answer : 6

21. $\frac{(a-3)!}{x!} = 120 \Rightarrow \min(a + x) = ?$

Yanıt / Answer : 8

22. $n, A \in N$

$42! = 6^n \cdot A \Rightarrow \max(n) = ?$

Yanıt / Answer : 19

23. $n, A \in N$

$72! = 4^n \cdot A \Rightarrow \max(n) = ?$

Yanıt / Answer : 35

24. $n, A \in N$

$(29! + 28!) = 10^n \cdot A \Rightarrow \max(n) = ?$

Yanıt / Answer : 7

25. $(253)_6 = (4n0)_5 \Rightarrow n = ?$

Yanıt / Answer : 1

26. $(23a)_6 + (321)_a = (x)_{10} \Rightarrow x = ?$

Yanıt / Answer ?

27. $(344)_5 + (231)_5 = (x)_5 \Rightarrow x = ?$

Yanıt / Answer : 1230

28. $121 = (abcd)_4 \Rightarrow a + b + c + d = ?$

Yanıt / Answer : 7

29. $(34)_6 \cdot (23)_6 = (x)_6 \Rightarrow x = ?$

Yanıt / Answer : 1310

30. $1 + 3 + 5 + 7 + \ldots + 33 + 32 + 30 + \ldots + 4 + 2 = ?$

Yanıt / Answer : 561

31. $5 + 10 + 15 + \ldots + 100 = ?$

Yanıt / Answer : 1050

32. $\frac{1}{2} + \frac{2}{3} + \frac{3}{2} + \frac{4}{3} + \frac{5}{2} + \ldots + \frac{23}{2} + 8 = ?$

Yanıt / Answer : 190

1. $(-7 + 10 : 2 + 3) - (-5 + 8 \cdot 2 - 1) = ?$

A) –11 B) –9 C) –5 D) 10 E) 5

2. $1 - [(16 : 2) \cdot (-1) + 8 : 4 + 1)] = ?$

A) –6 B) –5 C) 1 D) 5 E) 6

3. $4 - [(15 : 5) + 3 \cdot 5 - 9 : (-3)] = ?$

A) –21 B) –17 C) –15 D) –10 E) –5

4. $[(22 : 2 + 1) : 4 + 3] - [11 + 6 \cdot 2 - 15] = ?$

A) 1 B) 0 C) –1 D) –2 E) –3

5. $81 : 9 + 3 - 18 : 2 = ?$

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

6. $\begin{array}{r} a\,b\,c \\ \times\quad 1\,3 \\ \hline 2\,6\,4\,5 \\ +\;2\,1\,5 \\ \hline 2\,7\,9\,5 \end{array} \Rightarrow a + b + c = ?$

A) 8 B) 9 C) 10 D) 11 E) 12

7. $\begin{array}{c|c} A & 9 \\ \hline = & \\ \hline 7 & \end{array} \quad \begin{array}{c|c} B & 9 \\ \hline = & \\ \hline 8 & \end{array} \Rightarrow \begin{array}{c|c} A+B & 9 \\ \hline = & \\ \hline ? & \end{array}$

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

8. $\begin{array}{c|c} m+6 & 7 \\ \hline = & \\ \hline 3 & n \end{array} \quad \begin{array}{c|c} m-4 & n+1 \\ \hline = & \\ \hline 1 & 2 \end{array} \Rightarrow n = ?$

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

9. $\begin{array}{c|c} A & B \\ \hline = & \\ \hline 3 & 2 \end{array} \Rightarrow \min(A) = ?$

A) 5 B) 7 C) 9 D) 11 E) 13

10. $\begin{array}{r|l} A\,B\,2 & 1\,B \\ \hline -\,A\,0 & 5\,3 \\ \hline B\,2 & \\ -\,B\,2 & \\ \hline 0\,0 & \end{array} \Rightarrow A + B = ?$

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

11. $\begin{array}{r} ABC \\ -BAC \\ \hline 540 \end{array} \Rightarrow$ **A − B = ?**

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

12. $\begin{array}{r|l} a-b & b \\ \hline = & \\ \hline 0 & \end{array} \Rightarrow \begin{array}{r|l} 4b-a & a \\ \hline & \\ \hline & ? \end{array}$

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

13. $\frac{405405}{405} = ?$

A) 11 B) 101 C) 111 D) 1001 E) 1111

14. $\begin{array}{r|l} A & B \\ \hline = & 4 \\ \hline 5 & \end{array} \quad \begin{array}{r|l} B & C \\ \hline = & 3 \\ \hline 1 & \end{array} \Rightarrow \begin{array}{r|l} A & 12 \\ \hline = & \\ \hline ? & \end{array}$

A) 6 B) 8 C) 9 D) 10 E) 11

15. $\begin{array}{r|l} A & 8 \\ \hline = & B \\ \hline 1 & \end{array} \quad \begin{array}{r|l} A & 3 \\ \hline = & B+5 \\ \hline 1 & \end{array} \Rightarrow$ **A = ?**

A) 25 B) 28 C) 30 D) 42 E) 49

16. a, b, c, d $\in Z^+$

$\left.\begin{array}{l} a \cdot b = 15 \\ b \cdot c = 30 \\ a \cdot c = 18 \end{array}\right\} \Rightarrow$ **a + b + c = ?**

A) 10 B) 12 C) 14 D) 17 E) 19

17. a, b, c $\in Z^-$

$\left.\begin{array}{l} a \cdot b = 7 \\ b \cdot c = 3 \end{array}\right\} \Rightarrow$ **a + b + c = ?**

A) 11 B) 9 C) 7 D) −7 E) −11

18. a, b, c $\in Z^+$

$a \cdot b = 66$

$b \cdot c = 77$

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

A) 143 B) 81 C) 27 D) 24 E) 21

19. a, b $\in N$

$a + b = 24$

$\max\left(\frac{1}{a}+\frac{1}{b}\right) = ?$

A) $\frac{1}{6}$ B) $\frac{24}{143}$ C) $\frac{3}{16}$ D) $\frac{24}{23}$ E) $\frac{3}{2}$

20. $AB \in N^+$

$(AB)^2 - (BA)^2 = 792$

$(A - B) = 2 \Rightarrow$ **A + B = ?**

A) 4 B) 12 C) 14 D) 16 E) 18

Yanıtlar / *Answers*

1. B	2. E	3. B	4. B	5. D	6. A
7. E	8. B	9. D	10. C	11. E	12. B
13. D	14. C	15. A	16. C	17. E	18. D
19. D	20. A				

1. $a + b + a - 1 - 2(a + b) + 2 + b = ?$

A) -1 B) 0 C) 1 D) $1 + a$ E) $-1 + b$

2. $\dfrac{16:4+4}{16:(4+4)} - \dfrac{16-2\cdot 7}{(16+4):4} + 0{,}4 = ?$

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

3.

$\begin{array}{r} D \\ +\ E \\ \hline F \end{array} \Rightarrow D+E+F = ?$

A) 13 B) 15 C) 17 D) 21 E) 26

4. $[-(9) - (-3)] - [- (-5) + (-11)] = ?$

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

5. $9 - [2\cdot(4 - 7) - 12 : (4\cdot 3)] = ?$

A) 24 B) 16 C) 8 D) 4 E) 2

6.

$\begin{array}{c|c} A & B \\ \hline = & 5 \\ \hline 3 & \end{array} \quad \begin{array}{c|c} B & C \\ \hline = & 6 \\ \hline 5 & \end{array} \Rightarrow \begin{array}{c|c} A+B & 9 \\ \hline = & \\ \hline ? & \end{array}$

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

7.

$\begin{array}{c|c} A & 5 \\ \hline = & B \\ \hline B-5 & \end{array} \quad \begin{array}{c|c} A & 6 \\ \hline = & C \\ \hline C-4 & \end{array} \Rightarrow B+C=?$

A) 11 B) 12 C) 13 D) 14 E) 15

8.

$\begin{array}{c|c} a & b \\ \hline = & a-2 \\ \hline b-1 & \end{array} \Rightarrow b = ?$

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

9.

$\begin{array}{c|c} x & y-1 \\ \hline = & x-3 \\ \hline 2 & \end{array} \Rightarrow y = ?$

A) $\dfrac{x}{x+3}$ B) $\dfrac{2x-1}{x+3}$ C) $\dfrac{2x-5}{x-3}$ D) $\dfrac{x+4}{2x-1}$ E) $\dfrac{2x-5}{x-1}$

10. $AB + BA = 154 \Rightarrow$ **max(AB) = ?**

A) 86 B) 77 C) 95 D) 68 E) 96

11. $a, b, c \in Z^+$

$2a + 3b + 5c = 47$

$\Rightarrow$ **max(a) = ?**

A) 18 B) 20 C) 23 D) 24 E) 26

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

$3x + 4y + 2z = 98 \Rightarrow$ **max(x) = ?**

A) 33 B) 32 C) 30 D) 28 E) 27

13. $a, b, c \in Z^+$

$$\left.\begin{array}{l}(a+b)\cdot(b+c)=45\\ a(b-4)=0\end{array}\right\} \Rightarrow \textbf{min(a+c)=?}$$

A) 4 B) 5 C) 6 D) 7 E) 9

14.
$$\left.\begin{array}{l}x\cdot y=12\\ x\cdot z=20\\ z\cdot y=15\end{array}\right\} \Rightarrow \textbf{x+y+z=?}$$

A) 12 B) 13 C) 18 D) 21 E) 24

15.
$$\left.\begin{array}{l}2a-b+2c=17\\ a-2b+c=7\end{array}\right\} \Rightarrow \textbf{(abc)+(bca)+(cab)=?}$$

A) 777 B) 891 C) 999 D) 1110 E) 1221

16.
$$\left.\begin{array}{l}a-5=4(b+1)+10\\ a+2=7(b-3)+6\end{array}\right\} \Rightarrow \textbf{b=?}$$

A) 9 B) 10 C) 12 D) 14 E) 16

17. $a, b, c \in Z^+, b < 100$

$$a+\frac{b}{c}=9 \Rightarrow \textbf{max(a+b+c)=?}$$

A) 83 B) 91 C) 100 D) 106 E) 109

18. $A + B = D - C$

$A + B + C + E = D + 8$

$\Rightarrow$ **E = ?**

A) 16 B) 12 C) 8 D) 4 E) 0

19. $a, b, c \in R^+$

$$\left.\begin{array}{l}a\cdot b=168\\ b\cdot c=192\\ a\cdot c=224\end{array}\right\} \Rightarrow \textbf{?<?<?}$$

A) $a < b < c$ B) $a < c < b$

C) $b < c < a$ D) $b < a < c$

E) $c < a < b$

20. $x, y, z \in N^+$

$$\left.\begin{array}{l}x+y=28\\ x+z=30\\ y+z=12\end{array}\right\} \Rightarrow \textbf{x+y+z=?}$$

A) 35 B) 33 C) 31 D) 29 E) 27

Yanıtlar / *Answers*

1. C	2. B	3. E	4. B	5. A	6. D
7. A	8. B	9. C	10. C	11. A	12. C
13. C	14. A	15. D	16. C	17. E	18. C
19. D	20. A				

1. **5 + 6 + 7 + ... + 39 = ?**

A) 780 B) 770 C) 742 D) 700 E) 680

2. **17 + 18 + 19 + ... + 27 = ?**

A) 363 B) 360 C) 300 D) 280 E) 242

3. **4 + 6 + 8 + ... + 40 = ?**

A) 418 B) 400 C) 396 D) 398 E) 306

4. **1 + 3 + 5 + ... + 17 = ?**

A) 64 B) 81 C) 100 D) 121 E) 144

5. **7 + 13 + 19 + ... + 67 = ?**

A) 370 B) 376 C) 382 D) 394 E) 407

6. **10 + 13 + 16 + ...+ 34 = ?**

A) 220 B) 198 C) 176 D) 164 E) 152

7. **17 + 21 + 25 +.....+ 45 = ?**

A) 324 B) 302 C) 284 D) 260 E) 248

8. **1 + 3 + 5 + 7 + ... + 25 + 24 + 22 + ... + 6 + 4 + 2 = ?**

A) 300 B) 324 C) 325 D) 330 E) 332

9. **4 – 5 + 6 – 7 + 8 – 9 ... + 18 – 19 + 20 – 21 = ?**

A) –10 B) –9 C) –8 D) –7 E) –6

10. $\frac{1}{2}+\frac{3}{2}+\frac{5}{2}+\ldots+\frac{17}{2}+\frac{19}{2}=?$

A) 100 B) $\frac{91}{2}$ C) $\frac{81}{2}$ D) 50 E) 48

11. $5 - 7 + 9 - 11 + 13 - 15 + \ldots - 43 + 45 - 47 + 49 = ?$

A) –23 B) –22 C) 0 D) 5 E) 27

12. $2 + 4 + 6 + 8 + \ldots + 2n = 342 \Rightarrow n = ?$

A) 36 B) 32 C) 24 D) 19 E) 18

13. $12 + 14 + 16 + \ldots 2n = 390 \Rightarrow n^2 + n = ?$

A) 360 B) 420 C) 480 D) 496 E) 500

14. $11 + 13 + 15 + \ldots + 2n - 1 = 416 \Rightarrow n = ?$

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

15. $3 + 6 + 9 + 12 + \ldots + 3n = 513 \Rightarrow n = ?$

A) 15 B) 16 C) 17 D) 18 E) 20

16. $1 \cdot 3 + 2 \cdot 5 + 3 \cdot 7 + 4 \cdot 9 + \ldots + 10 \cdot 21 = A$

$1 \cdot 6 + 2 \cdot 8 + 3 \cdot 10 + 4 \cdot 12 + \ldots + 10 \cdot 24 = ?$

A) A + 80 B) A + 75 C) A + 105 D) A + 165 E) A + 180

17. $1 + 2 + 3 + \ldots + n = A$

$15 + 16 + 17 + \ldots + n = B$

$A + B = 315 \Rightarrow A = ?$

A) 180 B) 200 C) 210 D) 240 E) 250

18. $A = 3 \cdot 5 + 4 \cdot 6 + 5 \cdot 7 + \ldots + 12 \cdot 14$

$\Rightarrow 17 + 26 + 37 + \ldots + 170 = ?$

A) A + 18 B) A + 20 C) A + 24 D) A + 30 E) A + 33

19. $\frac{2+4+6+\ldots+24}{\cdot 6a} = 13 \Rightarrow a = ?$

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

20. $1 + 3 + 5 + \ldots + 2n - 1 = A$

$3 + 5 + 7 + \ldots + 2n + 1 = B$

$\Rightarrow B - A = ?$

A) $n^2 + 2n$ B) n^2 C) $n^2 - 2n$ D) 2n E) $2n^2 + 2n$

21. $\frac{1}{2} + \frac{2}{3} + \frac{3}{2} + \frac{4}{3} + \ldots + \frac{19}{2} + \frac{20}{3} = ?$

A) $\frac{160}{3}$ B) $\frac{131}{6}$ C) $\frac{203}{6}$ D) $\frac{225}{3}$ E) $\frac{260}{3}$

Yanıtlar / *Answers*

1. B	2. E	3. A	4. B	5. E	6. B
7. E	8. C	9. B	10. D	11. E	12. E
13. B	14. D	15. D	16. D	17. C	18. B
19. B	20. D	21. E			

1. $\frac{7!+6!}{7!-6!} = ?$

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

2. $\frac{8!-6!}{5\cdot 6!} = ?$

A) 9 B) 10 C) 11 D) 12 E) 14

3. $\frac{(n-5)!}{2\cdot(n-4)!} = \frac{1}{22} \Rightarrow n = ?$

A) 8 B) 10 C) 12 D) 14 E) 15

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

A) 0 B) 1 C) $\frac{1}{(n+1)!}$ D) $\frac{1}{n!}$ E) n!

5. $\frac{26!\cdot 38!}{37!\cdot 25!\cdot 13} = ?$

A) 5! B) 76 C) 58 D) 38 E) 21

6. **a'nın en küçük değeri için n kaçtır?** What is the rate of n for the minimum value of a?

$$\frac{a!+3 \mid 5}{2 \mid n}$$

A) 0 B) 2 C) 4 D) 5 E) 6

7. $\left[\left(\frac{1}{1!}+\frac{1}{2!}+\frac{5}{5!}\right) : \left(\frac{1}{5!}+\frac{1}{6!}+\frac{7}{7!}\right)\right] \cdot \frac{56}{30} = ?$

A) 55 B) 100 C) 148 D) 172 E) 259

8. $\frac{n!}{(n-2)!} = 6 \Rightarrow n = ?$

A) 0 B) 1 C) 3 D) 6 E) 12

9. $\frac{n!\cdot(n-2)!}{(n-3)!} : \frac{n!(n-2)}{n} = 15 \Rightarrow n = ?$

A) 1 B) 12 C) 15 D) 17 E) 21

10. $\frac{(n+1)!}{n!} : \frac{(2n)!}{(2n+1)!} = 28 \Rightarrow n = ?$

A) 1 B) 3 C) 12 D) 16 E) 21

11. $\frac{n!+2\cdot(n-2)!}{(n-1)!+n!}=\frac{14}{15} \Rightarrow \sum n=?$

A) 0 B) 2 C) 4 D) 10 E) 15

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

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

13. $\frac{(2n-4)!}{(3n+1)!}:\frac{(2n-3)!}{(3n+2)!}=\frac{17}{7} \Rightarrow n=?$

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

14. $(n+1)!=4!\cdot n! \Rightarrow n=?$

A) 12 B) 21 C) 23 D) 27 E) 32

15. $\frac{2\cdot 8!+10!}{8!\cdot 10^2+8!\cdot 84}=?$

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

16. $\frac{[(x-y)\cdot(x+y)]!}{(x^2-y^2-1)!\cdot(x+y)}=?$

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

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

A) $\frac{1}{2}$ B) $\frac{3}{4}$ C) $\frac{5}{2}$ D) $\frac{7}{3}$ E) $\frac{8}{5}$

18. $n!=a \Rightarrow (n+1)\cdot n!-n!\,(n+2)=?$

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

19. $P\binom{n}{n-3}=120 \Rightarrow n=?$

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

20. $C\binom{n}{n-4}=C\binom{n}{n-6} \Rightarrow n=?$

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

Yanıtlar / *Answers*

1. C	2. C	3. E	4. D	5. B	6. D
7. E	8. C	9. C	10. B	11. E	12. B
13. C	14. C	15. B	16. C	17. A	18. B
19. C	20. A				

1. $(243)_5 = (x)_{10} \Rightarrow x = ?$

A) 73 B) 82 C) 88 D) 93 E) 97

2. $(340)_{10} = (x)_7 \Rightarrow x = ?$

A) 453 B) 466 C) 566 D) 656 E) 664

3. $(1a3)_4 = (102)_5 \Rightarrow a = ?$

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

4. $a > b > c$

$(abc)_3 = (x)_{10} \Rightarrow x = ?$

A) 18 B) 21 C) 25 D) 27 E) 29

5. $3 \cdot 9^4 + 2 \cdot 9^2 + 6 \cdot 9 + 5 = (x)_9 \Rightarrow x = ?$

A) 3265 B) 3026 C) 30265

D) 300265 E) 32065

6. $(ba2)_5 = (233)_a \Rightarrow b = ?$

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

7. $(324)_5 \cdot (23)_5 = (x)_5 \Rightarrow x = ?$

A) 12312 B) 14212 C) 11342

D) 14112 E) 21342

8. $42 = (x)_5 \Rightarrow x = ?$

A) 88 B) 100 C) 112 D) 120 E) 132

9. $(1,34)_5 = ?$

A) $\frac{44}{25}$ B) $\frac{44}{5}$ C) $\frac{43}{25}$ D) $\frac{43}{5}$ E) $\frac{42}{25}$

10. $(2,24)_5 + (0,22)_5 = (n)_{10} \Rightarrow n = ?$

A) 2,04 B) 2,14 C) 2,34 D) 3,02 E) 3, 04

11. $n = [(121)_a]^2 \Rightarrow (n)_{(a+1)} = ?$

A) 100000 B) 10000 C) 10001 D) 10010 E) 1000

12. $(2\cdot3^5 + 2\cdot3^4 + 3^3 + 35) = (x)_9 \Rightarrow x = ?$

A) 2247 B) 2335 C) 62338 D) 8338 E) 868

13. $(14)_m + (25)_m = (41)_m \Rightarrow m = ?$

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

14. $(a312)_4 = (182)_{10} \Rightarrow a = ?$

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

15. $\sqrt{(144)_x} = 10 \Rightarrow x = ?$

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

16. $(42)_a + (43)_b = 45 \Rightarrow b - a = ?$

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

17. $a \neq 0, (aaa)_4 = (aa)_m \Rightarrow m = ?$

A) 9 B) 12 C) 15 D) 18 E) 20

18. $(333)_4 - (111)_3 = (abc)_5 \Rightarrow a\ ?\ b\ ?\ c$

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

19. $(23m1)_5 = (346)_{10} \Rightarrow m = ?$

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

20. $(102)_n + (21n)_4 = (x)_{10} \Rightarrow x = ?$

A) 30 B) 40 C) 48 D) 50 E) 112

Yanıtlar / *Answers*

1. A	2. E	3. C	4. B	5. C	6. B
7. D	8. E	9. A	10. E	11. B	12. E
13. D	14. C	15. C	16. A	17. E	18. B
19. E	20. D				

RASYONEL SAYILAR / RATIONAL NUMBERS

BÖLÜM 2
CHAPTER

RASYONEL SAYILAR / *RATIONAL NUMBERS*

Kesir: a ve b tamsayı ve $b \neq 0$ olmak üzere $\frac{a}{b}$ ifadesi bir kesirdir.

Fraction: *Provided that a and b are integers and $b \neq 0$, the expression $\frac{a}{b}$ is called a* ***fraction.***

Rasyonel Sayı: Bir kesre denk olan kesirlerin oluşturduğu küme bir tane sayı belirtir. Bu sayıya **rasyonel sayı** denir. Rasyonel sayılar kümesi Q ile gösterilir.

Rational Number: *The set formed by the fractions to a fraction indicates a number. This number is called a* ***rational number.*** *The set of is denoted by Q.*

$$A=\{\frac{10}{20},\frac{4}{8},\frac{3}{6}\} \Rightarrow A=\frac{1}{2}$$

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

RASYONEL SAYILARIN ÖZELLİKLERİ
PROPERTIES of RATIONAL NUMBERS

1. $-\frac{a}{b}=\frac{a}{-b}=\frac{-a}{b}$
2. $a\neq 0,\ \frac{0}{a}=0$
3. $\frac{a}{b}\pm\frac{c}{b}=\frac{a\pm c}{b}$
4. $\frac{a}{b}\pm\frac{c}{d}=\frac{ad\pm bc}{bd}$
5. $a\frac{b}{c}=\frac{a\cdot c+b}{c},\ -a\frac{b}{c}=\frac{(-a\cdot c)-b}{c}$
6. $\frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}$
7. $\frac{a}{\frac{b}{c}}=\frac{a\cdot c}{b}$
8. $\frac{\frac{a}{b}}{c}=\frac{a}{b\cdot c}$
9. $\frac{\frac{a}{b}}{\frac{c}{d}}=\frac{a\cdot d}{b\cdot c}$
10. $a^{-1}=\frac{1}{a}$
11. $\left(\frac{a}{b}\right)^{-1}=\frac{b}{a},\left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^{n}$

Örnekler / Examples 1:

a. $\frac{2}{7}+\frac{3}{7}=\frac{2+3}{7}=\frac{5}{7}$

b. $\frac{3}{11}-\frac{5}{11}=\frac{3-5}{11}=\frac{-2}{11}$

c. $\frac{9}{8}+\frac{2}{7}=\frac{9\cdot 7+8\cdot 2}{8\cdot 7}=\frac{63+16}{56}=\frac{79}{56}$

d. $\frac{3}{5}-\frac{1}{12}=\frac{3\cdot 12-1\cdot 5}{5\cdot 12}=\frac{36-5}{60}=\frac{31}{60}$

e. $\frac{19}{24}-\frac{13}{30}=\frac{19}{\underset{(5)}{24}}-\frac{13}{\underset{(4)}{30}}=\frac{95}{120}-\frac{52}{120}=\frac{43}{120}$

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

$=\frac{1}{6}+\frac{4}{3}$

$=\frac{1\cdot 3+6\cdot 4}{6\cdot 3}=\frac{27}{18}=\frac{3}{2}$

g. $\left(2\frac{1}{2}-3\frac{1}{2}\right)-\left(2\frac{1}{3}-4\frac{1}{3}\right)=\left(\frac{5}{2}-\frac{7}{2}\right)-\left(\frac{7}{3}-\frac{13}{3}\right)$

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

$=-1+2=1$

Örnekler / Examples 2:

a. $\frac{2}{3}\cdot\frac{4}{5}=\frac{2\cdot 4}{3\cdot 5}=\frac{8}{15}$

b. $3\frac{1}{2}\cdot 2\frac{1}{5}=\frac{7}{2}\cdot\frac{11}{5}=\frac{7\cdot 11}{2\cdot 5}=\frac{77}{10}$

c. $3\cdot\frac{7}{5}=\frac{3\cdot 7}{5}=\frac{21}{5}$

d. $\frac{3}{5}:\frac{2}{7}=\frac{3}{5}\cdot\frac{7}{2}=\frac{3\cdot 7}{5\cdot 2}=\frac{21}{10}$

e. $\frac{\frac{3}{5}}{2}=3\cdot\frac{2}{5}=\frac{3\cdot 2}{5}=\frac{6}{5}$

f. $\frac{\frac{1}{4}}{5} = \frac{1}{4} \cdot \frac{1}{5} = \frac{1}{20}$

g. $\frac{3}{\frac{2}{5}} - \frac{3}{2} = 3 \cdot \frac{5}{2} - \frac{3}{2} \cdot \frac{1}{5} = \frac{15}{\underset{(5)}{2}} - \frac{3}{10}$

$= \frac{75}{10} - \frac{3}{10} = \frac{72}{10} = \frac{36}{5}$

h. $2\frac{1}{3} \cdot 5\frac{2}{3} + 4 = \frac{7}{3} \cdot \frac{17}{3} + 4 = \frac{119}{9} + 4 = \frac{119+36}{9}$

$= \frac{155}{9}$

ONDALIK SAYILAR / *DECIMAL NUMBERS*

Tanım: Paydası 10'un pozitif tamsayı kuvvetleri şeklinde olan veya bu şekle getirilebilen rasyonel sayılara **ondalık sayılar** denir.

Definition: *The ration numbers, the denominator of which is of the from as positive integer powers of 10 or of the form that gives a result like this when converted, are called* ***decimal numbers.***

Örnek / Example:

$\frac{4}{10} = 0.4$, $\frac{6}{10^2} = 0.06$, $-\frac{4}{5} = -\frac{8}{10} = -0.8$

Yukarıdaki sayılar birer ondalık sayıdır. / *The* numbers given above *are decimal numbers.*

$\frac{1}{10^n} = 0,\underbrace{000.....01}_{n \text{ tane / } n \text{ times}}$

Örnekler / Examples:

a. $\frac{0,021}{\underset{(1000)}{0,03}} + \frac{0,5}{\underset{(10)}{5}} = \frac{21}{30} + \frac{5}{10} = \frac{7}{10} + \frac{1}{10} = \frac{8}{10} = 0,8$

b. $\frac{0,02 - (0,29 + 0,03)}{0,001} = \frac{0,02-0,32}{0,001} = \frac{-0,30}{\underset{(1000)}{0,001}} = \frac{-300}{1} = -300$

c. $\frac{5}{0,0002} : \frac{0,012}{0,03} = \frac{5}{\underset{(10000)}{0,0002}} \cdot \frac{0,03}{\underset{(1000)}{0,012}}$

$= \frac{50000}{2} \cdot \frac{30}{12}$

$= 25000 \cdot \frac{5}{2}$

$= 62500$

DEVİRLİ ONDALIK SAYILAR
PERIODIC DECIMALS

Tanım: Bir rasyonel sayı ondalıklı sayı biçiminde yazıldığı da virgülden sonra gelen kısımdaki sayılar belli bir rakamdı sonra tekrar ediyorsa bu sayılara **devirli ondalık sayı** den

Definition: *When a rational number is written in the decimal form, if the numbers coming after the comm repeats infinitely afterwards a certain number, then the numbers are called periodic decimals.*

$$ab, cd\overline{efg} = \frac{abcefg - abcd}{99900}$$

Örnek / Example:

35,244.....= $35,24\overline{}$

1,555..... = $1,\overline{5}$

3,123123..... = $3,\overline{123}$

0, 2222..... = $0,\overline{2}$

Örnek / Example:

a. $0,\overline{7} = \frac{7-0}{9} = \frac{7}{9}$

b. $4,\overline{1} = \frac{41-4}{9} = \frac{37}{9}$

c. $12,\overline{3} = \frac{123-12}{9} = \frac{111}{9} = \frac{37}{3}$

d. $0,1\overline{5} = \frac{15-1}{90} = \frac{14}{90} = \frac{7}{45}$

e. $5,1\overline{8} = \frac{518-51}{90} = \frac{467}{90}$

f. $32,1\overline{54} = \frac{32154-321}{990} = \frac{31833}{990} = \frac{3537}{110}$

Örnek / Example:

$\frac{0,2\overline{1} + 0,1\overline{2}}{0,2\overline{1} - 0,1\overline{6}} = ?$

A) 5,5 B) 6 C) 6,5 D) 7 E) 7,5

Çözüm / Solution:

$\frac{0,2\overline{1} + 0,1\overline{2}}{0,2\overline{1} - 0,1\overline{6}} = \frac{\frac{21-2}{90} + \frac{12-1}{90}}{\frac{21-2}{90} - \frac{16-1}{90}}$

$= \frac{\frac{19+11}{90}}{\frac{19-15}{90}}$

$= \frac{30}{90} \cdot \frac{90}{4} = \frac{30}{4} = \frac{15}{2} = 7,5$

Yanıt / Answer

ÇÖZÜMLÜ TEST / *TEST WITH SOLUTIONS*

1. $\dfrac{\left(8-\frac{1}{3}\right)+\left(\frac{1}{3}+4\right)}{\left(7+\frac{5}{6}\right)+\left(6+\frac{1}{6}\right)} = ?$

A) $\frac{7}{5}$ B) $\frac{6}{7}$ C) $\frac{5}{8}$ D) $\frac{8}{5}$ E) -1

Çözüm / Solution:

$$\frac{\left(8-\frac{1}{3}\right)+\left(\frac{1}{3}+4\right)}{\left(7+\frac{5}{6}\right)+\left(6+\frac{1}{6}\right)} = \frac{\frac{24-1}{3}+\frac{1+12}{3}}{\frac{42+5}{6}+\frac{36+1}{6}}$$

$$= \frac{\frac{23+13}{3}}{\frac{47+37}{6}}$$

$$= \frac{\frac{36}{3}}{\frac{84}{6}} = \frac{12}{14} = \frac{6}{7}$$

Yanıt / Answer B

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

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

Çözüm / Solution:

$$\frac{6}{7}\left[\frac{1}{3}-\left(\frac{1}{2}-\left(\frac{1}{4}+\frac{1}{2}\right)\right)\right] = \frac{6}{7}\left[\frac{1}{3}-\left(\frac{1}{2}-\left(\frac{1+2}{4}\right)\right)\right]$$

$$= \frac{6}{7}\cdot\left[\frac{1}{3}-\left[\frac{1}{2}-\frac{3}{4}\right]\right]$$

$$= \frac{6}{7}\cdot\left[\frac{1}{3}-\left(\frac{2-3}{4}\right)\right]$$

$$= \frac{6}{7}\cdot\left[\frac{1}{3}+\frac{1}{4}\right]$$

$$= \frac{6}{7}\cdot\frac{4+3}{12} = \frac{6}{7}\cdot\frac{7}{12} = \frac{1}{2}$$

Yanıt / Answer A

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

A) $\frac{13}{21}$ B) $\frac{3}{7}$ C) $\frac{11}{21}$ D) $\frac{3}{4}$ E) $\frac{8}{23}$

Çözüm / Solution:

$$0,\overline{3}+\frac{1}{2+\frac{3}{2}} = \frac{3}{9}+\frac{1}{2+\frac{3}{2}} = \frac{1}{3}+\frac{2}{7} = \frac{13}{21}$$

Yanıt / Answer A

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

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

Çözüm / Solution:

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

Yanıt / Answer C

5. $\left[\frac{5}{2}-\frac{1}{1-\frac{1}{2}}\right] : \left[\frac{1}{2}-\frac{\frac{1}{2}}{1+\frac{1}{2}}\right] = ?$

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

Çözüm / Solution:

$$\left[\frac{5}{2}-\frac{1}{1-\frac{1}{2}}\right] : \left[\frac{1}{2}-\frac{\frac{1}{2}}{1+\frac{1}{2}}\right] = \left[\frac{5}{2}-2\right] : \left[\frac{1}{2}-\frac{\frac{1}{2}}{\frac{3}{2}}\right]$$

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

$$= \frac{1}{2} : \frac{1}{6} = \frac{1}{2}\cdot 6 = 3$$

Yanıt / Answer D

6. $\dfrac{1+a}{1-\dfrac{1-a}{1-\dfrac{1}{a}}} = ?$

A) $-a$ B) -1 C) 0 D) 1 E) a

Çözüm / Solution:

$$\frac{1+a}{1-\dfrac{1-a}{1-\dfrac{1}{a}}} = \frac{1+a}{1-\dfrac{1-a}{\dfrac{a-1}{a}}} = \frac{1+a}{1-\dfrac{a(1-a)}{a-1}}$$

$$= \frac{1+a}{-(1-a)\cdot(a+1)} \over a-1$$

$$= \frac{1+a}{1+a} = 1$$

Yanıt / Answer D

7. $\dfrac{15}{0,\overline{15}} - \dfrac{1}{0,\overline{1}} = ?$

A) 24 B) 30 C) 60 D) 90 E) 96

Çözüm / Solution:

$$\frac{15}{0,\overline{15}} - \frac{1}{0,\overline{1}} = \frac{15}{\dfrac{15}{99}} - \frac{1}{\dfrac{1}{9}} = 99 - 9 = 90$$

Yanıt / Answer D

8. $\dfrac{1}{m-2} - \dfrac{1}{m+2} = 1 \Rightarrow (m^2+1)^2 = ?$

A) 25 B) 36 C) 49 D) 64 E) 81

Çözüm / Solution:

$$\frac{1}{m-2} - \frac{1}{m+2} = 1$$

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

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

$$m^2 - 4 = 4 \Rightarrow m^2 = 8$$

$$(m^2+1)^2 = (8+1)^2 = 9^2 = 81$$

Yanıt / Answer E

9. $\dfrac{1}{0,001} + \dfrac{2}{0,02} + \dfrac{0}{0,3} = ?$

A) 111 B) 123 C) 1110 D) 1111 E) 1230

Çözüm / Solution:

$$\frac{1}{0,001} + \frac{2}{0,02} + \frac{3}{0,3} = \frac{1}{\dfrac{1}{1000}} + \frac{2}{\dfrac{2}{100}} + \frac{3}{\dfrac{3}{10}}$$

$$= 1000 + 100 + 10$$

$$= 1110$$

Yanıt / Answer C

10. $2 + \dfrac{x}{2 + \dfrac{x}{2 + \dfrac{x}{2}}} = 3 \Rightarrow x = ?$

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

Çözüm / Solution:

$$2 + \frac{x}{2 + \dfrac{x}{2 + \dfrac{x}{2}}} \rightarrow 3$$

$$2 + \frac{x}{3} = 3 \Rightarrow \frac{6+x}{3} = 3$$

$$6 + x = 9$$

$$x = 3$$

Yanıt / Answer C

11. $\dfrac{0,3}{x} = \dfrac{0,9}{0,03} \Rightarrow x = ?$

A) 0,01 B) 0,1 C) 1 D) 1,1 E) 10

Çözüm / Solution:

$$\frac{\dfrac{3}{10}}{x} = \frac{\dfrac{9}{10}}{\dfrac{3}{100}} \Rightarrow \frac{3}{10}\cdot\frac{1}{x} = \frac{9}{10}\cdot\frac{100}{3} \Rightarrow \frac{1}{10\cdot x} = 10$$

$$\Rightarrow x = \frac{1}{100} = 0,01$$

Yanıt / Answer A

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

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

Çözüm / Solution:

$$\frac{\frac{1}{2\cdot1}+\frac{1}{3\cdot2\cdot1}-\frac{1}{4\cdot3\cdot2\cdot1}}{\frac{1}{2\cdot1}-\frac{1}{3\cdot2\cdot1}+\frac{1}{4\cdot3\cdot2\cdot1}} : \frac{3\cdot2\cdot1+4\cdot3\cdot2\cdot1}{5\cdot4\cdot33\cdot2\cdot1}$$

$$= \frac{\frac{1}{2}+\frac{1}{6}-\frac{1}{24}}{\frac{1}{2}-\frac{1}{6}+\frac{1}{24}} : \frac{6+24}{120-24} = \frac{\frac{15}{24}}{\frac{9}{24}} : \frac{30}{96}$$

$$= \frac{5}{3}\cdot\frac{16}{5} = \frac{16}{3}$$

Yanıt / Answer A

13. $\left(\frac{3}{5}-\frac{2}{5}\cdot 0{,}05\right) : 0{,}29 = ?$

A) $\frac{1}{4}$ B) 2 C) 4 D) 1 E) $\frac{1}{145}$

Çözüm / Solution:

$$\left(\frac{3}{5}-\frac{2}{5}\cdot 0{,}05\right) : 0{,}29 = \left(\frac{3}{5}-\frac{2}{5}\cdot\frac{5}{100}\right) : \frac{29}{100}$$

$$= \left(\frac{3}{5}-\frac{2}{100}\right) : \frac{29}{100}$$

$$= \frac{60-2}{100} : \frac{29}{100}$$

$$= \frac{58}{100}\cdot\frac{100}{29} = 2$$

Yanıt / Answer B

14. $\dfrac{3x-6}{3} - \dfrac{2x+4}{2} = ?$

A) 2 B) x C) x – 2 D) 4 E) – 4

Çözüm / Solution:

$$\frac{3x-6}{3} - \frac{2x+4}{2} = \frac{2(3x-6)-3(2x+4)}{6}$$

$$= \frac{6x-12-6x-12}{6} = \frac{-24}{6} = -4$$

Yanıt / Answer E

15. $(2{,}39\,7 + 0{,}3\cdot 0{,}01) : 0{,}001 - 400 = ?$

A) 2000 B) 2380 C) 2390 D) 2397 E) 2400

Çözüm / Solution:

$(2{,}397 + 0{,}3.0{,}01) : 0{,}001 - 400$

$= (2{,}397 + 0{,}003) : 0{,}001 - 400$

$= 2{,}4 : 0{,}001 - 400 = 2400 - 400$

$= 2000$

Yanıt / Answer A

16. $\dfrac{\frac{1}{5}:\left(\frac{1}{10}-\frac{1}{5}\right)}{\frac{2}{5}:(0{,}2-0{,}4)} = ?$

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

Çözüm / Solution:

$$\frac{\frac{1}{5}:\left(\frac{1}{10}-\frac{1}{5}\right)}{\frac{2}{5}:(0{,}2-0{,}4)} = \frac{\frac{1}{5}:\left(-\frac{1}{10}\right)}{\frac{2}{5}:\left(\frac{2}{10}\right)} = \frac{-2}{-2} = 1$$

Yanıt / Answer C

17. $\dfrac{\frac{4}{0{,}3}}{2} - \dfrac{1}{1-\frac{5}{6}} = ?$

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

Çözüm / Solution:

$$\frac{\frac{4}{0{,}3}}{2} - \frac{1}{1-\frac{5}{6}} = \frac{\frac{4}{3}}{\frac{10}{2}} - \frac{1}{\frac{1}{6}}$$

$$= \frac{40}{6} - 6 = \frac{40-36}{6} = \frac{4}{6} = \frac{2}{3}$$

Yanıt / Answer A

18. $(a-1):\left(a-\frac{2a-1}{a}\right)=?$

A) $a-1$ B) $\frac{a+1}{a}$ C) $\frac{1}{a-1}$

D) $\frac{a}{a-1}$ E) $\frac{a-1}{a}$

Çözüm / Solution:

$$(a-1):\left(a-\frac{2a-1}{a}\right)=(a-1):\left(\frac{a^2-2a+1}{a}\right)$$
$$=(a-1)\cdot\frac{a}{(a-1)^2}$$
$$=\frac{a}{a-1}$$

Yanıt / Answer D

19. $\frac{2a-1}{a-\frac{1}{2}}=?$

A) 4 B) 2 C) a D) $\frac{1}{2}$ E) a – 1

Çözüm / Solution:

$$\frac{2a-1}{a-\frac{1}{2}}=\frac{2a-1}{\frac{2a-1}{2}}=(2a-1)\cdot\frac{2}{2a-1}=2$$

Yanıt / Answer B

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

A) $\frac{1891}{990}$ B) $\frac{1741}{900}$ C) $\frac{1891}{999}$

D) $\frac{2001}{900}$ E) $\frac{2111}{999}$

Çözüm / Solution:

$$\frac{1,\overline{1}}{1,1}+\frac{0,1}{0,\overline{1}}=\frac{1\frac{1}{9}}{1\frac{1}{10}}+\frac{\frac{1}{10}}{\frac{1}{9}}$$

$$=\frac{\frac{10}{9}}{\frac{11}{10}}+\frac{9}{10}=\frac{100}{99}+\frac{9}{10}=\frac{1000+891}{990}=\frac{1891}{990}$$

Yanıt / Answer A

21. $a=\frac{-2}{0,02},\ b=\frac{-2}{0,04},\ c=\frac{-2}{0,08}\Rightarrow\ ?<?<?$

A) c < b < a B) b < c < a C) a < b <

D) b < a < c E) c < a < b

Çözüm / Solution:

$$\left.\begin{array}{l} a=-\frac{2}{0,02}=-\frac{2}{2}=-100 \\ b=-\frac{2}{0,04}=-\frac{2}{\frac{4}{100}}=-50 \\ c=-\frac{2}{0,08}=-\frac{2}{\frac{8}{100}}=-25 \end{array}\right\}\Rightarrow\ a<b<c$$

Yanıt / Answer C

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

A) 5 B) $\frac{11}{5}$ C) $\frac{13}{5}$ D) 0 E) $-\frac{1}{5}$

Çözüm / Solution:

$$\frac{3}{5}-\frac{3}{5}\cdot\left(\frac{1}{3}-\frac{1}{3}:\frac{1}{9}\right)=\frac{3}{5}-\frac{3}{5}\left(\frac{1}{3}-\frac{1}{3}\cdot 9\right)$$
$$=\frac{3}{5}-\frac{3}{5}\left(\frac{1}{3}-3\right)=\frac{3}{5}-\frac{3}{5}\left(-\frac{8}{3}\right)$$
$$=\frac{3}{5}+\frac{8}{5}=\frac{11}{5}$$

Yanıt / Answer B

23. $1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{3}}}}=?$

A $\frac{17}{3}$ B) $\frac{18}{11}$ C) $\frac{11}{8}$ D) $\frac{11}{7}$ E) $\frac{7}{11}$

Çözüm / Solution:

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{3}}}}=1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{\frac{4}{3}}}}=1+\cfrac{1}{1+\frac{1}{1+\frac{3}{4}}}$$
$$=1+\cfrac{1}{1+\frac{1}{\frac{7}{4}}}=1+\frac{1}{1+\frac{4}{7}}=1+\frac{1}{\frac{11}{7}}=1+\frac{7}{11}=\frac{18}{11}$$

Yanıt / Answer B

24. $\dfrac{\dfrac{x}{3}}{\dfrac{2}{x}} + \dfrac{\dfrac{x}{3}}{\dfrac{2}{}} = 1 \Rightarrow x = ?$

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

Çözüm / Solution:

$$\frac{\frac{x}{3}}{\frac{2}{x}} + \frac{\frac{x}{3}}{\frac{2}{}} = \frac{x}{6} + \frac{2x}{3} = 1$$

$$\frac{x + 4x}{6} = 1 \Rightarrow 5x = 6 \Rightarrow x = \frac{6}{5}$$

Yanıt / Answer B

25. $\left(1+\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\cdot\left(1-\frac{1}{5}\right)\cdots\left(1-\frac{1}{49}\right) = ?$

A) $\frac{48}{49}$ B) 1 C) $\frac{72}{49}$ D) $\frac{3}{2}$ E) 2

Çözüm / Solution:

$$\left(1+\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1+\frac{1}{4}\right)\left(1-\frac{1}{5}\right)\cdots\left(1-\frac{1}{49}\right)$$

$$= \frac{3}{2}\cdot\frac{2}{3}\cdot\frac{5}{4}\cdot\frac{4}{5}\cdots\frac{49}{48}\cdot\frac{48}{49} = 1$$

Yanıt / Answer B

26. $\frac{x}{2} + \frac{x+1}{3} = \frac{7}{6} \Rightarrow x = ?$

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

Çözüm / Solution:

$$\frac{3x}{6} + \frac{2x+2}{6} = \frac{7}{6}$$

$$5x + 2 = 7$$

$$x = 1$$

Yanıt / Answer C

27. $\dfrac{2,7}{0,09} + \dfrac{0,35}{0,07} - \dfrac{4}{0,4} = ?$

A) 25 B) 30 C) 35 D) 40 E) 45

Çözüm / Solution:

$$\underset{(100)}{\frac{2,7}{0,09}} + \underset{(100)}{\frac{0,35}{0,07}} - \underset{(10)}{\frac{4}{0,4}} = \frac{270}{9} + \frac{35}{7} - \frac{40}{4}$$

$$= 30 + 5 - 10$$

$$= 25$$

Yanıt / Answer A

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

A) $\frac{43}{10}$ B) $\frac{86}{21}$ C) $\frac{43}{11}$ D) $\frac{86}{23}$ E) $\frac{43}{12}$

Çözüm / Solution:

$$\frac{\left(\frac{1}{2}-5\right)+\left(\frac{1}{3}-3\right)}{\left(2-\frac{5}{6}\right)\cdot\left(\frac{3}{2}-3\right)} = \frac{\frac{1-10}{2}+\frac{1-9}{3}}{\frac{12-5}{6}\cdot\frac{3-6}{2}}$$

$$= \frac{-\frac{9}{2}-\frac{8}{3}}{\frac{7}{6}\cdot\left(-\frac{3}{2}\right)}$$

$$= \frac{-27-16}{6}\cdot\left(-\frac{12}{21}\right)$$

$$= -\frac{43}{6}\cdot\left(-\frac{12}{21}\right)$$

$$= \frac{43}{6}\cdot\frac{12}{21}$$

$$= \frac{86}{21}$$

Yanıt / Answer B

YÖS SORULARI / YÖS QUESTIONS

1. $x > 0$

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

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

(YÖS 1989)

Çözüm / Solution:

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

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

$$x^2 = 4$$

$$x = \pm 2 \Rightarrow x = 2$$

Yanıt / Answer B

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

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

(YÖS 1990)

Çözüm / Solution:

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

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

Yanıt / Answer C

3. $\frac{4}{x} - \frac{1}{x-1} = 1 \Rightarrow x = ?$

A) 3 B) 2 C) 1 D) –1 E) –2

(YÖS 199

Çözüm / Solution:

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

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

$$x^2 - 4x + 4 = 0$$

$$(x-2)^2 = 0 \Rightarrow x = 2$$

Yanıt / Answer

4. $\frac{a+1}{a} = x$

$\frac{b-1}{b} = y \Rightarrow \frac{1}{a} + \frac{1}{b} = ?$

A) $\frac{x}{y}$ B) $\frac{y}{x}$ C) $x - y$

D) $y - x$ E) $x + y$

(YÖS 1991

Çözüm / Solution:

$$\frac{a+1}{a} = 1 + \frac{1}{a} = x \Rightarrow \frac{1}{a} = x - 1$$

$$\frac{b-1}{b} = 1 - \frac{1}{b} = y \Rightarrow \frac{1}{b} = 1 - y$$

$$\Rightarrow \frac{1}{a} + \frac{1}{b} = x - 1 + 1 - y = x - y$$

Yanıt / Answer C

5. $0 < x$

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

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

(YÖS 1993)

Çözüm / Solution:

$$\frac{2}{3x} = \frac{3x}{2} \Rightarrow 9x^2 = 4 \Rightarrow x = \frac{2}{3}$$

Yanıt / Answer C

6. $\dfrac{3^{-1} + 3}{2^{-1} + 2} = ?$

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

(YÖS 1994)

Çözüm / Solution:

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

Yanıt / Answer C

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

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

(YÖS 1994)

Çözüm / Solution:

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

$$= \frac{a^2 - 2ab + b^2}{ab} \cdot \frac{ab}{a-b}$$

$$= \frac{(a-b)^2}{a-b}$$

$$= a-b$$

Yanıt / Answer E

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

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

(YÖS 1997)

Çözüm / Solution:

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

$$= \frac{25}{6} \cdot \frac{8}{25} = \frac{8}{6} = \frac{4}{3}$$

Yanıt / Answer D

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

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

(YÖS 2001)

Çözüm / Solution:

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

Yanıt / Answer E

10. $\left.\begin{array}{l} a \cdot b = \frac{12}{35} \\ b \cdot c = \frac{28}{45} \\ a \cdot c = \frac{1}{3} \end{array}\right\} \Rightarrow |a| = ?$

A) $\frac{7}{9}$ B) $\frac{3}{5}$ C) $\frac{5}{4}$ D) $\frac{1}{7}$ E) $\frac{3}{7}$

(YÖS 2003)

Çözüm / Solution:

$$(a \cdot b \cdot b \cdot c \cdot a \cdot c) = \frac{12}{35} \cdot \frac{28}{45} \cdot \frac{1}{3}$$

$$(a \cdot b \cdot c)^2 = \frac{4}{5} \cdot \frac{4}{15} \cdot \frac{1}{3}$$

$$(a \cdot b \cdot c) = \pm\frac{4}{15}$$

$$\frac{a \cdot b \cdot c}{b \cdot c} = \pm\frac{4}{15} : \frac{28}{45}$$

$$a = \pm\frac{1}{1} \cdot \frac{3}{7}$$

$$a = \pm\frac{3}{7}$$

$$|a| = \frac{3}{7}$$

Yanıt / Answer E

11. $(0{,}75)^2 - (0,75) \cdot (0{,}5) - (0{,}25)^2 = ?$

A) 0,125 B) 0,25 C) 0,5 D) 0,75 E) 1

(YÖS 200

Çözüm / Solution:

$(0,75)^2 - (0,25)^2 - (0,75) \cdot (0{,}5)$

$= (0{,}5) \cdot 1 - (0,75) \cdot (0,5)$

$= (0{,}5) \cdot (1 - 0,75)$

$= (0,5) \cdot (0,25) = 0,125$

Yanıt / Answer

1. $-\frac{1}{25}:\left[\frac{1}{5}+\frac{2}{15}:\frac{2}{9}\right]=?$

Yanıt / Answer : $-\frac{1}{20}$

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

Yanıt / Answer : -1

3. $0,7\overline{6}+\frac{1,\overline{4}-2\frac{1}{9}}{3+\frac{1}{3}}=?$

Yanıt / Answer : $\frac{17}{30}$

4. $\frac{0,02}{1,4}+\frac{0,21}{0,7}-\frac{0,36}{2,1}=?$

Yanıt / Answer : $\frac{1}{7}$

5. $\left.\begin{array}{l} x=\frac{1}{a}-\frac{1}{b} \\ y=\frac{1}{b}-\frac{1}{a} \end{array}\right\} \Rightarrow \frac{x}{y}=?$

Yanıt / Answer : -1

6. $\frac{\frac{8}{3}+\frac{1}{9}}{\frac{16^2}{9^2}-1}=?$

Yanıt / Answer : $\frac{9}{7}$

7. $3-\frac{0,\overline{5}}{1-1,\overline{5}}=\frac{12}{x} \Rightarrow x=?$

Yanıt / Answer : 3

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

Yanıt / Answer : 2

9. $\dfrac{\dfrac{x}{y}}{\dfrac{y}{z}} : \dfrac{\dfrac{z}{y}}{x} = ?$

Yanıt / Answer : x^2

10. $\left(\dfrac{1999+\dfrac{19}{3}}{2003+\dfrac{7}{3}}\right) : 5 + \dfrac{4}{5} = ?$

Yanıt / Answer : 1

11. $A = \dfrac{10}{3} + \dfrac{13}{4} + \dfrac{16}{5} + \dfrac{19}{6} + \ldots + \dfrac{34}{11} + \dfrac{37}{12}$

$B = \dfrac{8}{3} + \dfrac{11}{4} + \dfrac{14}{5} + \dfrac{17}{6} + \ldots + \dfrac{32}{11} + \dfrac{35}{12}$

$\Rightarrow (A + B)^{-1} = ?$

Yanıt / Answer : $\dfrac{1}{60}$

12. $\dfrac{\left(2-1\dfrac{1}{3}\right)\cdot\left(3-2\dfrac{1}{4}\right)}{\left(1-\dfrac{1}{2}\right)\cdot\left(1-\dfrac{1}{3}\right)\cdot\left(1-\dfrac{1}{4}\right)\cdot\ldots\cdot\left(1-\dfrac{1}{10}\right)} = ?$

Yanıt / Answer : 5

13. $\dfrac{\dfrac{1}{1+\dfrac{1}{2}}-1}{-\dfrac{2}{3}\cdot\dfrac{}{-2-\dfrac{2}{3}}} = ?$

Yanıt / Answer : $-\dfrac{1}{12}$

14. $-\dfrac{1}{2} - \dfrac{-2-\dfrac{1}{x}}{2} = 1 \Rightarrow x = ?$

Yanıt / Answer : 1

15. $2 + \dfrac{8}{2+\dfrac{8}{2+\ddots}} = ?$

Yanıt / Answer : 4

16. $a, b, c, d \in Z^+$

$\dfrac{48}{11} = a + \dfrac{1}{b+\dfrac{1}{c+\dfrac{1}{d}}} \Rightarrow a + b + c + d = ?$

Yanıt / Answer : 10

1. $\frac{1}{x}-\left(\frac{1}{y}-\frac{1}{t}\right)-\left(\frac{1}{x}-\frac{1}{y}\right)-\frac{1}{t}=?$

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

2. $1^{-1}-2^{-1}-3^{-1}-6^{-1}=?$

A) 1 B) 0 C) $\frac{1}{2}$ D) $\frac{1}{3}$ E) 6^{-1}

3. $\frac{7a-9}{5a+3}$ pozitif ve basit kesir ise (positive and proper fraction), **? < a <?**

A) $\frac{9}{7}<a<9$ B) $-1<a<6$ C) $\frac{9}{7}<a<6$

D) $-1<a<16$ E) $-\frac{3}{5}<a<\frac{9}{7}$

4. $\left(\frac{11}{6}-1-\frac{7}{20}\right)\div\left(2+\frac{11}{132}-1\frac{3}{5}\right)=?$

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

5. $1-\dfrac{1}{1-\dfrac{1}{1-\frac{1}{a}}}=?$

A) 1 + a B) 1 − a C) −a D) a E) a − 1

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

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

7. $\left(\frac{1}{2}-\frac{1}{3}+\frac{1}{4}\right)-\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{8}\right)=?$

A) $\frac{3}{8}$ B) $\frac{1}{8}$ C) $\frac{5}{8}$ D) $\frac{11}{24}$ E) $\frac{13}{24}$

8. $\dfrac{\frac{13}{4}+\frac{9}{5}:\frac{24}{10}}{\frac{1}{3}:2-8}=?$

A) −2 B) $-\frac{24}{47}$ C) $-\frac{12}{47}$ D) $-\frac{2}{9}$ E) $\frac{2}{9}$

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

A) $\frac{16}{9}$ B) $\frac{9}{16}$ C) $\frac{9}{64}$ D) $\frac{4}{9}$ E) $\frac{1}{4}$

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

A) $\frac{22}{15}$ B) $\frac{14}{15}$ C) $\frac{15}{7}$ D) $\frac{7}{6}$ E) $\frac{13}{6}$

11. $\frac{12}{35}\cdot\frac{45}{36}\cdot\frac{42}{48}=?$

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

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

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

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

A) 36 B) 30 C) 25 D) 20 E) 16

14. $4a+\frac{1+\frac{1}{a}}{\frac{a+1}{a}}-1=?$

A) 3 B) 3a C) 4a D) 4a–1 E) 5a

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

A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{1}{10}$ E) $\frac{1}{12}$

18. $\frac{101^2-99^2}{100}-\frac{17^2-7^2}{40}=?$

A) –4 B) –3 C) –2 D) –1 E) 1

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

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

17. $\frac{1}{9}+\frac{\frac{1}{6}+\frac{5}{6}\cdot\frac{1}{6}}{\frac{5}{6}-\frac{1}{6}\cdot\frac{1}{2}}=?$

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

19. $\frac{71^2-59^2}{130}\div\frac{47^2-43^2}{90}=?$

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

20. $a>0$,

$$\left.\begin{array}{l} a\cdot b=\frac{1}{4} \\ b\cdot c=\frac{1}{6} \\ a\cdot c=\frac{2}{27} \end{array}\right\} \Rightarrow ?<?<?$$

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

Yanıtlar / *Answers*					
1. A	2. B	3. C	4. D	5. D	6. C
7. A	8. B	9. C	10. D	11. E	12. B
13. C	14. C	15. D	16. B	17. A	18. C
19. D	20. C				

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

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

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

A) $\frac{1}{2}$ B) $-\frac{2}{3}$ C) $-\frac{5}{3}$ D) $\frac{10}{9}$ E) $\frac{2}{3}$

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

A) $\frac{2}{15}$ B) $\frac{3}{5}$ C) $-\frac{7}{30}$ D) $\frac{7}{2}$ E) $\frac{-12}{3}$

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

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

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

A) $\frac{13}{9}$ B) $\frac{37}{9}$ C) $-\frac{5}{6}$ D) $\frac{11}{3}$ E) $\frac{26}{27}$

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

A) $\frac{19}{7}$ B) $\frac{9}{2}$ C) $\frac{37}{9}$ D) $\frac{39}{14}$ E) $-\frac{3}{2}$

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

A) $-\frac{1}{3}$ B) $\frac{1}{3}$ C) $\frac{3}{4}$ D) $\frac{9}{2}$ E) $\frac{15}{2}$

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

A) $-\frac{28}{9}$ B) $-\frac{56}{9}$ C) $\frac{1}{3}$ D) $\frac{11}{9}$ E) -1

9. $\dfrac{\frac{x}{y}}{z} : \dfrac{x}{\frac{y}{z}} = 9 \Rightarrow z = ?$

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

10. $1+\dfrac{2}{3-\frac{1}{1+\frac{2}{3-x}}} = 3 \Rightarrow x = ?$

A) 5 B) 6 C) 7 D) $\frac{15}{2}$ E) $\frac{17}{2}$

11. $2\frac{1}{2} : \frac{\frac{1}{3}}{1+\frac{1}{9}} = ?$

A) $\frac{3}{4}$ B) $\frac{1}{2}$ C) $\frac{25}{3}$ D) $\frac{5}{2}$ E) $\frac{50}{3}$

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

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

13. $\frac{\left(\frac{2001}{2004}+\frac{1}{2003}\right)-\left(\frac{1}{2003}-\frac{3}{2004}\right)}{\frac{1}{2003}-\left(\frac{1}{2003}+\frac{1}{2004}\right)} = ?$

A) -2004 B) -1002 C) -1 D) $-\frac{1}{1002}$ E) $-\frac{1}{2004}$

14. $\frac{(a^{-1}+b^{-1})^{-1}}{(a+b)^{-1}} = ?$

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

15. $0 < x < y < z$ ve(and) z, y, $x \in R$,

$a = \frac{x+y}{z}$, $b = \frac{x-z}{y}$, $c = \frac{y+z}{x} \Rightarrow$ **? < ? < ?**

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

16. $a = \frac{3}{4}$, $b = \frac{4}{5}$, $c = \frac{3}{5} \Rightarrow$ **? > ? > ?**

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

17. $1+\cfrac{2}{1+\cfrac{2}{1+\cfrac{2}{\ddots}}} = ?$

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

18. $2+\cfrac{2+\cfrac{2+\cfrac{\ddots}{2}}{2}}{2} = ?$

A) 2 B) 3 C) 4 D) 6 E) 10

19. $\cfrac{2-\left(\frac{1}{2}-2:\frac{1}{3}\right)^{-1}}{2-\cfrac{1}{2-\cfrac{1}{2-\cfrac{1}{\ddots}}}} = ?$

A) $\frac{1}{2}$ B) $\frac{11}{2}$ C) $-\frac{8}{11}$ D) $\frac{3}{8}$ E) $\frac{24}{11}$

20. $\left(1-\frac{1}{2}\right)+\left(2-\frac{1}{2}\right)+\ldots+\left(x-\frac{1}{2}\right)=32 \Rightarrow x = ?$

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

Yanıtlar / *Answers*

1. D	2. D	3. A	4. E	5. B	6. D
7. D	8. B	9. B	10. C	11. B	12. D
13. A	14. C	15. B	16. A	17. C	18. C
19. E	20. A				

1. **3,075 = ?**

A) $\frac{123}{40}$ B) $\frac{40}{9}$ C) $\frac{15}{4}$ D) $\frac{2}{16}$ E) $\frac{33}{10}$

2. $0,0703\,(0,3-\frac{2}{10}) = ?$

A) 0,00703 B) 0,0703 C) 0,703
D) –0,0703 E) –0,00703

3. $\frac{5,1}{0,017}+\frac{0,09}{0,003}+\frac{1}{0,1} = ?$

A) 610 B) 601 C) 340 D) 331 D) 304

4. $\frac{0,25}{2,5}+\frac{1,01}{0,1}+\frac{15}{0,02} = ?$

A) 77,1 B) 95,1 C) 186
D) 760,2 E) 861

5. **$5\cdot(0,002)^4 = ?$**

A) 8.10^{-13} B) 8.10^{-11} C) 16.10^{-10}
D) 16.10^{-11} E) 4.10^{-8}

6. $\frac{0,123}{0,44}=\frac{x}{0,88} \Rightarrow x = ?$

A) 0,164 B) 0,246 C) 0,142
D) 0,146 E) 0,82

7. $0,000018 = 1,8.10^x \Rightarrow x = ?$

A) –7 B) –6 C) –5 D) –4 E) –3

8. **(0,734 + 0,266) (1–0,99) = ?**

A) 0,01 B) 0,1 C) 0,101
D)0,2 E) 0,02

9. **(0,842 – 0, 342) . (0,118 + 0,082) = ?**

A) 0,02 B) 0,4 C) 0,2
D) 0,01 E) 0,1

10. **0,0125 = ?**

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

11. $\dfrac{0,012:0,03}{0,12+0,06}:\dfrac{5}{9}=?$

A) $\dfrac{10}{9}$ B) $\dfrac{18}{5}$ C) $\dfrac{2}{5}$ D) 4 E) 6

12. $\dfrac{0,aa+0,bb}{0,ab+0,ba}=?$

A) $\dfrac{a}{a+b}$ B) $\dfrac{a+b}{ab}$ C) $\dfrac{11}{100}$ D) 0,22 E) 1

13. $\left[(0,24:0,072).\dfrac{3}{10}\right]-0,25=?$

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

14. $\dfrac{3+(4,2:0,1)}{(1:0,3)-\dfrac{7}{3}}=?$

A) 20 B) 35 C) 40 D) 45 E) 50

15. $\dfrac{0,35}{0,7}-\dfrac{0,56}{0,28}-\dfrac{0,001}{0,002}=?$

A) –3 B) –2 C) 1 D) 2 E) 3

16. $\dfrac{20+\dfrac{0,01}{0,001}}{0,04+\dfrac{0,04}{4}}=?$

A) 600 B) 60 C) 6 D) 0,6 E) 0,06

17. $\dfrac{5}{0,25}+\dfrac{7}{0,025}+\dfrac{1}{0,0025}=?$

A) 10 B) 50 C) 200 D) 700 E) 800

18. $\dfrac{3-\dfrac{a}{2}}{0,25}=\dfrac{0,03}{0,005}\Rightarrow a=?$

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

19. $\dfrac{\dfrac{3}{5}+0,04}{0,4-\dfrac{2}{25}}=?$

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

20. $\dfrac{(0,431+0,3)-0,031}{0,07}=?$

A) $\dfrac{1}{100}$ B) $\dfrac{1}{10}$ C) 10 D) 50 E) 100

Yanıtlar / *Answers*

1. A	2. A	3. C	4. D	5. B	6. B
7. C	8. A	9. E	10. D	11. D	12. E
13. C	14. D	15. B	16. A	17. D	18. C
19. D	20. C				

ORAN ve ORANTI
RATIO and PROPORTION

BÖLÜM / CHAPTER 3

Tanım: Her ikisi de aynı anda sıfır olmayan aynı birimden iki niceliğin bölümüne **oran** denir.

Definition: *The quotient of the same unit, both of which are not zero at the same time is called ratio.*

$$\frac{3kg}{2kg}=\frac{3}{2}\ ,\ \frac{3cm}{5cm}=\frac{3}{5}\ ,\ \frac{3\,lt}{6lt}=\frac{1}{2}$$

Tanım: İki veya daha fazla oranın eşitliğine **orantı** denir.

Definition: *The equality of two or more rations is called proportion.*

$$\frac{a}{b}=k\ ,\ \frac{c}{d}=k,\ \frac{e}{f}=k \Rightarrow \frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k$$

Yukarıdaki ifade bir orantı olup k, orantı sabitidir.

$\frac{2}{3}=\frac{4}{6}=\frac{6}{9}=.....=\frac{2n}{3n}$ bir orantıdır. Bu orantının orantı sabiti $k=\frac{2}{3}$ tür.

The expression above is a proportion and K is called the proportionality constant.

$\frac{2}{3}=\frac{4}{6}=\frac{6}{9}=.....=\frac{2n}{3n}$ *is a proportion. Here,* $k=\frac{2}{3}$ *is the proportionality constant.*

ORAN ve ORANTININ ÖZELLİKLERİ
PROPERTIES of RATIO and PROPORTION

1. $a:b=c:d \Rightarrow \frac{a}{c}=\frac{b}{d}$

   $a:b:c=d:e:f \Rightarrow \frac{a}{d}=\frac{b}{e}=\frac{c}{f}$

2. $\frac{a}{b}=\frac{c}{d} \Rightarrow$

   I. $a\cdot d=b\cdot c$

   II. $\frac{a}{c}=\frac{b}{d}$

   III. $\frac{d}{b}=\frac{c}{a}$

   IV. $\frac{b}{a}=\frac{d}{c}$

Örnek / Example:

$$\frac{a}{b}=\frac{c}{d}=\frac{3}{4} \Rightarrow \left(\frac{a+d}{b}\right)\cdot\left(\frac{c+b}{d}\right)=?$$

Çözüm / Solution:

$$\left.\begin{matrix}a=c=3\\ b=d=4\end{matrix}\right\}$$

$$\Rightarrow \left(\frac{a+d}{b}\right)\cdot\left(\frac{c+b}{d}\right)=\left(\frac{3+4}{4}\right)\cdot\left(\frac{3+4}{4}\right)=\frac{49}{16}$$

3. $\frac{a}{b}=\frac{c}{d}=k \Rightarrow$

   I. $\frac{a+c}{b+d}=k$

   II. $\frac{m\cdot a}{m\cdot b}=\frac{t\cdot c}{t\cdot d}=\frac{m\cdot a+t\cdot c}{m\cdot b+t\cdot d}=k$

Örnek / Example:

$\frac{a}{3}=\frac{b}{4}=\frac{c}{5}$ ve (and) $3a+c=42 \Rightarrow$ **b = ?**

Çözüm / Solution:

$$\frac{a}{3}=\frac{b}{4}=\frac{c}{5}=k \Rightarrow \begin{cases}a=3k\\ b=4k\\ c=5k\end{cases}$$

$3a + c = 42$

$3\cdot 3k + 5k = 42 \Rightarrow 14k = 42 \Rightarrow k = 3$

$b = 4k \Rightarrow b = 4 \cdot 3 = 12$

Örnek / Example:

$\frac{a}{2}=\frac{b}{3}=\frac{c}{5}$ ve (and) $3a + 2b - 4c = -24 \Rightarrow$ **a = ?**

Çözüm / Solution:

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{5}=k \Rightarrow \begin{cases}a=2k\\ b=3k\\ c=5k\end{cases}$$

$3a + 2b - 4c = -24 \Rightarrow 3\cdot 2k + 2\cdot 3k - 4\cdot 5k = -24$

$\Rightarrow 6k + 6k - 20k = -24$

$\Rightarrow -8k = -24 \Rightarrow k = 3$

$\Rightarrow a = 2\cdot 3 = 6$

Örnek / Example:

$$\left.\begin{array}{l}\dfrac{a-1}{3}=\dfrac{b+2}{4}=\dfrac{c-2}{5}\\ 5a-2c=36\end{array}\right\} \Rightarrow \mathbf{b=?}$$

Çözüm / Solution:

$$\frac{a-1}{3}=\frac{b+2}{4}=\frac{c-2}{5}=k \Rightarrow \begin{cases}a=3k+1\\ b=4k-2\\ c=5k+2\end{cases}$$

$$5a-2c=36 \Rightarrow 5(3k+1)-2(5k+2)=36$$

$$15k+5-10k-4=36$$

$$5k+1=36$$

$$5k=35$$

$$k=7$$

$$b=4k-2=4\cdot 7-2=28-2=26$$

4. $\dfrac{a}{b}=\dfrac{c}{d} \Rightarrow \dfrac{m\cdot a+n\cdot b}{t\cdot a+l\cdot b}=\dfrac{m\cdot c+n\cdot d}{t\cdot c+l\cdot d}$

Örnek / Example:

$$\left.\begin{array}{l}\dfrac{a}{x}=\dfrac{b}{y}=\dfrac{c}{z}=\dfrac{1}{3}\\ a-2b+3c=2\\ 2y-3z=1\end{array}\right\} \Rightarrow \mathbf{x=?}$$

Çözüm / Solution:

$$\frac{a}{x}=\frac{-2\cdot b}{-2\cdot y}=\frac{3\cdot c}{3\cdot z}=\frac{1}{3}$$

$$\frac{a-2\cdot b+3\cdot c}{x-2\cdot y+3\cdot z}=\frac{1}{3} \Rightarrow \frac{2}{x-(-1)}=\frac{1}{3}$$

$$\Rightarrow 6=x+1$$

$$\Rightarrow x=5$$

5. i. a ve b doğru orantılı ise $\dfrac{a}{b}=k$

If a and b are directly proportional, then $\dfrac{a}{b}=k$

ii. a ve b ters orantılı ise

If a and b are inversely proportional to each other, then

$a\cdot b=k$

Örnek / Example:

$$\left.\begin{array}{l}a\cdot x=b\cdot y=c\cdot z=\dfrac{2}{3}\\ x+y+z=18\end{array}\right\} \Rightarrow \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=?$$

Çözüm / Solution:

$$a\cdot x=b\cdot y=c\cdot z=\frac{2}{3}$$

$$\frac{x}{\frac{1}{a}}=\frac{y}{\frac{1}{b}}=\frac{z}{\frac{1}{c}}=\frac{2}{3} \Rightarrow \frac{x+y+z}{\frac{1}{a}+\frac{1}{b}+\frac{1}{c}}=\frac{2}{3}$$

$$\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{3}{2}\cdot 18=27$$

Örnek / Example:

$$\frac{x}{3}=\frac{y}{4}=\frac{z}{7}=\frac{4x-5y+kz}{13} \Rightarrow \mathbf{k=?}$$

Çözüm / Solution:

$$\frac{4x}{3\cdot 4}=\frac{-5y}{-5\cdot 4}=\frac{zk}{7k}=\frac{4x-5y+kz}{13}$$

$$\frac{4x-5y+zk}{12-20+7k}=\frac{4x-5y+kz}{13}$$

$$7k-8=13$$

$$7k=21$$

$$k=3$$

Örnek / Example:

$a, b \in R^+$

$$\frac{a+b}{6}=\frac{2a-b}{9}=\frac{a\cdot b}{45} \Rightarrow \mathbf{b=?}$$

Çözüm / Solution:

$$\frac{a+b+2a-b}{6+9}=\frac{a\cdot b}{45}$$

$$\frac{3a}{15}=\frac{a\cdot b}{45} \Rightarrow b=9$$

ÇÖZÜMLÜ TEST / *TEST WITH SOUTIONS*

1. $\frac{a}{b}=\frac{2}{3}$, $2a+b=84 \Rightarrow$ **b = ?**

A) 14 B) 28 C) 27 D) 30 E) 36

Çözüm / Solution:

$$\frac{a}{b}=\frac{2}{3} \Rightarrow \frac{a}{2}=\frac{b}{3}=k \Rightarrow a=2k$$
$$b=3k$$
$$2a+b=2\cdot 2k+3k=7k=84 \Rightarrow k=12$$
$$b=3k=3\cdot 12=36$$

Yanıt / Answer E

2. $\frac{a}{2}=\frac{b}{3}=\frac{c}{4}$, $3a-b+2c=66 \Rightarrow$ **b = ?**

A) 12 B) 18 C) 22 D) 33 E) 44

Çözüm / Solution:

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{4}=k \Rightarrow a=2k,\ b=3k,\ c=4k$$
$$3a-b+2c=3\cdot 2k-3k+2\cdot 4k$$
$$=6k-3k+8k$$
$$11k=66$$
$$k=6$$
$$b=3k \Rightarrow b=3\cdot 6=18$$

Yanıt / Answer B

3. $\frac{a}{b}=\frac{3}{4} \Rightarrow \frac{a+b}{a}=?$

A) $\frac{7}{3}$ B) $\frac{7}{4}$ C) $\frac{14}{3}$ D) $\frac{3}{4}$ E) $\frac{3}{7}$

Çözüm / Solution:

$$\frac{a}{b}=\frac{3}{4} \Rightarrow 4a=3b \Rightarrow b=\frac{4a}{3}$$
$$\frac{a+b}{a}=\frac{a+\frac{4a}{3}}{a}=\frac{7a}{3}\cdot\frac{1}{a}=\frac{7}{3}$$

Yanıt / Answer A

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

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

Çözüm / Solution:

$$\frac{x}{y}=\frac{2}{3} \Rightarrow 3x=2y$$
$$x=\frac{2y}{3}$$
$$\frac{3x-4y}{x-y}=\frac{3\cdot\frac{2y}{3}-4y}{\frac{2y}{3}-y}=\frac{-2y}{-\frac{y}{3}}$$
$$=6$$

Yanıt / Answer E

5. $a:b:c=2:3:4$

$3a+4b-c=-28 \Rightarrow$ **b = ?**

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

Çözüm / Solution:

$a:b:c=2:3:4$

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{4}=k \Rightarrow a=2k,\ b=3k,\ c=4k$$
$$3a+4b-c=3\cdot 2k+4\cdot 3k-4k$$
$$=6k+12k-4k$$
$$14k=-28$$
$$k=-2$$
$$b=3\cdot(-2)=-6$$

Yanıt / Answer E

6. $a, b, c \in R$

$$\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=2 \Rightarrow \frac{a}{d}=?$$

A) 2 B) 4 C) 6 D) 8 E) 16

Çözüm / Solution:

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

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

$$\frac{b}{c}=2 \Rightarrow c=\frac{b}{2}$$

$$\frac{c}{d}\cdot\frac{\frac{b}{2}}{d}=\frac{b}{2d}=2 \Rightarrow b=4d \Rightarrow d=\frac{b}{4}$$

$$\frac{a}{d}=\frac{2b}{\frac{b}{4}}=8$$

Yanıt / Answer D

7. $\frac{a}{b}=\frac{2}{5}, \frac{b}{4}=c, a+b=21 \Rightarrow$ **c = ?**

A) $\frac{13}{5}$ B) $\frac{15}{4}$ C) 6 D) 28 E) 60

Çözüm / Solution:

$$\frac{a}{b}=\frac{2}{5} \Rightarrow 5a=2b \Rightarrow a=\frac{2b}{5}$$

$$a+b=\frac{2b}{5}+b=21$$

$$\frac{7b}{5}=21 \Rightarrow b=15$$

$$\frac{b}{4}=c \Rightarrow \frac{15}{4}=c$$

Yanıt / Answer B

8. $\frac{a}{-2}=\frac{b}{3}=3, a+b+c=1 \Rightarrow$ **c = ?**

A) 2 B) 1 C) −2 D) −1 E) −4

Çözüm / Solution:

$$\frac{a}{-2}=\frac{b}{3}=3 \Rightarrow \begin{array}{l} a=-6, \Rightarrow b=9 \\ a+b+c=1 \Rightarrow -6+9+c=1 \\ c=-2 \end{array}$$

Yanıt / Answer C

9. $\frac{1}{3a}=\frac{1}{4b}=\frac{1}{6c}, a+b+c=27 \Rightarrow$ **a − c = ?**

A) 3 B) 4 C) 6 D) 8 E) 12

Çözüm / Solution:

$$\frac{1}{3a}=\frac{1}{4b}=\frac{1}{6c}=k$$

$$3a=\frac{1}{k} \Rightarrow a=\frac{1}{3k}$$

$$4b=\frac{1}{k} \Rightarrow b=\frac{1}{4k}$$

$$6c=\frac{1}{k} \Rightarrow c=\frac{1}{6k}$$

$$a+b+c=\frac{1}{3k}+\frac{1}{4k}+\frac{1}{6k}=27$$

$$\frac{9}{12k}=27 \Rightarrow k=\frac{1}{36}$$

$$\left.\begin{array}{l} a=\dfrac{1}{3\cdot\frac{1}{36}} \Rightarrow a=12 \\ \\ c=\dfrac{1}{6\cdot\frac{1}{36}} \Rightarrow c=6 \end{array}\right\} \Rightarrow a-c=12-6=6$$

Yanıt / Answ

10. $\frac{a}{2}=\frac{b}{3}=\frac{c}{4}, 2a-3b+c=5 \Rightarrow$ **a = ?**

A) −15 B) −10 C) 5 D) 10 E) 15

Çözüm / Solution:

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{4}=k$$

$a=2k, b=3k, c=4k$

$$2a-3b+c=2\cdot 2k-3\cdot 3k+4k=5$$

$$4k-9k+4k=5$$

$$-k=5 \Rightarrow k=-5$$

$$a=2k=2\cdot(-5)=-10$$

Yanıt / Answe

11. $\frac{x}{x+y}=3 \Rightarrow \frac{x+y}{y}=$ **?**

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

Çözüm / Solution:

$$\frac{x}{x+y}=3 \Rightarrow x=3x+3y$$

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

$$\frac{x+y}{y}=\frac{-\frac{3y}{2}+y}{y}=\frac{-\frac{y}{2}}{y}$$

$$=-\frac{1}{2}$$

Yanıt / Answer A

12. $a, b, c \in Z^+$

$$\frac{a}{\frac{3}{5}}=\frac{b}{\frac{5}{8}}=\frac{c}{\frac{2}{3}} \Rightarrow \; ? < ? < ?$$

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

Çözüm / Solution:

$$\frac{a}{\frac{3}{5}}=\frac{b}{\frac{5}{8}}=\frac{c}{\frac{2}{3}}=k$$

$$\left.\begin{array}{l} a=\frac{3}{5}k=\frac{72}{120}k \\ b=\frac{5}{8}k=\frac{75}{120}k \\ c=\frac{2}{3}k=\frac{80}{120}k \end{array}\right\} \Rightarrow a<b<c$$

Yanıt / Answer A

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

$$\frac{a}{0,1}=\frac{b}{0,3}=\frac{c}{2} \Rightarrow ? > ? > ?$$

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

Çözüm / Solution:

$$\frac{a}{0,1}=\frac{b}{0,3}=\frac{c}{2}=k$$

$$\left.\begin{array}{l} a=0,1k \\ b=0,3k \\ c=2k \end{array}\right\} k=-10 \Rightarrow a=-1, \; b=-3, \; c=-20$$

$$\Rightarrow a>b>c$$

Yanıt / Answer A

14. $\frac{a}{3}=\frac{b}{4}=\frac{c}{5} \Rightarrow \left(\frac{a+2b+c}{a-b+c}\right)=?$

A) 3 B) 4 C) 6 D) 8 E) 9

Çözüm / Solution:

$$\frac{a}{3}=\frac{b}{4}=\frac{c}{5}=k$$

$a=3k, \; b=4k, \; c=5k$

$$\frac{a+2b+c}{a-b+c}=\frac{3k+2\cdot 4k+5k}{3k-4k+5k}=\frac{16k}{4k}=4$$

Yanıt / Answer B

15. $\frac{a}{b}=\frac{c}{d}=4 \Rightarrow \left(\frac{a-2b}{b}\right)\cdot\left(\frac{c}{c+2d}\right)=?$

A) $\frac{3}{4}$ B) 8 C) $\frac{4}{3}$ D) 3 E) $\frac{5}{2}$

Çözüm / Solution:

$$\frac{a}{b}=\frac{c}{d}=4$$

$$\frac{a}{b}=4 \Rightarrow a=4b$$

$$\frac{c}{d}=4 \Rightarrow c=4d$$

$$\left(\frac{a-2b}{b}\right)\cdot\left(\frac{c}{c+2d}\right)=\left(\frac{4b-2b}{b}\right)\cdot\left(\frac{4d}{4d+2d}\right)$$

$$=2\cdot\frac{4}{6}=\frac{4}{3}$$

Yanıt / Answer C

YÖS SORULARI / *YÖS QUESTIONS*

1. $\left.\begin{array}{l} b>0 \\ \frac{a}{b}=\frac{4}{3} \\ a+b=c \end{array}\right\} \Rightarrow ? < ? < ?$

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

D) $b<a<c$ E) $c<a<b$

(YÖS 1990)

Çözüm / Solution:

$$\frac{a}{b}=-\frac{4}{3}$$

$\Rightarrow a=-4k,\quad b=3k \quad k\in R^+$

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

Yanıt / Answer A

2. $a<0$

$$\frac{a\cdot b}{1}=\frac{b\cdot c}{-2}=\frac{c\cdot a}{9} \Rightarrow ? < ? < ?$$

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

D) $a<c<b$ E) $a<b<c$

(YÖS 1991)

Çözüm / Solution:

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

$\Rightarrow c=-2a=96$

$\Rightarrow c=18k$

$a=-9k$

$b=2k$

$a<0 \Rightarrow k\in R^+$

$\Rightarrow a<b<c$

Yanıt / Answer E

3. $\frac{x}{y}=\frac{a}{b} \Rightarrow \frac{b-y}{b+y}=?$

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 19

Çözüm / Solution:

$$\frac{x}{y}=\frac{a}{b}\Rightarrow b=\frac{ay}{x}$$

$$\frac{b-y}{b+y}=\frac{\frac{ay}{x}-y}{\frac{ay}{x}+y}=\frac{ay-xy}{ay+xy}=\frac{y(a-x)}{y(a+x)}=\frac{a-x}{a+x}$$

Yanıt / Answer

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

A) -24 B) -21 C) -18 D) -15 E) -12

(YÖS 19

Çözüm / Solution:

$$\frac{a}{2}=\frac{b}{-3}=k \Rightarrow a=2k,\quad b=-3k$$

$a+b=2k-3k=-k=2$

$k=-2$

$a=2\cdot(-2)=-4$

$b=-3\cdot(-2)=6$

$a\cdot b=-24$

Yanıt / Answe

5. $0 < a,\ 0 < b,\ 0 < c$

$\frac{b}{a} = \frac{1}{3}$

$\frac{a}{c} = \frac{2}{3}$

$a + b + c = 34 \Rightarrow$ **a = ?**

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

(YÖS 1993)

Çözüm / Solution:

$\frac{b}{a} = \frac{1}{3} \Rightarrow a = 3b \Rightarrow b = \frac{a}{3}$

$\frac{a}{c} = \frac{2}{3} \Rightarrow 2c = 3a \Rightarrow c = \frac{3a}{2}$

$a + \frac{a}{3} + \frac{3a}{2} = 34$

$\frac{17a}{6} = 34 \Rightarrow a = 12$

Yanıt / Answer C

6. $\left.\begin{array}{l} 0 < a,\ 0 < b \\ \frac{a}{4} = \frac{b}{3} \\ a^2 + b^2 = 100 \end{array}\right\} \Rightarrow$ **a − b = ?**

A) 2 B) 3 C) −1 D) −3 E) −4

(YÖS 1993)

Çözüm / Solution:

$0 < a,\ 0 < b$

$\frac{a}{4} = \frac{b}{3} = k$

$a = 4k,\quad b = 3k$

$a^2 + b^2 = 100$

$16k^2 + 9k^2 = 100$

$25k^2 = 100$

$k^2 = 4$

$k = 2$

$a = 8,\ b = 6$

$a - b = 8 - 6 = 2$

Yanıt / Answer A

7. $a > 0,\quad b > 0,\quad c > 0$

$a \cdot b = \frac{1}{4},\quad a \cdot c = \frac{1}{5},\quad b \cdot c = \frac{2}{3} \quad \Rightarrow$ **? < ? < ?**

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

D) $b < c < a$ E) $c < a < b$

(YÖS 1994)

Çözüm / Solution:

$a \cdot b = \frac{1}{4} \quad a \cdot c = \frac{1}{5} \quad b \cdot c = \frac{2}{3}$

$\Rightarrow abc = \frac{c}{4} = \frac{b}{5} = \frac{2a}{3} = 2k$

$\Rightarrow c = 8k,\ b = 10k,\ a = 3k$

$\Rightarrow a < c < b$

Yanıt / Answer B

8. $\frac{a}{4} = \frac{b}{5} = \frac{c}{7}$

$2a + 4b - 3c = 49 \Rightarrow$ **b = ?**

A) 14 B) 21 C) 28 D) 35 E) 42

(YÖS 1994)

Çözüm / Solution:

$\frac{a}{4} = \frac{b}{5} = \frac{c}{7} = k$

$a = 4k,\ b = 5k,\ c = 7k \Rightarrow$

$2a + 4b - 3c = 2 \cdot 4k + 4 \cdot 5k - 3 \cdot 7k$

$8k + 20k - 21k = 49$

$7k = 49$

$k = 7$

$b = 5k \Rightarrow b = 5 \cdot 7$

$b = 35$

Yanıt / Answer D

9. $k > 0$

$x = 2k$

$y = 3k$

$z = 4k$

$x + y + z = 360 \Rightarrow$ **z = ?**

A) 180 B) 160 C) 120 D) 80 E) 60

YÖS 1995)

Çözüm / Solution:

$x = 2k$

$y = 3k$

$z = 4k$

$x + y + z = 2k + 3k + 4k = 360$

$9k = 360$

$k = 40$

$\Rightarrow z = 4k = 4 \cdot 40 = 160$

Yanıt / Answer B

10. $\frac{a}{b^2} = \frac{3}{16} \Rightarrow \frac{a+b}{b} = ?$

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

(YÖS 1997)

Çözüm / Solution:

$$\frac{a}{b^2} = \frac{3}{16} \Rightarrow a = 3, \quad b = 4 \Rightarrow \frac{a+b}{b} = \frac{3+4}{4} = \frac{7}{4}$$

Yanıt / Answer C

11. $a, b, c \in R^+$

$\frac{3a+b}{b} = 2, \quad \frac{b+2c}{c} = 4 \Rightarrow$ **? < ? < ?**

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

D) $b < c < a$ E) $c < a < b$

(YÖS 199

Çözüm / Solution:

$$\left.\begin{array}{lll} 3a + b = 2b \Rightarrow & 3a = b, & a < b \\ b + 2c = 4c \Rightarrow & b = 2c, & c < b \\ & 3a = 2c, & a < c \end{array}\right\} \Rightarrow a < c < b$$

Yanıt / Answer

12. $A, B, C \in Z^+$

$A + B + C = 380$

$\frac{A}{B} = \frac{B}{C} = \frac{2}{3} \Rightarrow$ **C − B = ?**

A) 50 B) 60 C) 70 D) 80 E) 90

(YÖS 19

Çözüm / Solution:

$$\frac{A}{B} = \frac{2}{3} \Rightarrow 3A = 2B \Rightarrow A = \frac{2B}{3}$$

$$\frac{B}{C} = \frac{2}{3} \Rightarrow 2C = 3B \Rightarrow C = \frac{3B}{2}$$

$$A + B + C = \frac{2B}{3} + B + \frac{3B}{2} = 380$$

$$\frac{19B}{6} = 380 \Rightarrow B = 120$$

$$C = \frac{3 \cdot 120}{2} = 180$$

$$C - B = 180 - 120$$

$$= 60$$

Yanıt / Answe

13. $\frac{a}{b}=\frac{c}{d}=3 \Rightarrow \frac{\left(\frac{a+b}{b}\right)\cdot\left(\frac{c+d}{c}\right)}{\frac{a-b}{a}} = ?$

A) $\frac{8}{3}$ B) $\frac{4}{3}$ C) 16 D) 12 E) 8

(YÖS 1999)

Çözüm / Solution:

$a = 3b, \quad c = 3d$

$$\frac{\left(\frac{a+b}{b}\right)\cdot\left(\frac{c+d}{c}\right)}{\frac{a-b}{a}} = \frac{\frac{4b}{b}\cdot\frac{4d}{3d}}{\frac{2b}{3b}}$$

$$= \frac{16}{3}\cdot\frac{3}{2}$$

$$= 8$$

Yanıt / Answer E

14. $\frac{x}{5}=\frac{y}{6}=\frac{7}{8}=k,$

$x + y + z = 1900 \Rightarrow y = ?$

A) 900 B) 800 C) 700 D) 600 E) 500

(YÖS 1999)

Çözüm / Solution:

$$\frac{x}{5}=\frac{y}{6}=\frac{z}{8}=k$$

$\Rightarrow x = 5k, \quad y = 6k, \quad z = 8k$

$x + y + z = 1900$

$5k + 6k + 8k = 1900$

$19k = 1900$

$k = 100$

$\Rightarrow y = 6k = 600$

Yanıt / Answer D

15. $a + b + c = 80$

$\frac{a}{2}=\frac{b}{3}=\frac{c}{5} \Rightarrow b + a - c = ?$

A) -6 B) -4 C) 0 D) 6 E) 12

(YÖS 2000)

Çözüm / Solution:

$$\frac{a}{2}=\frac{b}{3}=\frac{c}{5}=k \Rightarrow a = 2k, \quad b = 3k, \quad c = 5k$$

$a + b + c = 80 \Rightarrow 2k + 3k + 5k = 80$

$10k = 80$

$k = 8$

$b + a - c = 3k + 2k - 5k$

$= 0$

Yanıt / Answer C

16. $\left.\begin{array}{l} a < 0 \\ a = 2b \\ b = \frac{c}{3} \end{array}\right\} \Rightarrow ? < ? < ?$

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

D) $c < a < b$ E) $c < b < c$

(YÖS 2003)

Çözüm / Solution:

$a = 2b = \frac{2}{3}c \Rightarrow 3a = 6b = 2c$

$\Rightarrow a = 2k \quad b = k \quad c = 3k \quad (k \in R^-)$

$\Rightarrow c < a < b$

Yanıt / Answer D

17. $\left.\begin{array}{l} a\cdot b=\dfrac{12}{35} \\ b\cdot c=\dfrac{28}{45} \\ a\cdot c=\dfrac{1}{3} \end{array}\right\} \Rightarrow |a| = ?$

A) $\frac{7}{9}$ B) $\frac{3}{5}$ C) $\frac{5}{4}$ D) $\frac{1}{7}$ E) $\frac{3}{7}$

(YÖS 2003)

Çözüm / Solution:

$$\frac{a\cdot b}{b\cdot c}=\frac{\frac{12}{35}}{\frac{28}{45}}=\frac{12\cdot 45}{35\cdot 28}\Rightarrow c=\frac{49}{27}a$$

$$a\cdot c=\frac{1}{3}\Rightarrow \frac{49}{27}a^2=\frac{1}{3}\Rightarrow a^2=\frac{9}{49}\Rightarrow |a|=\frac{3}{7}$$

Yanıt / Answer E

18. $a+\frac{1}{b}=3$

$b+\frac{1}{a}=8$

$\frac{a+b}{b-a}=?$

A) $\frac{8}{3}$ B) $\frac{9}{4}$ C) $\frac{11}{5}$ D) $\frac{12}{7}$ E) $\frac{13}{8}$

(YÖS 2005)

Çözüm / Solution:

$$\frac{a\cdot b+1}{b}=3\Rightarrow a\cdot b+1=3b$$

$$\frac{a\cdot b+1}{a}=8\Rightarrow a\cdot b+1=8a$$

$$3b=8a\Rightarrow b=8k,\ a=3k$$

$$\frac{a+b}{b-a}=\frac{3k+8k}{8k-3k}=\frac{11k}{5k}=\frac{11}{5}$$

Yanıt / Answer C

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

$a\cdot b\cdot c=12$

$c=?$

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

(YÖS 2006)

Çözüm / Solution:

$$\frac{a}{2}=\frac{2}{b}\Rightarrow a\cdot b=4$$

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

$$4\cdot c=12\Rightarrow c=3$$

Yanıt / Answer B

1. $\frac{a}{b}=\frac{c}{d}=4 \Rightarrow \left(\frac{3a+b}{b}\right):\left(\frac{2c+4d}{d}\right)=?$

Yanıt / Answer : $\frac{13}{12}$

2. $a, b \in R^+$

$\frac{a}{25}=\frac{b}{16}=\frac{82}{a+b} \Rightarrow a+b=?$

Yanıt / Answer : $41\sqrt{2}$

3. $\left.\begin{array}{l}\frac{x}{y}=\frac{3}{4}\\ \frac{x}{z}=\frac{6}{5}\end{array}\right\}, x+z=A\cdot(y-x) \Rightarrow A=?$

Yanıt / Answer : $\frac{11}{12}$

4. $\left.\begin{array}{l}\frac{a\cdot b}{c\cdot d}=\frac{5}{6}\\ \frac{a\cdot c}{b\cdot d}=\frac{6}{7}\end{array}\right\} \Rightarrow \frac{b^2}{c^2}=?$

Yanıt / Answer : $\frac{35}{36}$

5. $\left.\begin{array}{l}ax=by=cz=4\\ x+y+z=8\end{array}\right\} \Rightarrow \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=?$

Yanıt / Answer : 2

6. $\frac{a+4b}{3a-b}=\frac{7}{5} \Rightarrow \frac{a}{b}=?$

Yanıt / Answer : $\frac{27}{16}$

7. $\frac{a}{b}=\frac{c}{d}=\frac{1}{6} \Rightarrow \frac{a+b}{b}+\frac{c+d}{d}=?$

Yanıt / Answer : $\frac{7}{3}$

8. $\left.\begin{array}{l}\frac{x+y}{y}=\frac{4}{3}\\ \frac{y}{z}=6\end{array}\right\} \Rightarrow \frac{x}{z}=?$

Yanıt / Answer : 2

9. $\left.\begin{array}{l}\frac{a}{b}=\frac{c}{d}=k \\ \frac{6+5c}{n\cdot b+5d}=k\end{array}\right\} \Rightarrow n=?$

Yanıt / Answer : $\frac{6}{a}$

10. $a\cdot x=b\cdot y=c\cdot z=\frac{12}{5}$,

$x+y+z=96 \Rightarrow \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=?$

Yanıt / Answer : 40

11. $\left.\begin{array}{l}\frac{a}{2}=\frac{b}{3}=\frac{c}{4} \\ c=a+18\end{array}\right\} \Rightarrow b=?$

Yanıt / Answer : 27

12. $3a = 4b = 5c,$

$2a + 3b - c = 146$

$\Rightarrow c = ?$

Yanıt / Answer : 24

13. $a : b : c = 2 : 5 : 6 \Rightarrow \frac{2b+c}{5a-c}=?$

Yanıt / Answer :

14. $\left.\begin{array}{l}\frac{1}{3a}=\frac{1}{4b}=\frac{1}{3c} \\ b-3c=20\end{array}\right\} \Rightarrow a-b-c=?$

Yanıt / Answer : $\frac{2(}{3}$

15. $\frac{2a+4}{b+1}=\frac{b-4}{c+1}=\frac{b+2c}{a-2}=k \Rightarrow k=?$

Yanıt / Answer :

16. $\left.\begin{array}{l}\frac{a}{5}=\frac{b}{7}=\frac{c}{8} \\ 3a-2b+c=36\end{array}\right\} \Rightarrow a=?$

Yanıt / Answer : 2

1. $\frac{a+3b}{4a-b}=\frac{3}{4} \Rightarrow \frac{b}{a}=?$

A) $\frac{7}{12}$ B) $\frac{8}{15}$ C) $\frac{9}{17}$ D) $\frac{4}{3}$ E) $\frac{9}{2}$

2. $\frac{a}{b}=\frac{c}{d}=\frac{4}{5} \Rightarrow \frac{a+b}{b}+\frac{c+d}{d}=?$

A) $\frac{9}{5}$ B) $\frac{9}{10}$ C) $\frac{4}{5}$ D) $\frac{18}{5}$ E) $\frac{13}{5}$

3. $\frac{a+b}{b}=\frac{7}{3}$ ve(and) $\frac{b}{c}=6 \Rightarrow \frac{a}{c}=?$

A) $\frac{9}{2}$ B) 8 C) $\frac{6}{5}$ D) 12 E) $\frac{16}{5}$

4. $\frac{x}{y}=\frac{z}{t}=n$ ve(and) $\frac{8+5z}{a\cdot y+5t}=n \Rightarrow a=?$

A) $\frac{x}{8}$ B) $\frac{8}{x}$ C) $8x$ D) $\frac{y}{8}$ E) $\frac{8}{y}$

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

$5a+4c-2c=51 \Rightarrow a+b+c=?$

A) 48 B) 51 C) 60 D) 63 E) 72

6. $\frac{x}{y}=\frac{2}{3}, \frac{y}{z}=\frac{2}{3}$

$x+y+z=152 \Rightarrow z=?$

A) 72 B) 64 C) 48 D) 40 E) 32

7. $\left.\begin{array}{l}6a+5b+4c=170\\3a+4b+5c=46\end{array}\right\} \Rightarrow a+b+c=?$

A) 18 B) 24 C) 34 D) 48 E) 72

8. $\frac{a}{b}=\frac{c}{d}=\frac{2}{3} \Rightarrow \left(\frac{a-b}{b}\right)\cdot\left(\frac{c-d}{d}\right)=?$

A) $\frac{3}{8}$ B) $\frac{8}{9}$ C) $\frac{4}{9}$ D) $\frac{1}{9}$ E) $\frac{15}{18}$

9. $\frac{x}{3}=\frac{y}{4}=\frac{z}{5}$, $x^2+y^2+z^2=x\cdot y\cdot z \Rightarrow \mathbf{x+y+z=?}$

A) $\frac{32}{3}$ B) 14 C) 10 D) $\frac{85}{6}$ E) $\frac{103}{4}$

10. $\frac{a}{8}=\frac{b}{5}=\frac{c}{4}$,
$c=a-6 \Rightarrow \mathbf{b=?}$

A) 16 B) 9 C) 7 D) $\frac{27}{8}$ E) $\frac{15}{2}$

11. $\frac{a-2b}{b}=3 \Rightarrow \frac{\mathbf{a+4b}}{\mathbf{2a+5b}}=\mathbf{?}$

A) $\frac{4}{9}$ B) $\frac{4}{5}$ C) $\frac{3}{5}$ D) $\frac{2}{7}$ E) $\frac{1}{3}$

12. $\frac{x}{3}=\frac{y}{-4}=\frac{z}{6}$

$x+y+z=15 \Rightarrow \mathbf{x^2+y^2+z^2=?}$

A) 339 B) 417 C) 484 D) 549 E) 676

13. $\frac{a}{b}=\frac{5}{6}$ ve $\frac{b}{c}=\frac{3}{4}$ $\Rightarrow$ **a, b, c = ? , ? , ?**

A) 5, 12, 8 B) 8, 12, 15 C) 5, 6, 8
D) 6, 8, 15 E) 3, 4

14. a, b, c $\in Z^+$
$4a = 6b = 7c$
$\Rightarrow$ **min(a + b + c) = ?**

A) 54 B) 48 C) 47 D) 28 E) 24

15. $\left.\begin{array}{l}\frac{a}{3}=\frac{b}{5}=\frac{c}{6}\\ a+b+c=42\end{array}\right\} \Rightarrow \frac{\mathbf{a^2+b^2}}{\mathbf{c^2}}=\mathbf{?}$

A) $\frac{17}{18}$ B) $\frac{3}{22}$ C) $\frac{15}{4}$
D) $\frac{9}{5}$ E) $\frac{81}{25}$

16. $\left.\begin{array}{l}\frac{a}{5}=\frac{b}{7}=\frac{c}{9}\\ \frac{3x-6}{9}=\frac{a+b}{c}\end{array}\right\} \Rightarrow \mathbf{x=?}$

A) 6 B) 8 C) 12 D) 15 E) 18

17. $a\cdot x=b\cdot y=c\cdot z=36$

$\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{3}{4} \Rightarrow \mathbf{x+y+z=?}$

A) 18 B) 24 C) 27 D) 42 E) 54

18. $x+\frac{1}{y}=\frac{4}{5}$ ve $y+\frac{1}{x}=\frac{5}{9} \Rightarrow \frac{y}{x}=\mathbf{?}$

A) $\frac{9}{20}$ B) $\frac{25}{18}$ C) $\frac{18}{25}$ D) $\frac{36}{25}$ E) $\frac{25}{36}$

Yanıtlar / *Answers*

1. B	2. D	3. B	4. B	5. B	6. A
7. B	8. D	9. C	10. E	11. C	12. D
13. C	14. C	15. A	16. A	17. C	18. E

1. $\frac{a}{b} = \frac{7}{3} \Rightarrow \frac{a}{a+b} = ?$

A) $\frac{1}{3}$ B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) $\frac{3}{10}$ E) $\frac{7}{10}$

2. $\frac{a}{b} = \frac{2}{5}$, $b^2 - a^2 = 84 \Rightarrow a \cdot b = ?$

A) 10 B) 15 C) 20 D) 40 E) 42

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

A) 6 B) 7 C) 8 D) 9 E) 12

4. $\frac{a}{x} = \frac{b}{y} = \frac{c}{z} = \frac{4}{9} \Rightarrow \frac{x+y+z}{a+b+c} = ?$

A) $\frac{8}{27}$ B) $\frac{2}{3}$ C) $\frac{9}{4}$ D) $\frac{14}{9}$ E) $\frac{4}{3}$

5. $\frac{x}{y} = k$,

$x = 18 \Rightarrow y = 2$,

$y = 6 \Rightarrow x = ?$

A) 54 B) 162 C) 172 D) 180 E) 196

6. $3ab = 5ac = 6bc \Rightarrow a : b : c = ?$

A) 3 : 5 : 6 B) 4 : 6 : 7 C) 3 : 10 : 12

D) 6 : 5 : 3 E) 3 : 2 : 5

7. $\frac{a}{b} = \frac{c}{d} = \frac{2}{5} \Rightarrow \left(\frac{a+c}{c}\right) \cdot \left(\frac{c}{d+b}\right) = ?$

A) $\frac{5}{8}$ B) $\frac{2}{5}$ C) $\frac{16}{7}$ D) $\frac{3}{7}$ E) $\frac{7}{3}$

8. $\frac{a}{b} = \frac{c}{d} = \frac{d}{e} = \frac{4}{5} \Rightarrow \frac{b \cdot c \cdot d}{a \cdot d \cdot e} = ?$

A) $\frac{4}{5}$ B) $\frac{5}{6}$ C) $\frac{64}{25}$ D) $\frac{3}{7}$ E) $\frac{7}{3}$

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

A) 1 B) 4 C) $\frac{3}{5}$ D) $\frac{5}{7}$ E) $\frac{11}{9}$

10. $\frac{a}{b} = \frac{3}{5}$, $\frac{b}{c} = \frac{5}{6} \Rightarrow \frac{c}{a} = ?$

A) $\frac{1}{2}$ B) 2 C) $\frac{15}{4}$ D) 5 E) $\frac{5}{2}$

11. $6 : b : c = a : 4 : 2$, $2b - 3c = 12 \Rightarrow$ **a = ?**

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

12. $a : b : c : d = 3 : 4 : 5 : 6 \Rightarrow \dfrac{3a-b}{c+2d} =$ **?**

A) $\frac{11}{7}$ B) $\frac{13}{9}$ C) $\frac{5}{17}$ D) $\frac{14}{5}$ E) $\frac{17}{3}$

13. $x, y, z \in N^+$, $\dfrac{x}{y} = \dfrac{4}{5}$, $\dfrac{y}{z} = \dfrac{3}{5} \Rightarrow (x+y+z)_{min} =$ **?**

A) 34 B) 42 C) 48 D) 51 E) 52

14. $a, b, c \in Z^+$, $\dfrac{a}{6} = \dfrac{b}{5}$, $\dfrac{b}{c} = \dfrac{4}{3} \Rightarrow$ **? < ? < ?**

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

15. $\dfrac{a}{b} = \dfrac{3x+y}{y-3x} \Rightarrow \dfrac{a+b}{a-b} =$ **?**

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

16. $\dfrac{2}{3a-c} = \dfrac{5}{3b-a} = \dfrac{7}{3c-b} = \dfrac{7}{9} \Rightarrow$ **a + b + c = ?**

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

17. $\dfrac{a}{b} = \dfrac{c}{d}$, $a \cdot d \cdot b - b^2 \cdot c + 2 \cdot a - 6 = 0 \Rightarrow$ **a = ?**

A) 2 B) 3 C) 4 D) 8 E) 12

18. $\dfrac{a}{4} = \dfrac{6}{b} = \dfrac{7}{c}$, $a + 2b - c = 9 \Rightarrow$ **b = ?**

A) 6 B) 8 C) 12 D) 15 E) 18

19. $\dfrac{x}{a} = \dfrac{y}{b} = \dfrac{z}{c}$, $\dfrac{x}{2} = \dfrac{y}{3} = \dfrac{z}{5} \Rightarrow \dfrac{a+c}{b+c} =$ **?**

A) $\frac{3}{8}$ B) $\frac{4}{3}$ C) $\frac{5}{7}$ D) $\frac{7}{8}$ E) $\frac{8}{9}$

20. $\left.\begin{array}{l} \dfrac{x}{a} = \dfrac{y}{b} = \dfrac{z}{c} = \dfrac{3}{4} \\ x - y + 2z = 12 \\ a - b = 2 \end{array}\right\} \Rightarrow$ **c = ?**

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

Yanıtlar / *Answers*

1. E	2. D	3. D	4. C	5. A	6. D
7. B	8. A	9. A	10. B	11. A	12. C
13. E	14. E	15. C	16. D	17. B	18. A
19. D	20. E				

$\frac{x+y}{y} = 4 \Rightarrow \frac{x}{x+y} = ?$

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

2. $a \in N$, $4 : 5 = a^2 : 20 \Rightarrow$ **a = ?**

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

3. $\frac{x}{7} = \frac{y}{4}$, $x - y = 12 \Rightarrow$ **x + y = ?**

A) 24 B) 34 C) 44 D) 54 E) 64

4. $\frac{a}{b} = \frac{2}{5}$, $\frac{b}{c} = \frac{5}{8}$, $a + c = 40 \Rightarrow$ **b = ?**

A) 8 B) 16 C) 20 D) 24 E) 32

5. $\frac{x}{y} = \frac{2}{5}$, $\frac{y}{z} = \frac{4}{5} \Rightarrow$ **x = % ? · z**

A) 80 B) 75 C) 60 D) 45 E) 32

6. $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$, $ac - bd = 18$, $b + c = 9 \Rightarrow$

b − c = ?

A) 1 B) 2 C) 3 D) −2 E) −1

7. $a, b, c \in R^+$

$\frac{a}{0,3} = \frac{b}{0,7} = \frac{c}{0,11} \Rightarrow$ **? < ? < ?**

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

D) $b < a < c$ E) $b < c < a$

8. $\frac{2a+5}{b+1} = k$, $a = 5 \Rightarrow b = 4$, $a = 2 \Rightarrow$ **b = ?**

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

9. $\hat{A} + \hat{B} + \hat{C} = 180°$, $\frac{\hat{A}}{3} = \frac{\hat{B}}{7} = \frac{\hat{C}}{10} \Rightarrow$ $\hat{C}$ **= ?**

A) 90° B) 27° C) 63° D) 60° E) 30°

10. $10 : 8 : x = 5 : y : 3 \Rightarrow$ **$(x + y)^2$ = ?**

A) 10 B) 20 C) 63 D) 80 E) 100

11. $\frac{x}{3}=\frac{y}{4}=\frac{z}{5} \Rightarrow \frac{2x+3y}{4y-2z} = ?$

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

12. $a^2+\frac{1}{b^2}=49, \quad b^2+\frac{1}{a^2}=25 \Rightarrow \frac{a-b}{a+b} = ?$

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

13. $\frac{a}{3}=\frac{b}{5}=k \Rightarrow \sqrt{3a}+\sqrt{5b} = ?$

A) 8k B) 3k C) 5k D) $8\sqrt{k}$ E) $3\sqrt{k}$

14. $\frac{a+2b}{5}=a-2b \Rightarrow \frac{a}{b} = ?$

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

15. $ax = by = cz = 20, \quad \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{3}{4} \Rightarrow x+y+z = ?$

A) 5 B) 10 C) 15 D) 20 E) 25

16. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{2}{3}$, $2a+c+e=20$

$d+f=8 \Rightarrow b = ?$

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

17. $a+b+c=35$, $ax = by = cz = 7 \Rightarrow$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z} = ?$

A) 15 B) 10 C) 5 D) 2 E) 1

18. $\frac{a}{2}=\frac{b}{4}=\frac{c}{3}$, $3a-2b+c=3 \Rightarrow c = ?$

A) 18 B) 15 C) 12 D) 9 E) 6

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

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

20. $a:b:c=3:4:5 \Rightarrow \left(\frac{a+b}{b}\right)\cdot\left(\frac{b+c}{c}\right) = ?$

A) 3 B) $\frac{63}{20}$ C) 15 D) $\frac{9}{5}$ E) $\frac{16}{5}$

Yanıtlar / *Answers*

1. A	2. D	3. C	4. C	5. E	6. B
7. B	8. C	9. A	10. E	11. C	12. E
13. D	14. C	15. C	16. C	17. C	18. D
19. E	20. B				

1. $\frac{x}{5} = \frac{y}{6} = \frac{z}{3}$, $x - 3y + 5z = 8 \Rightarrow$ **z = ?**

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

2. $\frac{a}{b} = \frac{2}{4}$, $\frac{b}{c} = \frac{8}{10}$, $2a + b - 2c - 16 = 0 \Rightarrow$

b = ?

A) – 6 B) – 12 C) – 24 D) – 32 E) – 48

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

A) $\frac{12}{5}$ B) $\frac{7}{5}$ C) $\frac{25}{18}$ D) $\frac{9}{7}$ E) 5

4. $\frac{x \cdot z}{y \cdot t} = \frac{3}{4}$, $\frac{x-y}{y} = \frac{2}{3} \Rightarrow \frac{t}{z} = ?$

A) $\frac{10}{11}$ B) $\frac{20}{9}$ C) $\frac{25}{18}$ D) $\frac{2}{3}$ E) $\frac{3}{5}$

5. $\frac{x}{y} = \frac{2}{3}$, $\frac{y}{z} = \frac{3}{4}$, $\frac{z}{t} = \frac{4}{3} \Rightarrow \frac{t-x}{z-y} = ?$

A) 3 B) 2 C) 1 D) –1 E) 0

6. $\frac{a+b}{2b} = 3 \Rightarrow \frac{2a-b}{13b} = ?$

A) $\frac{12}{13}$ B) $\frac{11}{13}$ C) $\frac{10}{13}$ D) $\frac{9}{13}$ E) $\frac{8}{13}$

7. $\frac{a-3}{4} = \frac{b+4}{6} = \frac{c+6}{8}$, $4a + 6b - 3c = 20 \Rightarrow$

a = ?

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

8. $\frac{1}{x} = \frac{1}{2y} = \frac{1}{3z}$, $x - y + z = 25 \Rightarrow$ **y = ?**

A) 30 B) 20 C) 15 D) 12 E) 10

9. $\frac{x}{y} = \frac{z}{t} = \frac{3}{2} \Rightarrow \left(\frac{x+y}{x}\right)\left(\frac{z+t}{t}\right) = ?$

A) $\frac{3}{2}$ B) $\frac{25}{6}$ C) $\frac{5}{2}$ D) $\frac{25}{16}$ E) $\frac{16}{3}$

10. $\frac{x-2}{2} = \frac{y+1}{3} = \frac{z-1}{4}$, $x + y + z = 38 \Rightarrow$

z = ?

A) 11 B) 13 C) 15 D) 17 E) 19

11. $\frac{3}{y}=\frac{4}{z}=\frac{8}{x} \Rightarrow \frac{2xz+xy}{11z^2}=?$

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

12. $\frac{x+1}{2}=\frac{y-2}{3}=\frac{z+3}{4} \Rightarrow 3x-2y+z=12 \Rightarrow$

$x=?$

A) 6 B) 8 C) 10 D) 12 E) 16

13. $x:y:z=11:9:7 \Rightarrow \frac{x-y-z}{x+y}=?$

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

14. $\frac{1}{4x}=\frac{1}{3y}=\frac{1}{2z}$, $x+y-z=\frac{5}{12} \Rightarrow x-y=?$

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

15. $\frac{x}{y}=\frac{z}{t}=\frac{m}{n}=a \Rightarrow \frac{xz-2zm+3xm}{yt-2tn+3yn}=?$

A) 2a B) $3a^2$ C) a^3 D) a^2 E) a

16. $\frac{a+b}{2}=\frac{2a+3b}{3}=\frac{b-c}{5}$, $c+b=14 \Rightarrow$

$a+b=?$

A) -4 B) -10 C) 8 D) 12 E) 24

17. $\frac{a}{xy}=\frac{b}{xz}=\frac{c}{yz}$, $a+b+c=\frac{2}{x}+\frac{2}{y}+\frac{2}{z} \Rightarrow$

$a \cdot z=?$

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

18. $3a=2b=5c \Rightarrow \frac{2a+3b}{3b-5c}=?$

A) 6 B) 13 C) 15 D) $\frac{13}{5}$ E) $\frac{13}{3}$

19. $2x=3y=4z$, $\frac{1}{x}-\frac{1}{y}-\frac{1}{z}=1 \Rightarrow$

$x=?$

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

20. $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=\frac{3}{7}$, $xm=yn=zk=21 \Rightarrow$

$m+n+k=?$

A) 3 B) 6 C) 9 D) 12 E) 15

Yanıtlar / *Answers*

1. E	2. D	3. B	4. B	5. C	6. D
7. D	8. C	9. B	10. D	11. A	12. C
13. C	14. A	15. D	16. A	17. A	18. E
19. C	20. C				

ÇARPANLARA AYIRMA / FACTORIZATION

BÖLÜM / CHAPTER 4

Tanım: Toplam veya fark şeklinde verilen ifadelerin çarpım şeklinde yazılmasına bu ifadenin çapranlarına ayrılmış biçimi denir.

Definition: *Writing the expressions which are given in the form of sum or difference in the from of product is called factorising.*

$ax + bx + cx + \ldots\ldots + zx = (a + b + c + \ldots + z)\cdot x$

$ax - bx - cx - \ldots\ldots - zx = (a - b - c - \ldots - z)\cdot x$

Örnek / Example:

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

Örnek / Example:

$$x^2 - a \cdot x + x = x \cdot x - x \cdot a + x \cdot 1 = x \cdot (x - a + 1)$$

Örnek / Example:

$$3x^2 \cdot y^2 \cdot z - 6x \cdot y^2 \cdot z^2 = 3 \cdot x \cdot x \cdot y^2 \cdot z - 3 \cdot 2 \cdot x \cdot y^2 \cdot z \cdot z$$
$$= 3xy^2 z \cdot (x - 2z)$$

Örnek / Example:

$$15a^2 \cdot b - 20ab^2 - 25 \cdot a = 5 \cdot 3 \cdot a \cdot a \cdot b - 5 \cdot 4 \cdot a \cdot b^2 - 5 \cdot 5 \cdot a$$
$$= 5 \cdot a \cdot (3ab - 4b^2 - 5)$$

Örnek / Example:

$$x^4 - x^3 + x^2 - x = x \cdot x^3 - x \cdot x^2 + x \cdot x - x \cdot 1$$
$$= x\,(x^3 - x^2 + x - 1)$$
$$= x\,[x^2\,(x - 1) + (x - 1)]$$
$$= x \cdot (x - 1) \cdot (x^2 + 1)$$

Örnek / Example:

$$\frac{2 \cdot a}{x^2} - \frac{4 \cdot b}{x} - \frac{8}{x^3} = \frac{2}{x} \cdot \frac{a}{x} - \frac{2}{x} \cdot 2b - \frac{2}{x} \cdot \frac{4}{x^2}$$
$$= \frac{2}{x} \cdot \left(\frac{a}{x} - 2b - \frac{4}{x^2}\right)$$

Örnek / Example:

$$x^2 - bx - ax + ab = x(x - b) - a \cdot (x - b)$$
$$= (x - b) \cdot (x - a)$$

Örnek / Example:

$$x^2 \cdot y^2 + xy - x^3 - y^3 = x^2 \cdot y^2 - x^3 - y^3 + xy$$
$$= x^2 \cdot (y^2 - x) - y \cdot (y^2 - x)$$
$$= (y^2 - x) \cdot (x^2 - y)$$

Örnek / Example:

$$ax - az + ay - by - bx + bz = a \cdot (x - z + y) - b(y + x - z)$$
$$= (x - z + y) \cdot (a - b)$$

Örnek / Example:

$$(x + y) \cdot (m + n) - x - y = (x + y) \cdot (m + n) - (x + y)$$
$$= (x + y) \cdot (m + n - 1)$$

Örnek / Example:

$$\frac{1}{my} - \frac{1}{ny} - \frac{1}{mx} + \frac{1}{nx} = \frac{1}{y}\left(\frac{1}{m} - \frac{1}{n}\right) - \frac{1}{x}\left(\frac{1}{m} - \frac{1}{n}\right)$$
$$= \left(\frac{1}{m} - \frac{1}{n}\right)\left(\frac{1}{y} - \frac{1}{x}\right)$$

Örnek / Example:

$$\frac{x}{mk} - \frac{y}{nk} - \frac{x}{mp} + \frac{y}{np} = \frac{x}{mk} - \frac{x}{mp} - \frac{y}{nk} + \frac{y}{np}$$
$$= \frac{x}{m} \cdot \left(\frac{1}{k} - \frac{1}{p}\right) - \frac{y}{n} \cdot \left(\frac{1}{k} - \frac{1}{p}\right)$$
$$= \left(\frac{1}{k} - \frac{1}{p}\right) \cdot \left(\frac{x}{m} - \frac{y}{n}\right)$$

İKİ KARE FARKI / *DIFFERENCE of TWO SQUARES*

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

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

Örnek / Example:

$a^2 - 49 = a^2 - 7^2 = (a - 7) \cdot (a + 7)$

Örnek / Example:

$1 - y^2 = 1^2 - y^2 = (1 - y) \cdot (1 + y)$

Örnek / Example:

$4a^2 - 9 = (2a)^2 - 3^2 = (2a - 3) \cdot (2a + 3)$

Örnek / Example:

$$1\frac{7}{9}a^3b^2 - 1\frac{11}{25}ab^2 = a\left(\frac{16a^2b^2}{9} - \frac{36b^2}{25}\right)$$

$$= a\left(\left(\frac{4ab}{3}\right)^2 - \left(\frac{6b}{5}\right)^2\right)$$

$$= a\left(\frac{4ab}{3} - \frac{6b}{5}\right) \cdot \left(\frac{4ab}{3} + \frac{6b}{5}\right)$$

Örnek / Example:

$$\frac{4}{x^2} - \frac{9}{4y^2} = \left(\frac{2}{x}\right)^2 - \left(\frac{3}{2y}\right)^2$$

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

Örnek / Example:

$$x^4 - 13x^2 + 36 = x^4 - 9x^2 - 4x^2 + 36$$

$$= x^2(x^2 - 9) - 4(x^2 - 9)$$

$$= (x^2 - 9) \cdot (x^2 - 4)$$

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

İKİ KÜP TOPLAMI ve FARKI

SUM and DIFFERENCE of TWO CUBES

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

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

Örnek / Example:

$x^3 - 27 = x^3 - 3^3 = (x - 3) \cdot (x^2 + 3x + 9)$

Örnek / Example:

$1 + y^3 = 1^3 + y^3 = (1 + y) \cdot (1 - y + y^2)$

Örnek / Example:

$$a^{-3} + b^{-3} = \left(\frac{1}{a}\right)^3 + \left(\frac{1}{b}\right)^3 = \left(\frac{1}{a} + \frac{1}{b}\right) \cdot \left(\frac{1}{a^2} - \frac{1}{ab} + \frac{1}{b^2}\right)$$

Örnek / Example:

$$16a^3 - 250b^3 = 2 \cdot (8a^3 - 125b^3)$$

$$= 2 \cdot ((2a)^3 - (5b)^3)$$

$$= 2 \cdot (2a - 5b) \cdot (4a^2 + 10ab + 25b^2)$$

Örnek / Example:

$$\frac{a^3}{8} + \frac{8b^3}{27} = \left(\frac{a}{2}\right)^3 + \left(\frac{2b}{3}\right)^3 = \left(\frac{a}{2} + \frac{2b}{3}\right) \cdot \left(\frac{a^2}{4} - \frac{ab}{3} + \frac{4b^2}{9}\right)$$

Örnek / Example:

$$8a^3 - \frac{64}{a^3} = (2a)^3 - \left(\frac{4}{a}\right)^3$$

$$= \left(2a - \frac{4}{a}\right) \cdot \left(4a^2 + 8 + \frac{16}{a^2}\right)$$

$a^n \pm b^n$ İFADELERİNİN ÇARPANLARA AYRILMASI

FACTORIZATION of $a^n \pm b^n$

n bir doğal sayı olmak üzere

$a^n - b^n = (a - b) \cdot (a^{n-1} + a^{n-2}\ b + a^{n-3}\ b^2 + ... + b^{n-1})$

n tek doğal sayı olmak üzere

$a^n + b^n = (a + b) \cdot (a^{n-1} - a^{n-2}\ b + a^{n-3}\ b^2 - ... + b^{n-1})$

eşitlikleri vardır.

Provided that n is a natural number, there are,

$a^n - b^n = (a - b) \cdot (a^{n-1} + a^{n-2}\ b + a^{n-3}\ b^2 + ... + b^{n-1})$

Provided that n is an odd natural number, there are,

$a^n + b^n = (a + b) \cdot (a^{n-1} - a^{n-2}\ b + a^{n-3}\ b^2 - ... + b^{n-1})$

Örnek / Example:

$x^5 - y^5 = (x - y) \cdot (x^4 + x^3y + x^2y^2 + xy^3 + y^4)$

Örnek / Example:

$1 + x^7 = 1^7 + x^7 = (1 + x) \cdot (1^6 - 1^5 \cdot x + 1^4 \cdot x^2 - 1^3 \cdot x^3 + 1^2 \cdot x^4 - 1 \cdot x^5 + x^6)$

$= (1 + x) \cdot (1 - x + x^2 - x^3 + x^4 - x^5 + x^6)$

Örnek / Example:

$$(2y)^6 - \left(\frac{x}{2}\right)^6 = \left(2y - \frac{x}{2}\right)^6 \cdot \left(\begin{array}{l} (2y)^5 + (2y)^4 \cdot \frac{x}{2} + (2y)^3 \cdot \left(\frac{x}{2}\right)^2 + \\ (2y)^2 \cdot \left(\frac{x}{3}\right)^3 + (2y) \cdot \left(\frac{x}{2}\right)^4 + \left(\frac{x}{2}\right)^5 \end{array} \right)$$

$$= \left(2y - \frac{x}{2}\right) \cdot \left(\begin{array}{l} 32y^5 + 8y^4x + 2y^3 \cdot x^2 + \\ \frac{y^2 \cdot x^3}{2} + \frac{yx^4}{8} + \frac{x^5}{32} \end{array} \right)$$

ÖZDEŞLİKLER / *IDENTITIES*

$(a + b)^2 = a^2 + 2ab + b^2$

$(a - b)^2 = a^2 - 2ab + b^2$

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2 \cdot (ab + ac + bc)$

$(a + b)^3 = a^3 + 3a^2 b + 3ab^2 + b^3$

$(a - b)^3 = a^3 - 3a^2 b + 3ab^2 - b^3$

Örnek / Example:

$a + b = 12$ ve (and) $a \cdot b = 10 \Rightarrow$ **$a^2 + b^2 = ?$**

A) 32 B) 48 C) 64 D) 96 E) 124

Çözüm / Solution:

$a^2 + b^2 = (a + b)^2 - 2ab$

$a^2 + b^2 = 12^2 - 2 \cdot 10$

$= 144 - 20$

$= 124$

Yanıt / Answer E

Örnek / Example:

$$a + \frac{1}{a} = 3\sqrt{2} \Rightarrow a^2 + \frac{1}{a^2} = ?$$

A) 9 B) 12 C) 16 D) 24 E) 32

Çözüm / Solution:

$$\left(a + \frac{1}{a}\right)^2 = (3\sqrt{2})^2$$

$$a^2 + 2 \cdot a \cdot \frac{1}{a} + \frac{1}{a^2} = 18$$

$$a^2 + \frac{1}{a^2} = 18 - 2$$

$$a^2 + \frac{1}{a^2} = 16$$

Yanıt / Answer C

Örnek / Example:

$$x - \frac{4}{x} = -2 \Rightarrow x^3 - \frac{64}{x^3} = ?$$

A) 8 B) 4 C) – 16 D) –32 E) – 64

Çözüm / Solution:

$$\left(x - \frac{4}{x}\right)^3 = (-2)^3$$

$$x^3 - 3 \cdot x^2 \cdot \frac{4}{x} + 3 \cdot x \cdot \frac{16}{x^2} - \frac{64}{x^3} = -8$$

$$x^3 - 12x + \frac{48}{x} - \frac{64}{x^3} = -8$$

$$x^3 - 12\left(x - \frac{4}{x}\right) - \frac{64}{x^3} = -8$$

$$x^3 - 12 \cdot (-2) - \frac{64}{x^3} = -8$$

$$x^3 - \frac{64}{x^3} = -8 - 24$$

$$x^3 - \frac{64}{x^3} = -32$$

Yanıt / Answer D

Örnek / Example:

$a + b = -2$ ve (and) $a \cdot b = -15 \Rightarrow$ **$a^3 + b^3 = ?$**

A) –144 B) – 98 C) – 49 D) 16 E) 48

Çözüm / Solution:

$a^3 + b^3 = (a + b)^3 - 3ab\ (a + b)$

$a^3 + b^3 = (-2)^3 - 3 \cdot (-15) \cdot (-2)$

$= -8 - 90$

$= -98$

Yanıt / Answer B

$ax^2 + bx + c$ İFADELERİNİN ÇARPANLARA AYRILMASI

FACTORIZATION of $ax^2 + bx + c$

$m, n, k, \ell \in R$

$c = m \cdot n, \quad a = k \cdot \ell, \quad b = k \cdot n + \ell \cdot m$

$\Rightarrow ax^2 + bx + c = (k \cdot x + m) \cdot (l \cdot x + n)$

☞ $x - y = -(y - x)$

Örnek / Example:

$x^2 + 7x + 12 = ?$

Çözüm / Solution:

$x^2 + 7x + 12$

$x \nearrow\searrow 3$

$x \searrow\nearrow 4$

$3x + 4x = 7x$

$x^2 + 7x + 12 = (x + 4) \cdot (x + 3)$

Örnek / Example:

$6x^2 - 19x + 15 = ?$

Çözüm / Solution:

$6x^2 - 19x + 15$

$3x \nearrow\searrow -5$

$2x \searrow\nearrow -3$

$-9x - 10x = -19x$

$6x^2 - 19x + 15 = (3x - 5) \cdot (2x - 3)$

Örnek / Example:

$2x^2 + 5ax - 3a^2 = ?$

Çözüm / Solution:

$2x^2 + 5ax - 3a^2$

$2x \nearrow\searrow -a$

$x \searrow\nearrow 3a$

$6ax - ax = 5ax$

$2x^2 + 5ax - 3a^2 = (2x - a) \cdot (x + 3a)$

Örnek / Example:

$m^4 + 6m^2 + 9 = ?$

Çözüm / Solution:

$m^4 + 6m^2 + 9$

$m^2 \nearrow\searrow 3$

$m^2 \searrow\nearrow 3$

$3m^2 + 3m^2 = 6m^2$

$m^4 + 6m^2 + 9 = (m^2 + 3) \cdot (m^2 + 3)$

Örnek / Example:

$(5 - 3x)^2 + 4.(5 - 3x) - 21 = ?$

Çözüm / Solution:

$5 - 3x = t$

$(5 - 3x)^2 + 4(5 - 3x) - 21 = t^2 + 4t - 21$

$= (t + 7)(t - 3)$

$= (5 - 3x + 7)(5 - 3x$

$= (12 - 3x)(2 - 3x)$

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

Örnek / Example:

$x^4 + 4y^4 = ?$

Çözüm / Solution:

$x^4 + 4y^4 = x^4 + 4x^2y^2 + 4y^4 - 4x^2y^2$

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

$= (x^2 + 2y^2 - 2xy) \cdot (x^2 + 2y^2 + 2xy)$

Örnek / Example:

$x^4 - 23x^2 + 1 = ?$

Çözüm / Solution:

$x^4 - 23x^2 + 1 = x^4 + 2x^2 + 1 - 25x^2$

$= (x^2 + 1)^2 - (5x)^2$

$= (x^2 + 1 - 5x) \cdot (x^2 + 1 + 5x)$

Aşağıdaki ifadeleri çarpanlara Ayırınız.

Factorise the following expressions.

1. $ax + ay$

Çözüm / Solution:

$a \cdot x + a \cdot y = a \cdot (x + y)$

2. $ax + ay - az$

Çözüm / Solution:

$a \cdot x + a \cdot y - a \cdot z = a\,(x + y - z)$

3. $3 \cdot (x + y) - b \cdot (x + y)$

Çözüm / Solution:

$3 \cdot (x + y) - b \cdot (x + y) = (x + y) \cdot (3 - b)$

4. $a \cdot (x - y) + b \cdot (y - x) - c \cdot (x - y)$

Çözüm / Solution:

$a(x-y) + b(y-x) - c\,(x - y) = a\,(x-y) - b\,(x-y) - c\,(x-y)$

$= (x - y) \cdot (a - b - c)$

5. $(a - b)^2 \cdot (b + c) - (b - a) \cdot (b + c)^2$

Çözüm / Solution:

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

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

$= (a-b) \cdot (b+c) \cdot (a - b + b + c)$

$= (a - b) \cdot (b + c) \cdot (a + c)$

6. $x^2 - x - xy + y$

Çözüm / Solution:

$x^2 - x - xy + y = x\,(x - 1) - y\,(x - 1)$

$= (x-1) \cdot (x-y)$

7. $3xy - 4xz + 2x - 6y + 8z - 4$

Çözüm / Solution:

$3xy - 4xz + 2x - 6y + 8z - 4 = x \cdot (3y - 4z + 2) - 2 \cdot (3y - 4z + 2)$

$= (3y - 4z + 2)\,(x - 2)$

8. $2ax + bx - 2ay - by - cx + cy$

Çözüm / Solution:

$2ax + bx - 2ay - by - cx + cy$

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

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

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

9. $a^2b + ac - b^2\,ac - bc^2$

Çözüm / Solution:

$a^2b + ac - b^2\,ac - bc^2 = a \cdot (ab + c) - bc \cdot (ab + c)$

$= (a - bc) \cdot (ab + c)$

10. $ax - ay + by + az - bx - bz$

Çözüm / Solution:

$ax - ay + by + az - bx - bz = ax - bx - ay + by + az - bz$

$= (a-b)x - (a-b)y + (a-b)z$

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

11. $x^2 - 25$

Çözüm / Solution:

$x^2 - 25 = x^2 - 5^2$

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

12. $64\,m^2 - 36\,n^2$

Çözüm / Solution:

$64\,m^2 - 36\,n^2 = 4 \cdot (16\,m^2 - 9n^2)$

$= 4 \cdot [(4m)^2 - (3n)^2]$

$= 4 \cdot (4m - 3n) \cdot (4m + 3n)$

13. $9 - \frac{4}{n^2}$

Çözüm / Solution:

$9 - \frac{4}{n^2} = 3^2 - \left(\frac{2}{n}\right)^2$

$= \left(3 - \frac{2}{n}\right) \cdot \left(3 + \frac{2}{n}\right)$

14. $a^2 - b^2 - a - b$

Çözüm / Solution:

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

$= (a - b - 1) \cdot (a+b)$

15. $x^4 - 16$

Çözüm / Solution:

$x^4 - 16 = (x^2)^2 - 4^2$

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

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

16. $a^3 - 8$

Çözüm / Solution:

$a^3 - 8 = a^3 - 2^3$

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

17. $2a^3 + 54$

Çözüm / Solution:

$2a^3 + 54 = 2(a^3 + 27)$

$= 2 \cdot (a^3 + 3^3)$

$= 2 \cdot (a + 3) \cdot (a^2 - 3a + 9)$

18. $a^4b - b^4a$

Çözüm / Solution:

$a^4b - b^4a = ab \cdot (a^3 - b^3)$

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

19. $8 - \frac{27}{b^3}$

Çözüm / Solution:

$8 - \frac{27}{b^3} = 2^3 - \left(\frac{3}{b}\right)^3$

$= \left(2 - \frac{3}{b}\right) \cdot \left(4 + \frac{6}{b} + \frac{9}{b^2}\right)$

20. $5x^3 + \frac{40}{y^3}$

Çözüm / Solution:

$5x^3 + \frac{40}{y^3} = 5 \cdot \left(x^3 + \frac{8}{y^3}\right)$

$= 5 \cdot \left(x^3 + \left(\frac{2}{y}\right)^3\right)$

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

21. $x^5 + y^5$

Çözüm / Solution:

$x^5 + y^5 = (x + y) \cdot (x^4 - x^3y + x^2y^2 - xy^3 + y^4)$

22. $x^6 - 64$

Çözüm / Solution:

$x^6 - 64 = x^6 - 2^6$

$= (x-2) \cdot (x^5 + 2x^4 + 4x^3 + 8x^2 + 16x + 32)$

23. $x^4 - 1$

Çözüm / Solution:

$x^4 - 1 = ((x^2)^2 - 1^2) = (x^2 - 1) \cdot (x^2 + 1)$

$= (x - 1) \cdot (x + 1) \cdot (x^2 + 1)$

24. $x^2 - 3x - 4$

Çözüm / Solution:

$x^2 - 3x - 4 = (x-4)(x+1)$

$-4 = -4 \cdot 1$

$-3 = -4 + 1$

$x^2 - 3x - 4$

$x \quad -4$

$x \quad 1$

$\Rightarrow x - 4x = -3 \Rightarrow (x-4) \cdot (x+1)$

ÇÖZÜMLÜ TEST / *TEST WITH SOLUTIONS*

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

A) 1 B) a C) a+12

D) $\dfrac{a}{3-2a}$ E) $\dfrac{2}{3-2a}$

Çözüm / Solution:

$$2a+3-\frac{2a^2+3a-9}{2a-3}=2a+3-\frac{(2a-3)(a+3)}{2a-3}$$

$$=2a+3-(a+3)$$

$$=a$$

Yanıt / Answer B

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

A) $\dfrac{3}{a+2}$ B) $\dfrac{2}{a+2}$ C) $\dfrac{5}{a-2}$

D) $\dfrac{3}{a-2}$ E) $\dfrac{2}{a-2}$

Çözüm / Solution:

$$\frac{3}{a-2}+\frac{2(a+2)}{(a-2)(a+2)}=\frac{3}{a-2}+\frac{2}{a-2}=\frac{5}{a-2}$$

Yanıt / Answer C

3. $\dfrac{x^2-a^2}{a^2x-ax^2}=?$

A) $\dfrac{1}{ax}$ B) $\dfrac{x}{a}$ C) $\dfrac{x-a}{ax}$

D) $\dfrac{-x-a}{ax}$ E) $\dfrac{x+a}{ax}$

Çözüm / Solution:

$$\frac{(x-a)(x+a)}{ax(a-x)}=\frac{-(a-x)\cdot(x+a)}{ax\cdot(a-x)}=\frac{-x-a}{ax}$$

Yanıt / Answer D

4. $\dfrac{a^3-a^2+a-1}{a^2-a}=?$

A) $\dfrac{a^2+1}{a}$ B) $\dfrac{a^2-1}{a}$ C) $\dfrac{a}{a-1}$

D) $\dfrac{a}{a+1}$ E) $\dfrac{a^2+1}{a-1}$

Çözüm / Solution:

$$\frac{a^2\cdot(a-1)+(a-1)}{a\cdot(a-1)}=\frac{(a-1)(a^2+1)}{a\cdot(a-1)}=\frac{a^2+1}{a}$$

Yanıt / Answer A

5. $\dfrac{2ax^3-8a^3x}{3ax^2-6a^2x}=?$

A) $\dfrac{2(x-2a)}{a}$ B) $\dfrac{x+2a}{3x}$ C) $\dfrac{x-2a}{3x-a}$

D) $\dfrac{2(x-2a)}{3(x+a)}$ E) $\dfrac{2(x+2a)}{3}$

Çözüm / Solution:

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

Yanıt / Answer E

6. $\dfrac{1-a}{a}+\dfrac{a}{a+1}=?$

A) $\dfrac{a-1}{a}$ B) $\dfrac{a}{a-1}$ C) $\dfrac{a}{a+1}$

D) $\dfrac{1}{a.(a-1)}$ E) $\dfrac{1}{a\cdot(a+1)}$

Çözüm / Solution:

$$\frac{(1-a)(a+1)+a^2}{a\cdot(a+1)}=\frac{1-a^2+a^2}{a\cdot(a+1)}=\frac{1}{a\cdot(a+1)}$$

Yanıt / Answer E

7. $\dfrac{x^2-\frac{1}{4}}{x-\frac{1}{2}}-\dfrac{1}{2}=?$

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

Çözüm / Solution:

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

Yanıt / Answer A

8. $\dfrac{x}{\frac{1}{x}+1}+\dfrac{x}{x+1}=?$

A) x – 1 B) x + 1 C) x D) 1 E) – x

Çözüm / Solution:

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

$$=\frac{x\cdot(x+1)}{x+1}$$

$$=x$$

Yanıt / Answer C

9. $\dfrac{ax-1}{abx^2-(a+b)x+1}=?$

A) $\frac{-1}{bx-1}$ B) $\frac{1}{ax+1}$ C) $\frac{1}{ax-1}$

D) $\frac{1}{bx-1}$ E) $\frac{1}{bx+1}$

Çözüm / Solution:

$$\frac{ax-1}{abx^2-(a+b)x+1}=\frac{ax-1}{(ax-1)(bx-1)}=\frac{1}{bx-1}$$

Yanıt / Answer D

10. $\dfrac{5^{20}-3^{20}}{5^{15}+5^{10}\cdot 3^5+5^5\cdot 3^{10}+3^{15}}+3^5=x^5 \Rightarrow x=?$

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

Çözüm / Solution:

$$\frac{(5^5)^4-(3^5)^4}{5^{15}+5^{10}\cdot 3^5+5^5\cdot 3^{10}+3^{15}}+3^5=x^5$$

$$\frac{(5^5-3^5)\ (5^{15}+5^{10}\cdot 3^5+5^5\cdot 3^{10}+3^{15})}{5^{15}+5^{10}\cdot 3^5+5^5\cdot 3^{10}+3^{15}}+3^5=x^5$$

$$5^5-3^5+3^5=x^5 \Rightarrow 5^5=x^5 \Rightarrow x=5$$

Yanıt / Answe

11. $\left.\begin{matrix}x+y=5\\ x\cdot y=3\end{matrix}\right\} \Rightarrow x^2+y^2+2=?$

A) 15 B) 17 C) 19 D) 21 E) 23

Çözüm / Solution:

$$x+y=5 \Rightarrow (x+y)^2=5^2$$

$$x^2+2xy+y^2=25 = x^2+2\cdot 3+y^2=25$$

$$x^2+y^2=19$$

$$\Rightarrow x^2+y^2+2=19+2$$

$$=21$$

Yanıt / Answe

12. $\left.\begin{matrix}x+y=4\\ x\cdot y=2\end{matrix}\right\} \Rightarrow x^3+y^3=?$

A) 36 B) 40 C) 44 D) 48 E) 52

Çözüm / Solution:

$$x+y=4 \Rightarrow (x+y)^3=4^3$$

$$x^3+3x^2y+3xy^2+y^3=64$$

$$x^3+3xy(x+y)+y^3=64$$

$$x^3+3\cdot 2\cdot 4+y^3=64$$

$$x^3+24+y^3=64$$

$$x^3+y^3=40$$

Yanıt / Answer

13. $\left.\begin{array}{l} a^2+b^2+c^2=29 \\ a+b+c=9 \end{array}\right\} \Rightarrow ab+ac+bc=?$

A) 26 B) 30 C) 38 D) 40 E) 45

Çözüm / Solution:

$$a+b+c=9 \Rightarrow (a+b+c)^2=9^2$$

$$\underbrace{a^2+b^2+c^2}_{29}+2\cdot(ab+ac+bc)=81$$

$$29+2\cdot(ab+ac+bc)=81$$

$$\frac{2\cdot(ab+ac+bc)}{2}=\frac{52}{2}$$

$$ab+ac+bc=26$$

Yanıt / Answer A

14. $\frac{a}{a-1}-\frac{2}{a^2-1}+\frac{a}{a+1}=?$

A) $2a-1$ B) $a+2$ C) $2a^2$

D) a^2-2 E) 2

Çözüm / Solution:

$$\frac{a\cdot(a+1)-2+a\cdot(a-1)}{a^2-1}=\frac{a^2+a-2+a^2-a}{a^2-1}=\frac{2a^2-2}{a^2-1}$$

$$=\frac{2\cdot(a^2-1)}{a^2-1}$$

$$=2$$

Yanıt / Answer E

15. $\frac{(a+b)^2-11\cdot(a+b)+28}{a+b-4}=?$

A) $a+b-7$ B) $a+b+7$ C) $a-b-7$

D) $a+7$ E) $a-7$

Çözüm / Solution:

$$\frac{(a+b)^2-11\cdot(a+b)+28}{a+b-4}=\frac{(a+b-4)(a+b-7)}{a+b-4}$$

$$=a+b-7$$

Yanıt / Answer A

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

A) $\frac{8a}{a-1}$ B) $\frac{a+1}{4a}$ C) $\frac{8}{a-1}$

D) $\frac{4}{a+1}$ E) $\frac{a-1}{4a}$

Çözüm / Solution:

$$\frac{(a+2)^2-(2+3a)^2}{a-a^3}=\frac{[a+2-(2+3a)]\,[a+2+(2+3a)]}{a\cdot(1-a^2)}$$

$$=\frac{(a+2-2-3a)(a+2+2+3a)}{a\cdot(1-a)(1+a)}$$

$$=\frac{-2a\cdot(4a+4)}{a\cdot(1-a)\cdot(1+a)}$$

$$=\frac{-2\cdot4(a+1)}{1-a}$$

$$=\frac{8}{a-1}$$

Yanıt / Answer C

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

A) $-6a+2$ B) $-6(a-2)$ C) $6(a-2)$

D) $-6(a+2)$ E) $6(a+2)$

Çözüm / Solution:

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

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

$$=\frac{6}{a-2}\cdot(2-a)(2+a)$$

$$=\frac{-6\cdot(a-2)(a+2)}{a-2}$$

$$=-6(a+2)$$

Yanıt / Answer D

18. $m \in Z^+$, $\dfrac{x^2-mx+21}{x^2-9x+14}$ **kesri aşağıdakilerden hangisine eşit olabilir?**

Which of the following can be equal to above fraction?

A) $\dfrac{x+3}{x-2}$ B) $\dfrac{x-3}{x-2}$ C) $\dfrac{x+7}{x-2}$

D) $\dfrac{x-7}{x-2}$ E) $\dfrac{x+3}{x-7}$

Çözüm / Solution:

$$\frac{x^2-mx+21}{x^2-9x+14}=\frac{x^2-mx+21}{(x-2)(x-7)}$$

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

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

Yanıt / Answer B

19. $\dfrac{6x^2+x-1}{4x^2-1}=?$

A) $\dfrac{2x-1}{2x+1}$ B) $\dfrac{1}{2x-3}$ C) $\dfrac{2x-2}{3x-1}$

D) $\dfrac{3x+1}{2x+1}$ E) $\dfrac{3x-1}{2x-1}$

Çözüm / Solution:

$$\frac{6x^2+x-1}{4x^2-1}=\frac{(3x-1)\cdot(2x+1)}{(2x-1)\cdot(2x+1)}$$

$$=\frac{3x-1}{2x-1}$$

Yanıt / Answer E

YÖS SORULARI / *YÖS QUESTIONS*

1. $\dfrac{1-x}{1-\sqrt{x}}=?$

A) $\sqrt{x}$ B) $1+\sqrt{x}$ C) $x\sqrt{x}-$

D) $x-\sqrt{x}$ E) $-1-x\sqrt{x}$

(YÖS 19

Çözüm / Solution:

$$\frac{1-x}{1-\sqrt{x}}=\frac{(1-\sqrt{x})\,.\,(1+\sqrt{x})}{1-\sqrt{x}}$$

$$=1+\sqrt{x}$$

Yanıt / Answe

2. $x>0\,,\ y>0\,,\ x^2+y^2=34\,,\ 2y=\dfrac{30}{x}\ \Rightarrow (x+y)^2=$

A) 4 B) $\sqrt{30}$ C) $\sqrt{34}$ D) 49 E) 64

(YÖS 198

Çözüm / Solution:

$$2y=\frac{30}{x}\Rightarrow 2xy=30$$

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

$$=x^2+y^2+2xy$$

$$=34+30$$

$$=64$$

Yanıt / Answer

3. $\dfrac{(x+1)\cdot a^x}{a^{x+1}}-\dfrac{1}{a}=?$

A) $\dfrac{x}{a}$ B) $\dfrac{a}{x-a}$ C) $\dfrac{a^x-1}{a}$

D) $\dfrac{xa}{a^x}$ E) $\dfrac{x-1}{a^x}$

(YÖS 1982

Çözüm / Solution:

$$\frac{(x+1)\cdot a^x}{a^x\cdot a}-\frac{1}{a}=\frac{x+1}{a}-\frac{1}{a}=\frac{x+1-1}{a}=\frac{x}{a}$$

Yanıt / Answer A

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

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)

Çözüm / Solution:

$$\frac{ax\cdot(2x+1)}{x\cdot(a^2x^2-1)} \cdot \frac{ax+1}{2x+1} = \frac{ax\cdot(ax+1)}{x\,(ax-1)\,(ax+1)} = \frac{a}{ax-1}$$

Yanıt / Answer A

5. $\frac{x^2-4}{x^2+7x+10} \cdot \frac{2x+10}{4} = ?$

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)

Çözüm / Solution:

$$\frac{(x-2)\,(x+2)}{(x+2)\,(x+5)} \cdot \frac{2\,(x+5)}{4} = \frac{x-2}{2}$$

Yanıt / Answer E

6. $\frac{x^2-9}{x^2+x-12} \cdot \frac{3x+12}{x^2+2x-3} = ?$

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)

Çözüm / Solution:

$$\frac{(x-3)\,(x+3)}{(x+4)\,(x-3)} \cdot \frac{3\,(x+4)}{(x+3)\,(x-1)} = \frac{3}{x-1}$$

Yanıt / Answer C

7. $\frac{x-y}{x+y} \cdot \frac{4x+2y}{2x^2-xy-y^2} = ?$

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)

Çözüm / Solution:

$$\frac{x-y}{x+y} \cdot \frac{2\,(2x+y)}{(2x+y)\cdot(x-y)} = \frac{2}{x+y}$$

Yanıt / Answer C

8. $\frac{a^3-b^3}{a^2b+ab^2+b^3} \cdot \frac{2b^2+2ab}{a^2-b^2} = ?$

A) $\frac{2b}{a^2+ab+b^2}$ B) $\frac{2\,(a+b)}{ab}$ C) $\frac{2}{ab}$

D) 2a E) 2

(YÖS 1986)

Çözüm / Solution:

$$\frac{(a-b)\,(a^2+ab+b^2)}{b\,(a^2+ab+b^2)} \cdot \frac{2b\,(b+a)}{(a-b)\,(a+b)} = 2$$

Yanıt / Answer E

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

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)

Çözüm / Solution:

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

Yanıt / Answer B

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

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

(YÖS 1988)

Çözüm / Solution:

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

$$= x^2$$

Yanıt / Answer C

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

A) $1-a^2$ B) a^2-1 C) $a+1$

D) $a-1$ E) $1-a$

(YÖS 1991)

Çözüm / Solution:

$$\frac{a-1-a^3+a^2}{a^2-1} = \frac{(a-1)-a^2(a-1)}{a^2-1} = \frac{(a-1)(1-}{a^2-1}$$

$$= \frac{-(a-1)(a^2-1)}{a^2-1} = -a+1 = 1$$

Yanıt / Ans

12. $\frac{6a^2+13ab+6b^2}{2a+3b} = ?$

A) 2(3b + a) B) 3 (a + b) C) 3a

D) 3a + 2b E) 3a – 2b

(YÖS

Çözüm / Solution:

$$\frac{(3a+2b)(2a+3b)}{2a+3b} = 3a+2b$$

Yanıt / Ans

13. $\frac{a^6+64}{a^2+4} = ?$

A) $a^4 - 4a^2 + 16$ B) $a^4 + 4a^2 +$

C) $a^4 - 8a^2 + 16$ D) $a^4 + 8a^2 +$

E) $a^4 + 16$

(YÖS

Çözüm / Solution:

$$\frac{(a^2)^3+4^3}{a^2+4} = \frac{(a^2+4)(a^4-4a^2+16)}{a^2+4}$$

$$= a^4-4a^2+16$$

Yanıt / Ansv

14. $\left(\frac{x-y}{x}+\frac{y-x}{y}\right):\frac{x-y}{xy}=?$

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

(YÖS 1992)

Çözüm / Solution:

$$\frac{xy-y^2+xy-x^2}{xy}\cdot\frac{xy}{x-y}=\frac{-x^2+2xy-y^2}{x-y}$$

$$=\frac{-(x^2-2xy+y^2)}{x-y}=\frac{-(x-y)^2}{x-y}=-(x-y)$$

$$=y-x$$

Yanıt / Answer E

15. $\frac{a.(a-2)-a+2}{a-1}=?$

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

(YÖS 1993)

Çözüm / Solution:

$$\frac{a.(a-2)-a+2}{a-1}=\frac{a.(a-2)-(a-2)}{a-1}$$

$$=\frac{(a-2).(a-1)}{(a-1)}$$

$$=a-2$$

Yanıt / Answer B

16. $a-b=7,\ a+c=14 \Rightarrow a^2-bc-ab+ac=?$

A) 49 B) 63 C) 84 D) 98 E) 105

(YÖS 1994)

Çözüm / Solution:

$$a^2-bc-ab+ac=a^2-ab+ac-bc$$

$$=a\cdot(a-b)+c\cdot(a-b)$$

$$=(a-b)\cdot(a+c)$$

$$=7\cdot14=98$$

Yanıt / Answer D

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

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

(YÖS 1994)

Çözüm / Solution:

$$\left(\underset{(a)}{\frac{a}{b}}-\underset{(ab)}{\frac{2}{1}}+\underset{(b)}{\frac{b}{a}}\right)\cdot\frac{ab}{a-b}=\frac{a^2-2ab+b^2}{ab}\cdot\frac{ab}{a-b}$$

$$=\frac{(a-b)^2}{a-b}=a-b$$

Yanıt / Answer E

18. $x^2-3x-5=0 \Rightarrow \frac{x^3+27}{2x+6}=?$

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

(YÖS 1994)

Çözüm / Solution:

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

$$=\frac{x^2-3x-5+14}{2}=\frac{0+14}{2}=7$$

Yanıt / Answer C

19. $\frac{8\cdot(x^2-4)\cdot(x+2)}{[(x+2)(x-1)]^2-[(x-3)(x+2)]^2}=?$

A) 1 B) 2 C) 4
D) $8x$ E) $\frac{2(x-2)}{x-5}$

(YÖS 1995)

Çözüm / Solution:

$$\frac{8\cdot(x^2-4)\cdot(x+2)}{(x^2+x-2)^2-(x^2-x-6)^2}$$

$$=\frac{8\cdot(x^2-4)\cdot(x+2)}{[(x^2+x-2)-(x^2-x-6)]\cdot[(x^2+x-2)+(x^2-x-6)]}$$

$$=\frac{8\cdot(x^2-4)\cdot(x+2)}{2(x+2)\cdot 2(x^2-4)}=\frac{8}{4}=2$$

Yanıt / Answer B

20. $a-\frac{1}{a}=4 \Rightarrow a^2+\frac{1}{a^2}=?$

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

(YÖS 1997)

Çözüm / Solution:

$$\left(a-\frac{1}{a}\right)^2=4^2 = a^2-2\cdot a\cdot\frac{1}{a}+\frac{1}{a^2}=16 \Rightarrow a^2+\frac{1}{a^2}=18$$

Yanıt / Answer A

21. $x=\frac{3}{8}$, $y=\frac{11}{16} \Rightarrow \frac{x^2+2xy+4y^2}{x^3-8y^3}=?$

A) $-\frac{3}{8}$ B) -1 C) $\frac{5}{16}$ D) $\frac{13}{16}$ E) 2

(YÖS 1998)

Çözüm / Solution:

$$\frac{x^2+2xy+4y^2}{x^3-8y^3}=\frac{x^2+2xy+4y^2}{x^3-(2y)^3}$$

$$=\frac{x^2+2xy+4y^2}{(x-2y)(x^2+2xy+4y^2)}=\frac{1}{x-2y}$$

$$=\frac{1}{\frac{3}{8}-2\cdot\frac{11}{16}}=-1$$

Yanıt / Answer B

22. $\frac{a^3-ab^2+b^2-a^2}{a^3-a^2b-2a^2+2ab+a-b}=?$

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 1

Çözüm / Solution:

$$\frac{a^3-ab^2+b^2-a^2}{a^3-a^2b-2a^2+2ab+a-b}$$

$$=\frac{a(a^2-b^2)-(a^2-b^2)}{a^2(a-b)-2a(a-b)+(a-b)}$$

$$=\frac{(a^2-b^2)(a-1)}{(a-b)(a^2-2a+1)}=\frac{(a-b)(a+b)(a-1)}{(a-b)(a-1)^2}$$

$$=\frac{a+b}{a-1}$$

Yanıt / Answ

23. $5003^2-4997^2=?$

A) 10^4 B) $3\cdot10^4$ C) $6\cdot$

D) $3\cdot105$ E) $6\cdot105$

(YÖS 19

Çözüm / Solution:

$(5003-4997)\cdot(5003+4997)=6\cdot10000=6\cdot10^$

Yanıt / Answer

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

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 19

Çözüm / Solution:

$$\frac{(3+5a-a-3)\ (3+5a+a+3)}{a(a-1)\ (a+1)}$$

$$=\frac{4a\cdot(6a+6)}{a\cdot(a-1)\ (a+1)}=\frac{24}{a-1}$$

Yanıt / Answer A

1998) **25.** $(99)^2-4=?$

A) 8097 B) 8797 C) 9097
D) 9797 E) 9977

(YÖS 2000)

Çözüm / Solution:

$99^2-2^2=(99-2)\ (99+2)$

$=97\cdot 101=9797$

Yanıt / Answer D

ver E

26. $x^3+2=3x^2 \Rightarrow 3x+\frac{6}{x^2}=?$

A) 6 B) 9 C) 12 D) 13 E) 15

(YÖS 2001)

$\cdot 10^4$ **Çözüm / Solution:**

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

1999)

$$3x+\frac{6}{x^2}=\frac{3x^3+6}{x^2}=\frac{3(3x^2-2)+6}{x^2}$$

10^4

ver C

$$=\frac{9x^2-6+6}{x^2}=9$$

Yanıt / Answer B

27. $x^2+y^2-2xy-4=0 \Rightarrow |x-y|=?$

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

999)

(YÖS 2002)

Çözüm / Solution:

$(x-y)^2=4 \Rightarrow |x-y|=2$

Yanıt / Answer D

28. $\frac{(1{,}75)^2-(1{,}25)^2}{(2{,}25)^2-(1{,}75)^2}=?$

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

(YÖS 2003)

Çözüm / Solution:

$$\frac{(1{,}75-1{,}25)\cdot(1{,}75+1{,}25)}{(2{,}25-1{,}75)\cdot(2{,}25+1{,}75)}$$

$$=\frac{0{,}5\cdot 3}{0{,}5\cdot 4}=\frac{3}{4}$$

Yanıt / Answer A

29. $\frac{(x^2-2x+4)\cdot(x^2-4)}{x^3+8}=?$

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

D) $x+2$ E) $\frac{x+2}{x-2}$

(YÖS 2003)

Çözüm / Solution:

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

Yanıt / Answer C

30. $\dfrac{(cd-1)^2-(c-d)^2}{(d^2-1)(c-1)}=5 \Rightarrow c=?$

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

(YÖS 2004)

Çözüm / Solution:

$$\frac{c^2d^2-2cd+1-c^2-d^2+2cd}{(d^2-1)(c-1)}=5$$

$$\frac{c^2d^2+1-c^2-d^2}{(d^2-1)(c-1)}=5$$

$$\frac{c^2(d^2-1)-(d^2-1)}{(d^2-1)(c-1)}=5$$

$$\frac{(d^2-1)\cdot(c^2-1)}{(d^2-1)(c-1)}=5$$

$$c+1=5$$

$$c=4$$

Yanıt / Answer C

31. $\dfrac{x^2-x-12}{x^2-x-6}\cdot\dfrac{x^2+x-12}{x^2+x-6}=?$

A) $\dfrac{x+4}{x-2}$ B) $\dfrac{x-4}{x+2}$ C) $\dfrac{x^2-16}{x^2-4}$

D) $\dfrac{x^2-4x+16}{x^2-9}$ E) $\dfrac{x^2-4x+16}{x^2-4}$

(YÖS 2005)

Çözüm / Solution:

$$\frac{(x-4)\cdot(x+3)}{(x-3)(x+2)}\cdot\frac{(x+4)\cdot(x-3)}{(x+3)\cdot(x-2)}=\frac{x^2-16}{x^2-4}$$

Yanıt / Answer C

32. $x-\dfrac{1}{x}=3$

$3x^2+\dfrac{3}{x^2}=?$

A) 27 B) 30 C) 33 D) 37 E)

(YÖS 2

Çözüm / Solution:

$$x-\frac{1}{x}=3 \Rightarrow x^2-2+\frac{1}{x^2}=9$$

$$x^2+\frac{1}{x^2}=11$$

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

$$=3\cdot11=33$$

Yanıt / Answ

33. $(9,2+4,2)^2-4\cdot(9,2)\cdot(4,2)=?$

A) 4 B) 9 C) 16 D) 25 E

(YÖS

Çözüm / Solution:

$(a-b)^2=a^2+b^2-4ab$

$(9,2+4,2)^2-4\cdot(9,2)\cdot(4,2)=(9,2-4,2)^2$

$=5^2=25$

Yanıt / Ans

34. $\dfrac{5(a+3)^2-10a(a+3)+5a^2}{5}=?$

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

(YÖS

Çözüm / Solution:

$$=\frac{5(a+3)^2-10a(a+3)+5a^2}{5}$$

$$=\frac{5\left[(a+3)^2-2a(a+3)+a^2\right]}{5}$$

$$=a^2+6a+9-2a^2-6a+a^2=9$$

Yanıt / Ans

1. $\dfrac{a^2+b^2-c^2+2ab}{a^2-b^2+c^2+2ac} : \dfrac{a^2+ab-ac}{a-b+c} = ?$

Yanıt / Answer : $\dfrac{1}{a}$

2. $a^2+\dfrac{25}{a^2}=26 \Rightarrow a-\dfrac{5}{a}=?$

Yanıt / Answer : ∓ 4

3. $\dfrac{x^2+xy}{xy-y^2} : \dfrac{\dfrac{1}{x}+\dfrac{1}{y}}{\dfrac{y^2}{x}-y} = ?$

Yanıt / Answer : $-xy$

4. $a+b=-2 \Rightarrow \dfrac{a^2-b^2-12b-36}{a^2-6a-b^2-6b} = ?$

Yanıt / Answer : -2

5. $a, b \in R,$

$\left.\begin{matrix} b-a=3 \\ a\cdot b=-2 \end{matrix}\right\} \Rightarrow a^3-b^3 = ?$

Yanıt / Answer : -9

6. $\dfrac{1}{x}-x=-4 \Rightarrow x^2-\dfrac{1}{x^2}=?$

Yanıt / Answer : $8\sqrt{5}$

7. $x-6+\dfrac{9}{x}=0 \Rightarrow \dfrac{x^3+12}{x}=?$

Yanıt / Answer : 13

7. $\sqrt{x}+\dfrac{2}{\sqrt{x}}=x-\dfrac{4}{x} \Rightarrow x+\dfrac{4}{x}=?$

Yanıt / Answer : 5

9. $\left.\begin{matrix} a^2 - 12 = ab \\ b^2 - ab = 24 \end{matrix}\right\} \Rightarrow a - b = ?$

Yanıt / Answer : 6

10. $\left.\begin{matrix} x^2 + y^2 = 9 \\ x \cdot y = \frac{7}{2} \end{matrix}\right\} \Rightarrow x^3 + y^3 = ?$

Yanıt / Answer : 22

11. $x \in R^+$

$x^2 + \frac{4}{x^2} = 12 \Rightarrow x^2 - 4x = ?$

Yanıt / Answer : –2

12. $\frac{2a^2 - 5ab - 3b^2}{2a^2 - 6ab} : \frac{b^2 - 4a^2}{ab - 2a^2} = ?$

Yanıt / Answer : $\frac{1}{2}$

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

Yanıt / Answer :

14. $\frac{2x^2 - 3x + 1}{x^2 - 1} : \frac{2x^2 - x}{x^3 + x^2} = ?$

Yanıt / Answer

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

Yanıt / Answer :

16. $x^2 + 4x - 1 = 0 \Rightarrow x^2 + \frac{1}{x^2} = ?$

Yanıt / Answer :

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

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

2. $\frac{1}{9a^2}+36a^2=21 \Rightarrow \frac{1}{3a}+6a=?$

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

3. $x^2+y^2=74,\ x+y=12 \Rightarrow x\cdot y=?$

A) 35 B) 70 C) 109 D) 140 E) 147

4. $x^2+y^2=17,\ x\cdot y=4 \Rightarrow x-y=?$

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

5.
$x=(a-b)^2$
$y=4ab$ $\Rightarrow x+y+z=?$
$z=-(a+b)^2$

A) 0 B) 4ab C) 1 D) (ab) E) (a+b)

6. $16x^2+\frac{1}{4x^2}=125 \Rightarrow \frac{1}{2x}-4x=?$

A) 11 B) 21 C) 51 D) 81 E) 121

7. $x^2+\frac{1}{x^2}=\frac{17}{4} \Rightarrow x+\frac{1}{x}=?$

A) $\frac{2}{5}$ B) $\frac{5}{2}$ C) $\frac{5}{6}$ D) $\frac{5}{3}$ E) $\frac{13}{6}$

8. $b>a,\ b\neq 0,\ \frac{12}{b}=a,\ a^2+b^2=25 \Rightarrow b-a=?$

A) 6 B) 4 C) 1 D) −1 E) −4

9. $\left.\begin{array}{l} x+1=a \\ x-1=b \\ x^2-3=0 \end{array}\right\} \Rightarrow a\cdot b=?$

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

10. $\left.\begin{array}{l} a-b=6, \\ \frac{1}{a}-\frac{1}{b}=2 \end{array}\right\} \Rightarrow a\cdot b=?$

A) −6 B) −3 C) 0 D) 12 E) 15

11. $\dfrac{x^3y-y^3x}{x^2y-xy^2}=?$

A) $x-y$ B) x C) y D) $x+y$ E) $\dfrac{1}{x+y}$

12. $\dfrac{y^2-2yz+z^2}{yz+ay-z^2-az}=?$

A) $\dfrac{y-z}{z+a}$ B) $\dfrac{2ax}{4a}$ C) $\dfrac{y-z}{z-a}$ D) $\dfrac{y}{z}$ E) $\dfrac{z}{y}$

13. $\dfrac{a^2-4b^2}{a^2+2ba}\cdot\dfrac{2a^2+10ab}{a^2+3ab-10b^2}=?$

A) $\dfrac{1}{a+b}$ B) 2 C) $a-b$ D) $\dfrac{1}{2}$ E) $a+b$

14. $\left(\dfrac{x^4-16}{x^2+4}:\dfrac{x^2-9}{x-3}\right)\cdot\dfrac{x^2+3x}{x}=?$

A) x^2-1 B) x^2 C) x^2-4 D) x^2+1 E) x^2+3

15. $\dfrac{x^2-2x}{2x+6}\cdot\dfrac{x^2+x-6}{x^2-5x}:\dfrac{x^2-2x}{6x-30}=?$

A) $\dfrac{x-6}{x}$ B) $\dfrac{3x-6}{x}$ C) $x+6$ D) $\dfrac{x-2}{2x}$ E) $\dfrac{1}{x-6}$

16. $\dfrac{x}{x+y}+\dfrac{y}{x-y}=?$

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

17. $\dfrac{2a}{a^2-b^2}+\dfrac{2b}{b^2-a^2}=?$

A) $\dfrac{2}{a-b}$ B) $\dfrac{1}{a-b}$ C) $\dfrac{1}{b+a}$ D) $\dfrac{2}{b+a}$ E) $\dfrac{3}{b+a}$

18. $\dfrac{x^2+3xy-10y^2}{x^2-4y^2}:\dfrac{x^2-25y^2}{x^2+4xy+4y^2}=?$

A) $\dfrac{x-2y}{x+5y}$ B) $\dfrac{x+2y}{x-5y}$ C) $\dfrac{x+5y}{x-2y}$ D) $\dfrac{x+2y}{x-2y}$ E) $\dfrac{x-2y}{x-5y}$

Yanıtlar / *Answers*

1. B	2. D	3. A	4. C	5. A	6. A
7. B	8. C	9. C	10. B	11. D	12. A
13. B	14. C	15. B	16. B	17. D	18. B

1. $3x^2y - 6x^2y2 - 9xy^3 = ?$

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

2. $\dfrac{a^2-b^2}{4a^2+4ab} = ?$

A) $\dfrac{a-b}{4a}$ B) $\dfrac{a+b}{a-b}$ C) $\dfrac{a+b}{2(a-b)}$
D) $\dfrac{a+b}{5a}$ E) $\dfrac{a+b}{4a}$

3. $\left.\begin{array}{l} a^2+b^2=10 \\ a^3b+a^2b^2+ab^3=39 \end{array}\right\} \Rightarrow a+b = ?$

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

4. $\dfrac{a+1}{\sqrt{a}} = 3 \Rightarrow a^2 + \dfrac{1}{a^2} = ?$

A) 52 B) 48 C) 47 D) 41 E) 27

5. $20x^2 - 19x + 3 = ?$

A) $(4x + 3)(5x - 1)$ B) $(4x - 3)(5x - 1)$
C) $(4x + 3)(5x + 1)$ D) $(5x + 3)(4x + 1)$
E) $(20x + 1)(x + 3)$

6. $(a^2 + 5a - 14) : \dfrac{a^2-4}{5a} = ?$

A) $\dfrac{5a(a+7)}{a+2}$ B) $\dfrac{a+2}{5a}$ C) $\dfrac{5a(a+2)}{a-2}$
D) $\dfrac{5a}{a+2}$ E) $\dfrac{a+7}{a+2}$

7. $x + y = \dfrac{2}{5} \Rightarrow \dfrac{x\cdot(y-2) - y(x-2)}{x^2 - y^2} = ?$

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

8. $\dfrac{(2x-1)^2 - x^2}{3x^2 - 4x + 1} = ?$

A) 1 B) $x - 1$ C) $x + 1$
D) $\dfrac{x-1}{3}$ E) $\dfrac{x-1}{x+1}$

9. $\dfrac{4x^2 - y^2 - 4x + 1}{4x^2 - y^2 - 2y - 1} = ?$

A) $\dfrac{2x+y+1}{2x-y-1}$ B) $\dfrac{2x-y-1}{2x+y+1}$
C) $\dfrac{2x+y-1}{2x+y+1}$ D) $\dfrac{2x+y+1}{2x+y+1}$
E) $\dfrac{2x-y-1}{2x+y-1}$

10. $\dfrac{x^2-5x-6}{x^{n+1}-6x^n} : \dfrac{x+1}{x^{n+1}} = ?$

A) 1 B) x C) 2x D) 3x E) $\dfrac{x}{x^n}$

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

A) $\frac{x+1}{x}$ B) $2-\frac{3}{x}$ C) $3-\frac{1}{x}$

D) $2x+1$ E) $2x+3$

12. $a^2+2bc-b^2-c^2=?$

A) $(a-b-c)(a-b+c)$

B) $(a-b-c)(a+b+c)$

C) $(a-b+c)(a+b-c)$

D) $(a+b)(a-b+c)$

E) $(a+b)(a+b+c)$

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

A) -1 B) -2 C) -4 D) -8 E) -12

14. $x-\frac{1}{x}=3\sqrt{5} \Rightarrow x^3+\frac{1}{x^3}=?$

A) $3\sqrt{7}$ B) $6\sqrt{13}$ C) 5 D) 300 E) 322

15. $\left(\frac{x^2+xy}{xy+y^2}-\frac{xy-y^2}{x^2-xy}\right):\left(\frac{1}{y}-\frac{1}{x}\right)=?$

A) x B) $x-y$ C) y

D) $x+y$ E) $\frac{x-y}{x+y}$

16. $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=6,$

$x+y+z=2xyz$

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

A) 30 B) 32 C) 34 D) 36 E) 4

17. $x^2+4x+y^2+6y=-13 \Rightarrow x^2-y^2=?$

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

18. $x>2,\ x\in R \Rightarrow \frac{x^3-8}{\sqrt{x^2-4x+4}}+\frac{x^3+8}{\sqrt{x^2+4x+4}}=$

A) x^2-7 B) x^2+6 C) x^2

D) $2(x^2+4)$ E) $2(x^2-1)$

19. $\frac{a^2}{(a-b)^2}-\frac{a}{a-b}=?$

A) $\frac{b}{(a-b)^2}$ B) $\frac{a+b}{a-b}$ C) $\frac{a-1}{a+b}$

D) $\frac{ab}{(a-b)^2}$ E) $\frac{a^2}{(a-b)^2}$

Yanıtlar / *Answers*

1. B	2. A	3. D	4. C	5. B	6. A
7. A	8. A	9. C	10. B	11. B	12. C
13. C	14. E	15. D	16. B	17. B	18. D
19. D					

1. $\frac{6x^2-13x-5}{4x^2-25} = ?$

A) $\frac{2x+3}{2x-5}$ B) $3x+1$ C) $\frac{3x-1}{2x+5}$

D) $\frac{2x+1}{x-5}$ E) $\frac{3x+1}{2x+5}$

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

A) $x+3$ B) x C) $x-3$

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

3. $\frac{x^3+27}{x^2-9} : \frac{x^2-3x+9}{x^2-3x} = ?$

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

4. $\frac{a}{a-\frac{a+b}{2}} + \frac{b}{b-\frac{a+b}{2}} = ?$

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

5. $\frac{a^2+2a-3}{a^3+5a^2+6a} : \frac{a^2-3a+2}{a^3-4a} = ?$

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

6. $\frac{a^3-a^2}{3(a+1)} : \frac{a^2-1}{(a^2+a)^2} = ?$

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

7. $\left(\frac{x+1}{x-1} - \frac{x-1}{x+1}\right) \cdot \left(x - \frac{1}{x}\right) = ?$

A) x B) $\frac{1}{x+1}$ C) $\frac{4}{x+1}$ D) 4 E) 8

8. $\left(\frac{\frac{x^2}{2}-2}{\frac{x}{2}+1}\right) : \left(\frac{x}{2}-1\right) = ?$

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

9. $\left(x^2+\frac{1}{x}\right) : \frac{x^2-x+1}{x^2-x} = ?$

A) $x-1$ B) $\frac{x+1}{x}$ C) $\frac{x}{x+1}$

D) x^2-1 E) x^2

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

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

D) $\frac{x-2}{x+1}$ E) $\frac{x+2}{x-1}$

11. $\dfrac{a^4+a^2+1}{a^3+1} : \dfrac{a^2+a+1}{a^2-1} = ?$

A) a^2+1 B) $(a+1)^2$ C) $(a-1)^2$

D) $a-1$ E) $\dfrac{(a+1)^2}{a-1}$

12. $\left(\dfrac{1}{x}+\dfrac{1}{y}\right) : \left(\dfrac{x^2-y^2}{xy}\right) = ?$

A) $x-y$ B) $x+y$ C) $\dfrac{1}{x-y}$

D) $\dfrac{1}{x+y}$ E) $\dfrac{x-y}{xy}$

13. $\left(\dfrac{(a+b)^2-4ab}{a^2-ab}\right) : \left(\dfrac{a}{b}-1\right) = ?$

A) ab B) $a-b$ C) b D) $\dfrac{a}{b}$ E) $\dfrac{b}{a}$

14. $\left(\dfrac{x^4-y^4}{2x}\right) \cdot \left(\dfrac{1}{x+y}+\dfrac{1}{x-y}\right) = ?$

A) $x+y$ B) x^2-y^2 C) $\dfrac{x+y}{x}$

D) x^2+y^2 E) $\dfrac{x^2-y^2}{2}$

15. $\dfrac{b+\dfrac{a^2}{b}+a}{\dfrac{1}{a}+\dfrac{1}{b}} : \dfrac{a^3-b^3}{a^2-b^2} = ?$

A) b B) $a-b$ C) $a+b$ D) a E) $\dfrac{1}{a}$

16. $\dfrac{x^4-5x^2+4}{x^2-x-2} : \dfrac{x^2+x-2}{x} = ?$

A) 1 B) $\dfrac{x}{x+1}$ C) x

D) $\dfrac{x+1}{x-2}$ E) $\dfrac{x}{x-2}$

17. $\left(\dfrac{3x^2-20}{x-5}+\dfrac{x^2+30}{5-x}\right) : \left(1+\dfrac{5}{x}\right) = ?$

A) 2 B) x C) $\dfrac{x}{2}$ D) 2x E

18. $\dfrac{a^3-b^3}{a^2+ab+b^2} : \dfrac{a^2+ab-2b^2}{a^2+2ab} = ?$

A) 1 B) a C) b D) $a+b$ E)

19. $\left(\dfrac{2x}{x^2-1}-\dfrac{x}{1-x}-\dfrac{1}{x+1}\right) \cdot \left(1-\dfrac{1}{x}\right) = ?$

A) $\dfrac{x-1}{x+1}$ B) $\dfrac{x+1}{x}$ C) $2x-$

D) $\dfrac{x}{x+1}$ E) $x-3$

20. $\left(\dfrac{4}{x^2-4}-\dfrac{1}{x+2}-\dfrac{1}{x-2}\right) : \dfrac{x-1}{x^2+x-2} = ?$

A) -2 B) 4 C) $x-2$ D) $x+1$ E)

21. $\dfrac{a^2b^2-a^2-b^2+1}{(ab+1)^2-(a+b)^2} = ?$

A) 1 B) a C) ab D) b E) 2

Yanıtlar / *Answers*

1. E	2. A	3. C	4. C	5. A	6. C
7. D	8. E	9. D	10. E	11. D	12. C
13. E	14. D	15. D	16. C	17. D	18. B
19. B	20. A	21. A			

1. $a + b = 2 \Rightarrow a^3 + b^3 + 6ab = ?$

A) 2 B) 4 C) 8 D) 16 E) 14

2. $x, y \in Z^+$,
$x^2 - y^2 = 19 \Rightarrow 2x - y = ?$

A) 11 B) 13 C) 17 D) 21 E) 30

3. $a - b = 7a^2 - b^2 - 54 = 0 \Rightarrow a = ?$

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

4. $\left.\begin{matrix} x + y = 8 \\ x \cdot y = 8 \end{matrix}\right\} \Rightarrow x^2 + y^2 = ?$

A) 18 B) 28 C) 38 D) 48 E) 58

5. $9x^2 - 6xy + y^2 = 0 \Rightarrow \dfrac{x+y}{x-y} = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

6. $a + b = 11, c = 5 \Rightarrow a^2 - c^2 + 2ab + b^2 = ?$

A) 56 B) 69 C) 96 D) 102 E) 112

7. $\left.\begin{matrix} a - b = 10 \\ a \cdot b = -15 \end{matrix}\right\} \Rightarrow a^2 + b^2 = ?$

A) 80 B) 70 C) 60 D) 45 E) 35

8. $\left.\begin{matrix} x + y = 17 \\ x^2 - y^2 = 17 \end{matrix}\right\} \Rightarrow x^3 + y^3 = ?$

A) 564 B) 517 C) 473 D) 324 E) 257

9. $x + \dfrac{1}{x} = \dfrac{5}{2} \Rightarrow \sqrt{x} - \dfrac{1}{\sqrt{x}} = ?$

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

10. $\dfrac{(x+y)^2 - 4(x+y)}{(x+y)^2 - 16} = ?$

A) $\dfrac{1}{2}$ B) $\dfrac{x+y}{x+y+2}$ C) $\dfrac{3}{7}$

D) $\dfrac{x+y}{x+y+4}$ E) $\dfrac{6}{7}$

6. C
12. C
18. B

11. $x, y \in R^+$, $\left.\begin{array}{l} x+y=4 \\ \frac{1}{x}+\frac{1}{y}=2 \end{array}\right\} \Rightarrow x \cdot y = ?$

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

12. $\left.\begin{array}{l} x^2-xy=13 \\ y^2-xy=12 \end{array}\right\} \Rightarrow |x-y| = ?$

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

13. $a-\frac{1}{a}=\sqrt{3} \Rightarrow a+\frac{1}{a}=?$

A) $\sqrt{7}$ B) $\sqrt{6}$ C) $2\sqrt{6}$ D) $2\sqrt{7}$ E) $3\sqrt{7}$

14. $(92)^2-(18)^2 = a \cdot 814 \Rightarrow a = ?$

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

15. $\left.\begin{array}{l} a=x^3-3x^2y \\ a=y^3-3y^2x \end{array}\right\} \Rightarrow (x+y) = ?$

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

16. $A=(a-1)^2-2(a-1)(b-1)+(b-1)^2$

$B=a^2-b^2 \Rightarrow \frac{A}{B}=?$

A) $\frac{a-1}{b+1}$ B) $\frac{a-1}{a+b}$ C) $\frac{a+}{a-}$

D) $\frac{a-b}{a+b}$ E) $\frac{a+b}{a+1}$

17. $\frac{x(a^2)+y(a)+z}{a^2+3a-10}=\frac{3a-1}{a-2} \Rightarrow x+y+z=?$

A) –8 B) –6 C) 6 D) 10 E)

18. $a(a+b)=57$

$b^2(\frac{a}{b}+1)=64 \Rightarrow a+b=?$

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

19. $\left.\begin{array}{l} x-y=3 \\ x \cdot y=2 \end{array}\right\} \Rightarrow x^3-y^3=?$

A) 5 B) 15 C) 25 D) 35 E)

20. $\left.\begin{array}{l} a+b=-4 \\ \frac{1}{a}+\frac{1}{b}=\frac{1}{3} \end{array}\right\} \Rightarrow a-b=?$

A) –16 B) –12 C) –10 D) –8 E) –

Yanıtlar / *Answers*

1. C	2. A	3. B	4. D	5. A	6. C
7. B	8. C	9. A	10. D	11. C	12. B
13. A	14. E	15. B	16. D	17. E	18. B
19. E	20. D				

1. $\left.\begin{matrix} x^2 - xy = 3 \\ xy - y^2 = 2 \end{matrix}\right\} \Rightarrow |x - y| = ?$

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

2. $\left.\begin{matrix} a^2 - b^2 = 17 \\ b^2 - c^2 = 19 \\ a + c = 12 \end{matrix}\right\} \Rightarrow a - c = ?$

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

3. $x < 0,\ y < 0,\ x, y \in R$

$2x^2 - xy - 3y^2 = 0 \Rightarrow \dfrac{9y^2 - 4x^2}{x^2 - 3xy} = ?$

A) −2 B) −1 C) 0 D) 1 E) 2

4. $a + 2b = 5,\ a \cdot b = 2 \Rightarrow a^3 + 8b^3 = ?$

A) 28 B) 36 C) 49 D) 65 E) 82

5. $a + b = 11,\ a - b = 6 \Rightarrow a^2 - b^2 + a + b = ?$

A) 17 B) 33 C) 48 D) 56 E) 77

6. $x + \dfrac{1}{x} = p \Rightarrow x^2 + \dfrac{1}{x^2} = ?$

A) p^2 B) $2p$ C) $p^2 - 2$

D) $p^2 + 2$ E) $p^2 - 4$

7. $x - \dfrac{1}{x} = p \Rightarrow x^2 + \dfrac{1}{x^2} = ?$

A) $p^2 - 1$ B) $p^2 + 2$ C) $2p + 1$

D) $2p - 1$ E) $p^2 - 2$

8. $\left.\begin{matrix} a^2 + ab = 21 \\ ab + b^2 = 15 \end{matrix}\right\} \Rightarrow a + b = ?$

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

9. $a + b + c = 10,\ ab + ac + bc = 31 \Rightarrow a^2 + b^2 + c^2 = ?$

A) 38 B) 40 C) 48 D) 50 E) 52

10. $\left(\dfrac{x}{y} - \dfrac{y}{x}\right)^2 = 5 \Rightarrow \dfrac{x}{y} + \dfrac{y}{x} = ?$

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

11. $\left.\begin{array}{l} x^3 - 3x^2y = 65 \\ 3xy^2 - y^3 = 60 \end{array}\right\} \Rightarrow x - y = ?$

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

12. $a - b = 3,\ ab = 8 \Rightarrow a^3 - b^3 = ?$

A) 72 B) 88 C) 94 D) 99 E) 111

13. $a + \frac{1}{a} = 4 \Rightarrow a^3 + \frac{1}{a^3} = ?$

A) 42 B) 48 C) 50 D) 52 E) 56

14. $a^3 + b^3 = 91,\ ab(a + b) = 84 \Rightarrow a + b = ?$

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

15. $x = 3 \cdot \sqrt[3]{2} + 1 \Rightarrow x^3 - 3x^2 + 3x = ?$

A) 27 B) 39 C) 47 D) 55 E) 63

16. $x^2 - 8x + 15 = A \cdot B \Rightarrow \frac{A + B}{2} = ?$

A) x + 1 B) x − 3 C) x + 2 D) x − 6 E) x

17. $x^2 + mx + 12 = (x - 2) \cdot A \Rightarrow A = ?$

A) x + 6 B) x − 6 C) x + 2 D) x − 3 E) x

18. $a + b = 1 \Rightarrow \frac{a^2 - 3a + 2}{a + ab - b - 1} = ?$

A) −1 B) a − b C) 2b D) 1 E) 2

19. $a + c = 3,\ b + 2 = 0 \Rightarrow$

$\frac{a + b - c}{a + b + c} : (a^2 - b^2 - c^2 + 2bc) = ?$

A) 6 B) −3 C) 1 D) $\frac{1}{3}$ E)

20. $\left.\begin{array}{l} mx + ny = 12 \\ nx + my = 8 \\ m + n = 4 \end{array}\right\} \Rightarrow x + y = ?$

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

Yanıtlar / *Answers*

1. B	2. A	3. C	4. D	5. E	6. C
7. B	8. E	9. A	10. C	11. C	12. D
13. D	14. C	15. D	16. E	17. B	18. A
19. E	20. B				

$$\frac{a^3-9a-a^2b+9b}{a^2-ab-3a+3b}=?$$

A) $a+3$ B) $a-3$ C) $3-a$

D) $a-9$ E) $a+9$

$(61)^2-(60)^2=?$

A) 121 B) 241 C) 660

D) 1001 E) 3599

E) 2

$$\frac{a^2}{a-b}+\frac{b^2}{b-a}=?$$

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

D) $\frac{a+b}{b-a}$ E) $a+b$

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

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

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

3 E)

$$\left(1-\frac{5}{x}\right):\left(1-\frac{25}{x^2}\right)=?$$

A) x B) $x-5$ C) $\frac{x}{x+5}$

D) $\frac{x}{x-5}$ E) $\frac{x-5}{x+5}$

E	6. C
1. C	12. D
7. B	18. A

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

A) 5 B) $x-1$ C) $x+1$

D) x^2+1 E) $5(x^2-1)^2$

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

A) $x-1$ B) $x+2$ C) $x+1$

D) $x-3$ E) $x+4$

8. $\frac{1+\frac{1}{a}+\frac{1}{a^2}}{1+2a+a^2}:\frac{a^3-1}{a^5-a^3}=?$

A) $\frac{1}{1+a}$ B) $\frac{1}{a(a+1)}$ C) $\frac{a}{a+1}$

D) $\frac{a^2}{a-1}$ E) $\frac{a+1}{a-1}$

9. $\frac{a^3-a^2b+b^3-ab^2}{a^2-2ab+b^2}=?$

A) $\frac{a}{b}$ B) b C) a D) $a-b$ E) $a+b$

10. $x\in R^+, x-x^{-1}=2\sqrt{5} \Rightarrow x+\frac{1}{x}=?$

A) 4 B) $4\sqrt{3}$ C) $3\sqrt{5}$ D) 8 E) $2\sqrt{6}$

11. $(3x+2)^3 = 27x^3 + m\,x^2 + n\,x + 8 \Rightarrow m+n = ?$

A) 54 B) 60 C) 70 D) 80 E) 90

12. $\dfrac{(x-2)^3}{x^3-8} : \dfrac{x^2-4x+4}{x^2+2x+4} = ?$

A) 1 B) $x-2$ C) x^2-4

D) $(x-2)^2$ E) $x+2$

13. $\dfrac{x^2+x-6}{x^3-8} : \dfrac{2x^2+6x}{x^2+2x+4} = ?$

A) $2x$ B) $\dfrac{1}{2x}$ C) $x+3$

D) $x(x+2)$ E) x^2-2x

14. $\dfrac{x^6-y^6}{x^4+x^2y^2+y^4} = ?$

A) x^2+y^2 B) x^2-y^2 C) x^3-y^3

D) $\dfrac{x^3+y^2}{x-y}$ E) x^2y^2

15. $\left(x^2+xy+y^2+\dfrac{2y^3}{x-y}\right) : \left(x+\dfrac{y^2}{x-y}\right) = ?$

A) $x+y$ B) $x-y$ C) $\dfrac{x+y}{x-y}$

D) $\dfrac{y^2}{x+y}$ E) y^2

16. $\dfrac{a^4b-ab^4}{a^3b+a^2b^2+ab^3} : \dfrac{a^2-3ab+2b^2}{4b^2-a^2} = ?$

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

17. $\dfrac{m^3+m^2n+mn^2}{m^3+mn^2} : \dfrac{m^3-n^3}{m^4-n^4} = ?$

A) $m-n$ B) m^2+n^2 C) n

D) m E) $m+n$

18. $\dfrac{a^3-16a-a^2b+16b}{a^2-ab-4a+4b} = ?$

A) $a+4$ B) $a-4$ C) 16

D) $a+16$ E) a^2-16

19. $\left(\dfrac{61^2-59^2}{31^2-29^2}\right)^3 = ?$

A) 1 B) 8 C) 27 D) 64 E) 125

20. $\left(\dfrac{3}{2x-1} - \dfrac{1}{x+2} - \dfrac{5}{2x^2+3x-2}\right) \cdot \left(4x^2-1\right) = ?$

A) 1 B) 0 C) $2x-1$

D) $2x+1$ E) $\dfrac{1}{x-1}$

Yanıtlar / *Answers*

1. A	2. A	3. E	4. D	5. C	6. E
7. C	8. C	9. E	10. E	11. E	12. A
13. B	14. B	15. A	16. C	17. E	18. A
19. B	20. D				

ÜSLÜ SAYILAR / EXPONENTIALS

BÖLÜM 5
CHAPTER

Tanım : $n \in N$ ve $x \in R - \{0\}$ olmak üzere,

$x^n = \underbrace{x \cdot x \cdot x \ldots\ldots x}_{n \text{ tane}}$ sayısına, x sayısının n'inci kuvveti denir. x sayısına taban, n sayısına da üs (kuvvet) denir.

Definition : *Provided that $n \in N$ and $x \in R - \{0\}$, the number $x^n = \underbrace{x \cdot x \cdot x \ldots\ldots x}_{n \text{ tane}}$ is called n^{th} power of x.*

x is the base and n is the power.

ÜSLÜ SAYILARIN ÖZELLİKLERİ
PROPERTIES of EXPONENTIALS

$\underbrace{x \cdot x \cdot x \ldots\ldots x}_{n \text{ tane}} = x^n$

$x \in R - \{0\} \Rightarrow x^0 = 1$

$n \in R \Rightarrow 0^n = 1$

$n \in R - \{0\} \Rightarrow 1^n = 1$

0^0 tanımsızdır. / *0^0 is undefined.*

1. $x^n \cdot x^m = x^{m+n}$

Örnek / Example:

$9^4 \cdot 81^5 \cdot 243^7 = ?$

Çözüm (Solution):

$9^4 \cdot 81^5 \cdot 243^7 = 3^{2 \cdot 4} \cdot 3^{4 \cdot 5} \cdot 3^{5 \cdot 7}$

$= 3^8 \cdot 3^{20} \cdot 3^{35}$

$= 3^{8+20+35} = 3^{63}$

Örnek / Example:

$\left.\begin{array}{l} 4^{\frac{x}{2}+y} = 4 \\ 2^{x-2y} = 9 \end{array}\right\} \Rightarrow 2^x = ?$

A) 6 B) 8 C) 10 D) 12 E) 16

Çözüm / Solution:

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

$(2^{x+2y}) \cdot (2^{x-2y}) = 4 \cdot 9$

$2^{x+2y+x-2y} = 36$

$2^{2x} = 6^2 \Rightarrow 2^x = 6$

Yanıt / Answer A

2. $\frac{x^n}{x^m} = x^{n-m} = \frac{1}{x^{m-n}} \; (x \neq 0)$

Örnek / Example:

$$\frac{(-2)^{13} - 2^{14}}{2^{13}} = ?$$

Çözüm / Solution:

$$\frac{(-2)^{13} - 2^{14}}{2^{13}} = \frac{-2^{13} - 2^{13} \cdot 2}{2^{13}} = \frac{2^{13}(-1-2)}{2^{13}} = -3$$

Örnek / Example:

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

Çözüm / Solution:

$$\frac{-\frac{1}{8} \cdot \frac{8}{27} \cdot 4}{-4 \cdot \frac{1}{9}} = \frac{1}{2} \cdot \frac{8}{27} \cdot \frac{9}{1} \cdot \frac{1}{4} = \frac{1}{3}$$

Örnek / Example:

$$\frac{5^x + 10^x + 15^x}{2^x + 4^x + 6^x} = \frac{8}{125} \Rightarrow x = ?$$

Çözüm / Solution:

$$\frac{5^x + 2^x \cdot 5^x + 3^x \cdot 5^x}{2^x + 2^x \cdot 2^x + 2^x \cdot 3^x} = \frac{8}{125}$$

$$\frac{5^x \cdot (1 + 2^x + 3^x)}{2^x \cdot (1 + 2^x + 3^x)} = \frac{8}{125} \Rightarrow \left(\frac{5}{2}\right)^x = \left(\frac{5}{2}\right)^{-3}$$

$x = -3$

Örnek / Example:

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

Çözüm / Solution:

$$\frac{9^n\cdot 9^{-2}}{3^{2n}\cdot 3^{-1}} + \frac{3^m\cdot 3^{-1}}{3^m} = \frac{9^n\cdot 3}{9^n\cdot 81} + \frac{1}{3}$$

$$= \frac{1}{27} + \frac{1}{3} = \frac{1+9}{27} = \frac{10}{27}$$

3. $(x\cdot y)^n = x^n\cdot y^n$

Örnek / Example:

$a > 1,\ b > 1$

$$\left.\begin{array}{l} a^{x-y} = b^9\cdot a^{11} \\ b^{x-y} = a^8\cdot b^{10} \end{array}\right\} \Rightarrow \mathbf{x-y=?}$$

A) 35 B) 27 C) 21 D) 19 E) 17

Çözüm / Solution:

$$a^{x-y} = b^9\cdot a^{11}$$

$$\underline{\ x\ b^{x-y}} = \underline{\ x\ a^8\cdot b^{10}}$$

$$a^{x-y}\cdot b^{x-y} = b^9\cdot a^{11}\cdot a^8\cdot b^{10}$$

$$(a\cdot b)^{x-y} = (a\cdot b)^{19}$$

$$x-y = 19$$

Yanıt / Answer D

4. $\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$

Örnek / Example:

$9^a = x$ ve (and) $3^{a+2} = y \Rightarrow \mathbf{y^2 = ?}$

Çözüm / Solution:

$$3^{a+2} = y \Rightarrow 3^a\cdot 3^2 = y \Rightarrow 3^a = \frac{y}{9}$$

$$9^a = x \Rightarrow (3^a)^2 = x$$

$$\left(\frac{y}{9}\right)^2 = x$$

$$y^2 = 81\cdot x$$

5. $(x^n)^m = (x^m)^n = x^{m\cdot n}$

$(a^n)^m \neq (a)^{(n^m)}$

a^{n^m} ifadesi bilinemez. / *The term a^{n^m} is not l*

Örnek / Example:

$a, b \in Z - \{0,1\}$

$a^b = \frac{1}{343} \Rightarrow \mathbf{a+b=?}$

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

Çözüm / Solution:

$$a^b = \frac{1}{7^3} \Rightarrow a^b = 7^{-3}$$

$a^b = 7^{-3} \Rightarrow a = 7$ ve (and) $b = -3$

$a + b = 7 - 3 = 4$

Yanıt / An

6. $x^n = x^m \Rightarrow n = m,\ \begin{pmatrix} x\neq 0 \\ x\neq 1 \\ x\neq -1 \end{pmatrix}$

Örnek / Example:

$(x-3)^{3x-1} = (x-3)^{2x+4} \Rightarrow \mathbf{x=?}$

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

Çözüm / Solution:

Verilen eşitliğin sağlanması için taban 1'e eşit olmalı

To satify the given equation, the base must be equ

$x - 3 = 1$

$x = 4$

Ayrıca, tabanlar aynı olduğundan, üsler birbirine eşit o dır.

Morever since the bases are equal, powers mu equal to each other.

$3x - 1 = 2x + 4 \Rightarrow x = 5$

$\sum x = 4 + 5 = 9$

Yanıt / Answe

7.
$$a^n = b^n \Rightarrow \begin{cases} a = b, & \text{n tek sayı ise} \\ & \textit{If n is an odd number} \\ a = \pm b, & \text{n reel sayı} \\ & \textit{If n is a reel number} \end{cases}$$

Örnek / Example:

$(3^2)^5 + (-3^2)^5 - (-3^2)^5 + (-3^{-5})^{-2} = ?$

Çözüm / Solution:

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

$= 3^{10} + (-3^{10}) - (-3^{10}) + (3^{10})$

$= 3^{10} - 3^{10} + 3^{10} + 3^{10} = 2 \cdot 3^{10}$

Örnek / Example:

$$\frac{1}{2^{x-1}} + \frac{6}{2^x} + \frac{2}{2^{x-2}} = 64 \Rightarrow x = ?$$

Çözüm / Solution:

$$\frac{1}{2^x \cdot 2^{-1}} + \frac{6}{2^x} + \frac{2}{2^x \cdot 2^{-2}} = 64$$

$$\frac{2}{2^x} + \frac{6}{2^x} + \frac{8}{2^x} = 64$$

$$\frac{16}{2^x} = 64$$

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

$$2^{x+2} = 1 \Rightarrow x+2 = 0 \Rightarrow x = -2$$

8. $\left(\frac{x}{y}\right)^{-n} = \left(\frac{y}{x}\right)^n$, $x^{-n} = \frac{1}{x^n}$, $(x \neq 0)$

Örnek / Example:

$a^{-\frac{3}{2}} = 64 \Rightarrow a = ?$

Çözüm / Solution:

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

$a = 4^{-2} \Rightarrow a = \frac{1}{4^2} = \frac{1}{16}$

Örnek / Example:

$$\frac{3}{2^{1-x}} = 27 \Rightarrow ? < x < ?$$

Çözüm / Solution:

$$\frac{3}{2 \cdot 2^{-x}} = 27 \Rightarrow 3 \cdot 2^x = 2 \cdot 27$$

$\Rightarrow 2^x = 18$

$16 < 18 < 32$

$2^4 < 2^x < 2^5$

$4 < x < 5$

9. $a \cdot x^m + b \cdot x^m - c \cdot x^m = x^m (a + b - c)$

Örnek / Example:

$4 \cdot 2^{a+1} - 3 \cdot 2^{a+3} + 8 \cdot 2^{a+2} = ?$

Çözüm / Solution:

$= 4 \cdot 2^a \cdot 2 - 3 \cdot 2^a \cdot 2^3 + 8 \cdot 2^a \cdot 2^2$

$= 2^a \cdot (8 - 24 + 32)$

$= 2^a \cdot 16 = 2^a \cdot 2^4 = 2^{a+4}$

10. $(-a)^{2n} = a^{2n}$ $(n \in N)$

$(-a)^{2n+1} = -a^{2n+1}$

Örnek / Example:

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

Çözüm / Solution:

$$\frac{(-2)^3 + (-2^2)}{\left(\frac{1}{2}\right)^{-2} + \frac{1}{2^{-3}}} = \frac{-8 + (-4)}{(2)^2 + 2^3} = \frac{-8-4}{4+8} = \frac{-12}{12} = -1$$

Örnek / Example:

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

Çözüm / Solution:

$$\frac{(-2)^{-2} - 3^{-1} + 2^{-2}}{6^{-2}} = \frac{\left(\frac{1}{2}\right)^2 - \frac{1}{3} + \frac{1}{2^2}}{\frac{1}{6^2}} = \frac{\frac{1}{4} - \frac{1}{3} + \frac{1}{4}}{\frac{1}{36}}$$

$$= \frac{\frac{3-4+3}{12}}{\frac{1}{36}} = \frac{2}{12} \cdot \frac{36}{1} = 2 \cdot 3 = 6$$

ÇÖZÜMLÜ TEST / TEST WITH SOLUTIONS

1. $(-2^2) + (-5)^2 + (-5^2) - (-2)^3 = ?$

A) –12 B) 4 C) 46 D) 62 E) 38

Çözüm / Solution:

$= -4 + 25 - 25 - (-8) = 4$

Yanıt / Answer B

2. $\dfrac{(-2)^3 \cdot (-3)^{-2}}{-3^{-2}} = ?$

A) –8 B) 8 C) – 27 D) 27 E) 9

Çözüm / Solution:

$$\frac{(-2)^3 \cdot (-3)^{-2}}{-3^{-2}} = \frac{-8 \cdot \frac{1}{(-3)^2}}{-\frac{1}{3^2}} = \frac{-\frac{8}{9}}{-\frac{1}{9}} = 8$$

Yanıt / Answer B

3. $(-a)^{-2} \cdot (a^{-3}) \cdot (-a^{-2}) \cdot (-a^4) = ?$

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

Çözüm / Solution:

$$(-a)^{-2} \cdot (a^{-3}) \cdot (-a^{-2}) \cdot (-a^4)$$

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

Yanıt / Answer E

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

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

Çözüm / Solution:

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

$$= \left[\left(\frac{5}{6}\right)^{-1} + \frac{4}{5}\right]^{-2}$$

$$= \left(\frac{6}{5} + \frac{4}{5}\right)^{-2}$$

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

Yanıt / Ans

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

A) $\frac{2}{27}$ B) $\frac{27}{16}$ C) – 27 D) – 54 E) -

Çözüm / Solution:

$$\frac{(-2)^2 + (-2)^3}{\frac{1}{9} - \left(-\frac{1}{27}\right)} = \frac{4 + (-8)}{\frac{1}{9} + \frac{1}{27}} = \frac{-4}{\frac{4}{27}}$$

$$= -27$$

Yanıt / Answ

6. $\dfrac{10^8 - 10^6}{5^8 - 5^6} = ?$

A) 4 B) 99 C) 192 D) 264 E) 25

Çözüm / Solution:

$$\frac{10^8 - 10^6}{5^8 - 5^6} = \frac{10^6(10^2 - 1)}{5^6(5^2 - 1)} = \frac{10^6 \cdot 99}{5^6 \cdot 24}$$

$$= \left(\frac{10}{5}\right)^6 \cdot \frac{99}{24} = 2^6 \cdot \frac{99}{24}$$

$$= 64 \cdot \frac{99}{24} = 264$$

Yanıt / Answer

7. $\frac{a^{n+2}-a^{2-n}}{a^{n+3}-a^{3-n}} = ?$

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

Çözüm / Solution:

$$\frac{a^{n+2}-a^{2-n}}{a^{n+3}-a^{3-n}} = \frac{a^n \cdot a^2 - a^2 \cdot a^{-n}}{a^n \cdot a^3 - a^3 \cdot a^{-n}}$$

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

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

Yanıt / Answer A

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

A) – 2 B) – 1 C) 0 D) 1 E) 2

Çözüm / Solution:

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

$$= \frac{3^x(6 + \frac{1}{3} - 9)}{3^x \cdot \frac{4}{3}}$$

$$= \frac{-\frac{8}{3}}{\frac{4}{3}}$$

$$= -2$$

Yanıt / Answer A

9. $2^x + 2^{x+1} = m \cdot 2^{x+2} \Rightarrow m = ?$

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

Çözüm / Solution:

$$m = \frac{2^x + 2^{x+1}}{2^{x+2}}$$

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

$$= \frac{3}{4}$$

Yanıt / Answer D

10. a, b ∈ Z

$\frac{8^3 \cdot 6^4}{18^2} = 2^a \cdot 3^b \Rightarrow a + b = ?$

A) 8 B) 10 C) 11 D) 12 E) 15

Çözüm / Solution:

$$\frac{8^3 \cdot 6^4}{18^2} = 2^a \cdot 3^b = \frac{(2^3)^3 \cdot 2^4 \cdot 3^4}{3^4 \cdot 2^2} = 2^a \cdot 3^b$$

$$2^{13-2} \cdot 3^{4-4} = 2^a \cdot 3^b$$

$$2^{11} \cdot 3^0 = 2^a \cdot 3^b$$

$$a = 11, b = 0$$

$$a + b = 11$$

Yanıt / Answer C

11. $(4^{a+1} - 2^{2a}) : (3 \cdot 2^{3a}) = ?$

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

Çözüm / Solution:

$$\frac{4^{a+1} - 2^{2a}}{3 \cdot 2^{3a}} = \frac{(2^2)^{a+1} - 2^{2a}}{3 \cdot 2^{3a}}$$

$$= \frac{2^{2a+2} - 2^{2a}}{3 \cdot 2^{3a}} = \frac{2^{2a}(2^2 - 1)}{3 \cdot 2^{2a} \cdot 2^a}$$

$$= \frac{3}{3 \cdot 2^a}$$

$$= \frac{1}{2^a} = 2^{-a}$$

Yanıt / Answer D

12. $2^a = 50 \Rightarrow 2^{2a-2} = ?$

A) 125 B) 250 C) 500 D) 625 E) 750

Çözüm / Solution:

$2^a = 50$

$$2^{2a-2} = 2^{2a} \cdot 2^{-2} = (2^a)^2 \cdot \frac{1}{2^2}$$

$$= (50)^2 \cdot \frac{1}{4}$$

$$= \frac{2500}{4} = 625$$

Yanıt / Answer D

13. $16^{\frac{x}{2}} = 256 \Rightarrow x = ?$

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

Çözüm / Solution:

$$16^{\frac{x}{2}} = 256$$

$$(2^4)^{\frac{x}{2}} = 2^8 \Rightarrow 2^{2x} = 2^8$$

$$2x = 8$$

$$x = 4$$

Yanıt / Answer C

14. $\frac{5^x}{2^{x+1}} = \frac{1}{4} \Rightarrow \left(\frac{4}{25}\right)^{2x} = ?$

A) $\frac{2}{5}$ B) $\frac{1}{5}$ C) 0 D) 16 E) $\frac{625}{16}$

Çözüm / Solution:

$$\frac{5^x}{2^{x+1}} = \frac{1}{4} \Rightarrow \frac{5^x}{2^x} = \frac{1}{2}$$

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

$$= \left(\frac{1}{2}\right)^{-4} = 16$$

Yanıt / Answer D

15. $2^{-x} = 3 \Rightarrow 27 \cdot 2^{2x+1} = ?$

A) $\frac{16}{3}$ B) 6 C) 3 D) 7 E) 9

Çözüm / Solution:

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

$$27 \cdot 2^{2x+1} = 27 \cdot 2^{2x} \cdot 2$$

$$= 27 \cdot (2^x)^2 \cdot 2$$

$$= 27 \cdot (2^{-x})^{-2} \cdot 2$$

$$= 54 \cdot 3^{-2}$$

$$= \frac{54}{9} = 6$$

Yanıt / Answer B

16. $\frac{1,44}{10^{n+1}} = 0,000144 \Rightarrow n = ?$

A) 3 B) 4 C) – 4 D) 0 E) -

Çözüm / Solution:

$$\frac{1,44}{10^{n+1}} = 0,000144$$

$$\frac{144 \cdot 10^{-2}}{10^{n+1}} = 144 \cdot 10^{-6}$$

$$10^{-2-n-1} = 10^{-6} \Rightarrow -3-n = -6$$

$$n = 3$$

Yanıt / Ansı

17. $3,2 \cdot 10^n = 0,0000032 \Rightarrow n = ?$

A) 4 B) 5 C) 6 D) – 6 E) -

Çözüm / Solution:

$$3,2 \cdot 10^n = 0,0000032$$

$$3,2 \cdot 10^n = 3,2 \cdot 10^{-6}$$

$$10^n = 10^{-6} \Rightarrow n = -6$$

Yanıt / Answ

18. $2^x - 2^{x+1} + 2^{x+2} = 384 \Rightarrow x = ?$

A) 3 B) 5 C) 6 D) 7 E) 8

Çözüm / Solution:

$$2^x - 2^{x+1} + 2^{x+2} = 384$$

$$2^x - 2^x \cdot 2 + 2^x \cdot 2^2 = 384$$

$$2^x (1 - 2 + 4) = 384$$

$$2^x = \frac{384}{3} = 128$$

$$2^x = 2^7 \Rightarrow x = 7$$

Yanıt / Answe

19. $4^{\frac{x}{2}-1} = 3 \Rightarrow 8^{x-2} \cdot 3^{-3} = ?$

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

Çözüm / Solution:

$$(2^2)^{\frac{x}{2}-1} = 3 \Rightarrow 2^{x-2} = 3$$

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

$$2^x = 12$$

$$8^{x-2} \cdot 3^{-3} = (2^3)^{x-2} \cdot \frac{1}{27}$$

$$= 2^{3x-6} \cdot \frac{1}{27}$$

$$= (2^x)^3 \cdot 2^{-6} \cdot \frac{1}{27}$$

$$= \frac{12^3}{64 \cdot 27} = \frac{4^3 \cdot 3^3}{64 \cdot 27} = 1$$

Yanıt / Answer E

20. $8^x = a \Rightarrow (32)^{3x} = ?$

A) a^3 B) $4a^3$ C) $16a^3$ D) a^5 E) a^{15}

Çözüm / Solution:

$$8^x = a$$

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

$$(32)^{3x} = (2^5)^{3x}$$

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

$$= a^5$$

Yanıt / Answer D

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

$$\frac{(0{,}009)^{-3} \cdot (0{,}0081)^3}{3^3} = 2^a \cdot 3^b \cdot 5^c$$

$\Rightarrow$ **a + b − c = ?**

A) −6 B) −3 C) 3 D) 6 E) 9

Çözüm / Solution:

$$\frac{(0{,}009)^{-3} \cdot (0{,}0081)^3}{3^3} = 2^a \cdot 3^b \cdot 5^c$$

$$\frac{(3^2 \cdot 10^{-3})^{-3} \cdot (3^4 \cdot 10^{-4})^3}{3^3} = \frac{3^{-6} \cdot 10^9 \cdot 3^{12} \cdot 10^{-12}}{3^3}$$

$$= \frac{3^6 \cdot 10^{-3}}{3^3}$$

$$= 3^3 \cdot (2 \cdot 5)^{-3}$$

$$= 2^{-3} \cdot 3^3 \cdot 5^{-3}$$

$$\left.\begin{array}{l} a = -3 \\ b = 3 \\ c = -3 \end{array}\right\} \Rightarrow a + b - c = -3 + 3 + 3 = 3$$

Yanıt / Answer C

22. $a, b \in Z^+$

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

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

Çözüm / Solution:

$$a, b \in Z^+, a^b = 2$$

$$a^{2a-b} = 8$$

$$a^{2a} \cdot a^{-b} = 8$$

$$a^{2a} \cdot \frac{1}{a^b} = 8$$

$$\frac{a^{2a}}{2} = 8$$

$$(a^a)^2 = 16$$

$$a^a = 4$$

$$a = 2$$

Yanıt / Answer C

23. $\dfrac{(-2^{-1})^4 \cdot (-2)^{-5} \cdot (-2^2)}{(-2)^{-1} \cdot (-2)^{-6}} = ?$

A) -1 B) 1 C) 2 D) 2^2 E) 2^7

Çözüm / Solution:

$$\frac{(-2^{-1})^4 \cdot (-2)^{-5} \cdot (-2^2)}{(-2)^{-1} \cdot (-2)^{-6}} = \frac{2^{-4} \cdot (-2^{-5}) \cdot (-2^2)}{-2^{-1} \cdot 2^{-6}}$$

$$= -\frac{2^{-4} \cdot 2^{-5} \cdot 2^2}{2^{-1} \cdot 2^{-6}}$$

$$= -\frac{2^{-7}}{2^{-7}}$$

$$= -1$$

Yanıt / Answer A

24. $\left.\begin{matrix} 4^{a+2b} = 8 \\ 8^{a+b} = 16 \end{matrix}\right\} \Rightarrow b = ?$

A) $\frac{1}{2}$ B) $\frac{1}{9}$ C) $\frac{1}{6}$ D) $\frac{1}{8}$ E) $\frac{1}{16}$

Çözüm / Solution:

$(2^2)^{a+2b} = 8 \qquad (2^3)^{a+b} = 16$

$2^{2a+4b} = 2^3 \qquad 2^{3a+3b} = 2^4$

$2a + 4b = 3 \qquad 3a + 3b = 4$

$-3 \,/\, 2a + 4b = 3$

$2 \,/\, 3a + 3b = 4$

$-6a - 12b = -9$

$+ \quad 6a + 6b = 8$

$-6b = -1$

$b = \frac{1}{6}$

Yanıt / Answer C

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

A) $\frac{9}{14}$ B) $\frac{11}{14}$ C) $\frac{19}{14}$ D) $\frac{23}{14}$ E

Çözüm / Solution:

$$\left[\left(\frac{1}{2}\right)^{-1} - \left(\frac{3}{2}\right)^{-2}\right]^{-1} = \left[2 - \frac{4}{9}\right]^{-1}$$

$$= \left(\frac{14}{9}\right)^{-1}$$

$$= \frac{9}{14}$$

Yanıt / Answ

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

A) -1 B) 1 C) 64 D) -64 E) $-$

Çözüm / Solution:

$$\frac{\left(-\frac{1}{2}\right)^{-3} \cdot 2^{-3} - (-3^2)}{\left(-\frac{1}{2}\right)^3} = \frac{-2^3 \cdot 2^{-3} + 9}{-\frac{1}{8}}$$

$$= \frac{-1 + 9}{-\frac{1}{8}} = \frac{8}{-\frac{1}{8}} = -64$$

Yanıt / Answe

27. $\left.\begin{matrix} 2^x = a \\ 3^y = b \end{matrix}\right\} \Rightarrow 6^{xy} = ?$

A) $a^b \cdot b^a$ B) $a^y \cdot b^x$ C) a^x

D) ab E) $a^x\, y^b$

Çözüm / Solution:

$2^x = a$

$3^y = b$

$6^{xy} = (2 \cdot 3)^{xy} = 2^{xy} \cdot 3^{xy}$

$= (2^x)^y \cdot (3^y)^x$

$= a^y \cdot b^x$

Yanıt / Answe

YÖS SORULARI / YÖS QUESTIONS

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

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

(YÖS 1991)

Çözüm / Solution:

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

$$= 2$$

Yanıt / Answer B

2. $2^x = a$

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

A) $\dfrac{1}{4^a}$ B) $\dfrac{1}{2^a}$ C) 2^a D) 2^{2a} E) 2^{4a}

(YÖS 1992)

Çözüm / Solution:

$$2^x = a$$

$$2^{2^{(x+2)}} = 2^{2^x \cdot 2^2}$$

$$= 2^{4a}$$

Yanıt / Answer E

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

A) −17 B) −15 C) − 2 D) −1 E) 15

(YÖS 1993)

Çözüm / Solution:

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

$$= -1$$

Yanıt / Answer D

4. $3^{2x-1} = 12$

$3^{x-1} = ?$

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

(YÖS 1993)

Çözüm / Solution:

$$3^{2x-1} = 12 \Rightarrow 3^{2x} \cdot 3^{-1} = 12$$

$$(3^x)^2 = 36$$

$$3^x = 6$$

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

$$= 6 \cdot \frac{1}{3}$$

$$= 2$$

Yanıt / Answer A

5. $3^{x-1} = a$

$\Rightarrow \dfrac{27^x}{9} = ?$

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

(YÖS 1993)

Çözüm / Solution:

$$3^{x-1} = a \Rightarrow 3^x = 3a$$

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

$$= 3a^3$$

Yanıt / Answer C

6. $\dfrac{4{,}7 \cdot 10^{-6}}{0{,}047} = 10^x \Rightarrow x = ?$

A) − 4 B) − 3 C) − 2 D) −1 E) 0

(YÖS 1995)

Çözüm / Solution:

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

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

Yanıt / Answer A

7. $\frac{(xy)^{n-4}}{(xy)^n} = 2 \Rightarrow \frac{1}{x^2y^2} = ?$

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

(YÖS 1995)

Çözüm / Solution:

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

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

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

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

Yanıt / Answer D

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

A) 144 B) 169 C) 175 D) 200 E) 225

(YÖS 1997)

Çözüm / Solution:

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

$$9^{x+1} = (3^2)^{x+1}$$

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

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

$$= (3^x)^2 \cdot 9 = 5^2 \cdot 9 = 225$$

Yanıt / Answer E

9. $32^{x-3} = 243$

$\Rightarrow 2^{x+1} = ?$

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

(YÖS 1998)

Çözüm / Solution:

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

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

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

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

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

$$2^x = 24$$

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

$$= 24 \cdot 2 = 48$$

Yanıt / An

10. $2^{x+4} + 2^{x+1} + 2^x = 304$

$\Rightarrow x = ?$

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

(YÖS

Çözüm / Solution:

$$2^x \cdot 2^4 + 2^x \cdot 2 + 2^x = 304$$

$$2^x (16 + 2 + 1) = 304$$

$$2^x \cdot 19 = 304$$

$$2^x = 16 = 2^4$$

$$x = 4$$

Yanıt / An

11. $x^a = \sqrt{5} \Rightarrow x^{-4a} = ?$

A) $\frac{1}{125}$ B) $\frac{1}{25}$ C) $\frac{1}{5}$ D) 5

(YÖS

Çözüm / Solution:

$$x^a = \sqrt{5}$$

$$x^{-4a} = (x^a)^{-4} = (\sqrt{5})^{-4}$$

$$= \left(5^{\frac{1}{2}}\right)^{-4} = 5^{-2} = \frac{1}{25}$$

Yanıt / Ans

12. $0{,}00758 = 75{,}8 \cdot 10^{-a} \Rightarrow a = ?$

A) 6 B) 5 C) 4 D) – 5 E) – 6

(YÖS 2004)

Çözüm / Solution:

$$75{,}8 \cdot 10^{-4} = 75{,}8 \cdot 10^{-a}$$
$$10^{-4} = 10^{-a}$$
$$4 = a$$

Yanıt – Answer C

13. $15^{12} \cdot 625^{x} = 3^{12} \Rightarrow x = ?$

A) – 6 B) – 5 C) – 3 D) – 2 E) – 1

(YÖS 2004)

Çözüm / Solution:

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

Yanıt – Answer C

14. $2^{-4}(2^5 + 2^6) = ?$

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

(YÖS 2005)

Çözüm / Solution:

$$2^{-4} \cdot 2^5 + 2^{-4} \cdot 2^6 = 2 + 2^2$$
$$= 2 + 4 = 6$$

Yanıt – Answer C

15. $\dfrac{3^x + 3^x + 3^x}{3^x \cdot 3^x \cdot 3^x} = \dfrac{1}{27}$

$x = ?$

A) –2 B) –1 C) 1 D) 2 E) 3

(YÖS 2005)

Çözüm / Solution:

$$\frac{3^x(3)}{3^x \cdot 3^x \cdot 3^x} = \frac{1}{27} \Rightarrow 81 = 3^{2x}$$
$$3^4 = 3^{2x}$$
$$\Rightarrow 2x = 4$$
$$x = 2$$

Yanıt – Answer D

16. $x \neq 0$

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

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

(YÖS 2006)

Çözüm / Solution:

$$\left(\frac{4x^a}{x^{b+1}}\right)^2 \cdot \left(\frac{x^b}{2x^{a-1}}\right)^2$$
$$= \frac{16x^{2a}}{x^{2b+2}} \cdot \frac{x^{2b}}{4 \cdot x^{2a-2}}$$
$$= 4 \cdot x^{2a-2a+2} x^{2b-2b-2}$$
$$= 4 \cdot x^2 \cdot x^{-2} = 4$$

Yanıt – Answer B

17. $\dfrac{2^{24}\left(3^{44} - 3^{22}\right)}{6^{22}(3^{11}+1)(3^{11}-1)} = ?$

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

(YÖS 2007)

Çözüm (Solution):

$$\frac{2^{24}\left(3^{44}-3^{22}\right)}{6^{22}(3^{11}+1)(3^{11}-1)}=\frac{2^{24}\cdot 3^{22}\cdot(3^{22}-1)}{2^{22}\cdot 3^{22}\cdot(3^{22}-1)}$$

$$=\frac{2^{24}}{2^{22}}=2^{24-22}=2^2=4$$

Yanıt / Answer C

18. $5^{x+1}=10^x$

$4^x\cdot 5^{\frac{1}{x}}=?$

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

(YÖS 2007)

Çözüm / Solution:

$5^{x+1}=10^x \Rightarrow 5^x\cdot 5=10^x$

$2^x=5,\ 2=5^{\frac{1}{x}}$

$4^x\cdot 5^{\frac{1}{x}}=(2^x)^2\cdot 5^{\frac{1}{x}}$

$=5^2\cdot 2=50$

Yanıt / Answer D

19. $a-2b=4$

$\frac{2^a}{4^{2b}}=64$

$\Rightarrow b=?$

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

(YÖS 2007)

Çözüm / Solution:

$a-2b=4 \Rightarrow a=4+2b$

$\frac{2^a}{4^{2b}}=\frac{2^a}{2^{4b}}=2^{a-4b}=2^6$

$a-4b=6$

$4+2b-4b=6$

$-2b=2 \Rightarrow b=-1$

Yanıt / Answer A

1. $\dfrac{(-1)^3 \cdot (-2)^3}{(-4)^3} = ?$

Yanıt / Answer : $-\dfrac{1}{8}$

2. $x = -4 \Rightarrow \dfrac{4^{2x-1} \cdot 6^{2x-1}}{24^{3x+2}} = ?$

Yanıt / Answer : 24

3. $\dfrac{2^n \cdot 3^n}{6^{n+2}} = ?$

Yanıt / Answer : $\dfrac{1}{36}$

4. $2^x = 3 \Rightarrow 2^{2x+1} = ?$

Yanıt / Answer : 18

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

Yanıt / Answer : 3^{-8}

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

Yanıt / Answer : $-\dfrac{1}{3}$

7. $\left[((a)^{-1})^2\right] : \left((-a^{-1})^{-1}\right)^{-2} = ?$

Yanıt / Answer : 1

8. $\dfrac{(0,2)^7}{(0,04)^4} = ?$

Yanıt / Answer : 5

9. $\dfrac{4\cdot 10^{-4}}{3{,}6\cdot 10^{-6}+1{,}64\cdot 10^{-6}}=?$

Yanıt / Answer : 20

10. $(0,064)^{\frac{2}{3}}+\left(\dfrac{125}{64}\right)^{-\frac{2}{3}}=?$

Yanıt / Answer : 0,8

11. $3^{x-1}+5\cdot 3^{x+1}+9\cdot 3^{x-2}=147 \Rightarrow x=?$

Yanıt / Answer : 2

12. $\dfrac{a^{22}+a^{15}+a^{13}}{a^{21}+a^{14}+a^{12}}=?$

Yanıt / Answer : a

13. $A=4^x+4^x+4^x+4^x+4^x \Rightarrow \dfrac{A}{5}=?$

Yanıt / Answe

14. $\left.\begin{matrix}2^a=27\\2^b=3\end{matrix}\right\} \Rightarrow \dfrac{a+b}{b}=?$

Yanıt / Answer

15. $4^n=x,\ 3^n=y \Rightarrow 24^{2n}=?$

Yanıt / Answer : x^3y

16. $\dfrac{3^{x+2}-4\cdot 3^{x+1}}{3^{x-2}+3^x}=?$

Yanıt / Answer : –2,7

17. $4^{a+3} - 4^{a+2} + 4^{a+1} - 4^a = 102 \Rightarrow a = ?$

Yanıt / Answer : $\frac{1}{2}$

18. $\frac{4 \cdot 2^{20} - 3 \cdot 2^{21}}{8^6} = ?$

Yanıt / Answer : $-\frac{1}{8}$

19. $\frac{6^n + 6^n + 6^n + 6^n}{3^n + 3^n} = ?$

Yanıt / Answer : 2^{n+1}

20. $\left.\begin{array}{l} a = 1 + 3^{-x} \\ b = 1 + 3^{x} \end{array}\right\} \Rightarrow a = ?$

Yanıt / Answer : $\frac{b}{b-1}$

21. $a = \left(\frac{3}{5}\right)^m \Rightarrow (0,6)^{3m-1} = ?$

Yanıt / Answer : $\frac{5a^3}{3}$

22. $\frac{25^{a-1}}{(0,04)^{-a} + 25^a} = ?$

Yanıt / Answer : $\frac{1}{50}$

23. $x^{-m} = 2 \Rightarrow (x^{3m-3})^{-1} = ?$

Yanıt / Answer : $8x^3$

24. $x^3 = 2^a$,
$x^{3/2} = 8^b \Rightarrow a = ?$

Yanıt / Answer : 6b

25. $44^m = 8^n \cdot 11^m \Rightarrow \frac{2m+3n}{m-n} = ?$

Yanıt / Answer : 12

26. $\left.\begin{matrix} 4^{x+2y} = 8 \\ 8^{x+y} = 16 \end{matrix}\right\} \Rightarrow y = ?$

Yanıt / Answer : $\frac{1}{6}$

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

Yanıt / Answer : 3

28. $\left.\begin{matrix} 4^x = 2^{x+1} \\ 3^{xy} + 3^{y+2} = 10 \end{matrix}\right\} \Rightarrow x + y = ?$

Yanıt / Answer : 1

29. $\left.\begin{matrix} 3^{2x} - 3^{2a} = 16 \\ 3^x + 3^a = 8 \end{matrix}\right\} \Rightarrow a = ?$

Yanıt / Ar

30. $a^{-\frac{1}{2}} = \frac{1}{8} \Rightarrow a^{\frac{2}{3}} = ?$

Yanıt / Ans

31. $\left.\begin{matrix} 2^x = 9 \\ 2^{2y} = 27 \end{matrix}\right\} \Rightarrow \frac{x+2y}{2y-4x} = ?$

Yanıt / Ans

32. $\frac{6^{x+2}}{4^{1-x}} = \frac{24^x}{3^{2x-1}} \Rightarrow x = ?$

Yanıt / Answe

1. $2^{3a+9} = 8^{-b-3} \Rightarrow a + b = ?$

A) −6 B) −2 C) 0 D) 4 E) 12

2. $\frac{(-2)^2 \cdot 2^3 \cdot 2^{-9}}{8^{-3}} = ?$

A) 2 B) 4 C) 16 D) 32 E) 64

3. $10^x = 16$
$2^{x-1} \cdot 5^{x+3} = ?$

A) 125 B) $\frac{125}{2}$ C) 250 D) 625 E) 1000

4. $2^{a+4} = 6,$
$3^{2b+1} = 12 \Rightarrow 3^{ba-2} = ?$

A) $\frac{1}{8}$ B) $\frac{3}{4}$ C) $\frac{1}{24}$ D) 2 E) 12

5. $5^{2a-b} = 625,$
$2^{2a+b} = 128 \Rightarrow a \cdot b^{-1} = ?$

A) $\frac{3}{2}$ B) $\frac{4}{9}$ C) $\frac{11}{4}$ D) $\frac{11}{6}$ E) 5

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

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{4}{9}$ D) $\frac{3}{4}$ E) 3

7. $\frac{2^x}{3^{-x} + 3^{-x} + 3^{-x}} = 72 \Rightarrow x = ?$

A) 0 B) 1 C) 3 D) 6 E) 8

8. $\left(\frac{1}{2}\right)^{x-2} \cdot 8^{x+1} = 2^{4-x} \Rightarrow x = ?$

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

9. $\frac{2^x + 2^x + 2^x}{2^x \cdot 2^x} = 24 \Rightarrow x = ?$

A) −1 B) −2 C) −3 D) $\frac{1}{6}$ E) $\frac{1}{16}$

10. $3^{x-1} + \frac{2}{3^{1-x}} = 81 \Rightarrow x = ?$

A) 3 B) 4 C) 9 D) 27 E) $\frac{1}{6}$

11. $\frac{1}{2^{x-2}} \cdot \frac{4}{4^{3-x}} = 64 \Rightarrow x = ?$

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

12. $\frac{3^3 - 3^2}{9} \cdot (2^{-3})^{-2} = ?$

A) 32 B) 64 C) 128 D) 256 E) 512

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

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

14. $(-a)^5 \cdot (-a)^4 \cdot -a^3 = ?$

A) $-a^{12}$ B) a^{-3} C) a^4 D) a^{12} E) a^{60}

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

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

16. $2^{a-1} = 4 \Rightarrow 4^{a-1} = ?$

A) 2^{-2} B) 2^{-3} C) 2^{-4} D) 2 E) 16

17. $\frac{2^{-2} \cdot 2^4 \cdot (-2)^3 \cdot (-2^6)}{-2^5 \cdot (-2)^2} = ?$

A) -2^2 B) $-\frac{1}{2^4}$ C) -2^4 D) 2^8 E)

18. $x + y^{-1} = 3$,
$y + x^{-1} = 2 \Rightarrow y \cdot x^{-1} = ?$

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

19. $2^{a+1} = 16$
$2^b = 8 \Rightarrow b - a = ?$

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

20. $8^{x-1} = 2^{x+1} \Rightarrow 2^x = ?$

A) -8 B) -4 C) 0 D) 2 E) 4

Yanıtlar / *Answers*

1. A	2. D	3. E	4. C	5. D	6. B
7. C	8. B	9. C	10. B	11. E	12. C
13. B	14. D	15. B	16. E	17. C	18. B
19. C	20. E				