1. **10 farklı kurşun kalem ile 3 farklı tükenmez kalem içerisinden 1 kurşun kalem veya 1 tükenmez kalem kaç farklı şekilde seçilebilir?**

How many different ways can 1 pencil or 1 ballpoint pen be selected from 10 different pencils and 3 different ballpoint pens?

A) 30 B) 20 C) 13 D) 11 E) 2

2. **4 farklı kalem ile 6 farklı defter arasından 1 kalem ve 1 defter kaç farklı şekilde seçilebilir?**

How many different ways can 1 pen and 1 notebook be selected among 6 different notebooks with 4 different pens?

A) 24 B) 20 C) 12 D) 10 E) 2

3.

İstanbul'dan Sivas'a 4 farklı yoldan; Sivas'tan Erzurum'a 3 farklı yoldan gidilebilmektedir.

Sivas'a uğramak şartıyla İstanbul'dan Erzurum'a kaç farklı yoldan gidilebilir?

From Istanbul to Sivas in 4 different ways; There are 3 different routes from Sivas to Erzurum.

How many different ways can you go from Istanbul to Erzurum, provided that you visit Sivas?

A) 7 B) 10 C) 11 D) 12 E) 14

4. **4 farklı kitap yan yana kaç farklı şekilde sıralanabilir?**

How many different ways can 4 different books be lined up side by side?

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

5. $A = \{Z, A, F, E, R\}$

kümesinin harfleriyle harfleri farklı, 3 harfli anlamlı ya da anlamsız kaç farklı şekilde yazılabilir?

How many different 3-letter meaningful or meaningless ways can be written with the letters of the set?

A) 20 B) 25 C) 30 D) 45 E) 60

6. $\binom{n}{} = \frac{n!}{(n+2)!}$

$\Rightarrow \binom{10}{} : \binom{9}{} = ?$

A) $\frac{5}{6}$ B) $\frac{4}{3}$ C) $\frac{9}{10}$ D) $\frac{5}{4}$ E) $\frac{6}{5}$

7. **9, 8, 7, 6 rakamları ile rakamları farklı üç basamaklı kaç farklı doğal sayı yazılabilir?**

How many different three-digit natural numbers with 9, 8, 7, 6 numbers and different numbers can be written?

A) 48 B) 24 C) 12 D) 8 E) 6

8. $A = P(6, 2)$

$B = P(5, 3)$

$C = P(3, 2)$

$\Rightarrow \frac{A + B}{C} = ?$

A) 10 B) 15 C) 16 D) 18 E) 25

9. $\sum_{m=2}^{4} (m-1) \cdot \sum_{m=2}^{4} (m^2+m+1) = ?$

A) 94 B) 96 C) 100 D) 236 E) 246

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

$\sum_{k=1}^{10} \frac{1}{n.(n+1)} = ?$

A) $\frac{10}{11}$ B) 10! C) $\frac{9}{10}$ D) $\frac{10}{9}$ E) $\frac{11}{10}$

11. $\sum_{k=1}^{3} \log_{36} k = ?$

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

12. $A = \sum_{k=1}^{80} k!$

A'nın birler basamağındaki rakam kaçtır?
What is the number in units digit of A?

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

13. $x \in N$,

$\sum_{n=1}^{5} (xn+2) < 48$

$\Rightarrow$ **S.S. = ?**

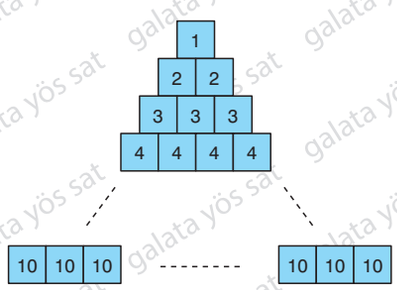
A) $\{0, 1\}$ B) $\{1, 2\}$ C) $\{1, 2, 3\}$
D) $\{0, 1, 2\}$ E) $\varnothing$

14. $1 + r + r^2 + r^3 + \ldots + r^{n-1} = \frac{r^n - 1}{r - 1}$

$\Rightarrow \sum_{k=0}^{49} 2^k = ?$

A) $2^{49} - 1$ B) $2^{50} - 1$ C) 2^{49}
D) 2^{50} E) $2^{100} - 2$

15.



Kutularda bulunan tüm sayıların toplamı kaçtır?
What is the sum of all the numbers in the boxes?

A) $\frac{10\,.\,11}{2}$ B) $\frac{10\,.\,11\,.\,24}{3}$ C) $\frac{10\,.\,11\,.\,21}{6}$

D) $\frac{20\,.\,21\,.\,41}{6}$ E) $\frac{8\,.\,9\,.\,17}{6}$

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

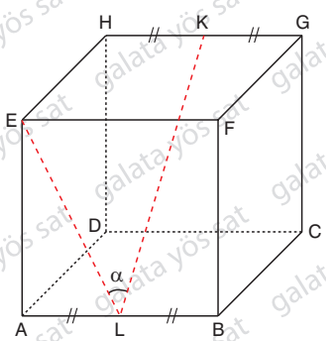
1. $a = \sin^2\left(\text{arc tan}\left(\frac{3}{2}\right)\right) + \cos^2\left(\text{arc tan}\left(\frac{3}{2}\right)\right)$

$b = \tan\left(\text{arc sin}\left(\frac{2}{3}\right)\right) \cdot \cot\left(\text{arc sin}\left(\frac{2}{3}\right)\right)$

$\Rightarrow$ **a + b = ?**

A) 0 B) 1 C) 2 D) 3 E) $\frac{9}{4}$

2.



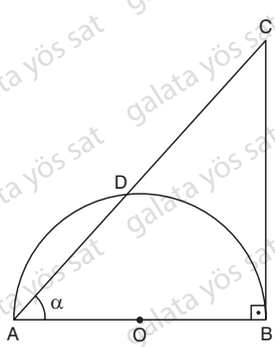
$|AL| = |LB|$, $|HK| = |KG|$

ABCDEFGH bir küp (cube)

$\Rightarrow$ **cosα = ?**

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

3.



O merkez (O center)

$[AB] \perp [BC]$, $|DC| = 4|AD|$, $m(\widehat{BAD}) = \alpha$

$\Rightarrow$ **cotα = ?**

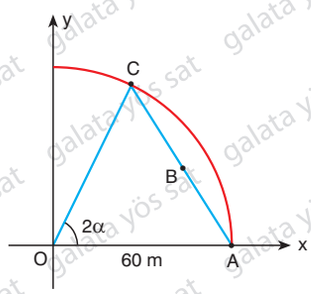
A) $\frac{1}{2}$ B) 1 C) 2 D) $\frac{3}{2}$ E) $\frac{2}{3}$

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

$\Rightarrow$ $\frac{\textbf{sin14x – cos11x}}{\textbf{cosx – sin2x}} = ?$

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

5.



O merkez

(O center)

$|OC| = |OA| = 60$ m

$m(\widehat{COA}) = 2\alpha$

A noktasında bulunan karınca B üzerinden doğrusal olarak C ye dakikada 3 m hızla p dakikada gitmiştir.

Buna göre, p nin α türünden eşiti nedir?

ant at point A linearly on B went to C in p minutes per 3 meters (3m) .

According to the information above, what is equivalent of p in type of a?

A) 20 sinα B) 20 sin2α C) tan2α D) 40sin2α E) 40 sinα

6. $A = \sqrt{1 + 9\sin^4 x} + \sqrt{49 + 25\cos^4 x}$

$B = \sqrt{16 + 4\sin^4 x}$

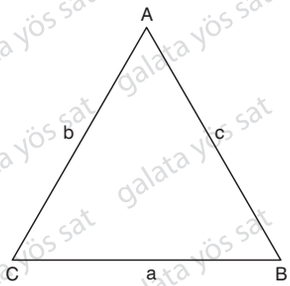
$\Rightarrow$ **min(A + B) = ?**

A) – 4 B) – 1 C) 13 D) 16 E) 25

7. $\textbf{8} \cdot \left[\sin^4\frac{\pi}{12} + \cos^4\frac{\pi}{12}\right] = ?$

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

1.

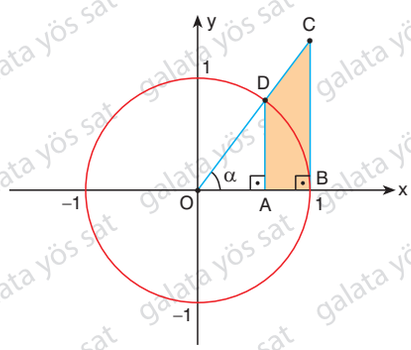


$$\frac{m(\hat{A})}{2} = \frac{m(\hat{B})}{3} = \frac{m(\hat{C})}{7}$$

$\Rightarrow \frac{a}{b} = ?$

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

2.



$\Rightarrow$ **A(ABCD) = ?**

A) $\frac{\sin^3\alpha}{\cos\alpha}$ B) $\frac{\sin^2\alpha}{\cos\alpha}$ C) $\frac{\cos^3\alpha}{2\sin\alpha}$

D) $\frac{\cos^2\alpha}{2\sin\alpha}$ E) $\frac{\sin^3\alpha}{2\cos\alpha}$

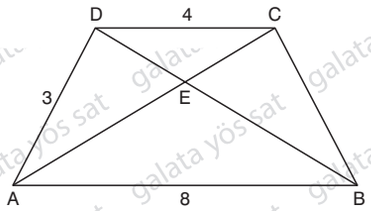
3. $\tan20° = x$

$\Rightarrow \frac{\tan740° - \tan225°}{\cot250° + \cot160°} = ?$

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

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

4.



ABCD yamuk (trapezoid)

$|DC| = 4, \quad |AD| = 3, \quad |AB| = 8$

$m(\hat{DAB}) = 30°$

$\Rightarrow \frac{A(\hat{DAB})}{A(\hat{ADC})} = ?$

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

5. $a = \cos10°$

$b = \sin83°$

$c = \cot37°$

$d = \tan15°$

Aşağıdaki sıralamalardan hangisi doğrudur?
Which of the following sequencing is correct?

A) c > b > a > d B) c > d > b > a

C) c > a > b > d D) c > b > d > a

E) a > b > c > d

6. $\frac{\pi}{2} < x < \pi$

$\cot x = -\frac{1}{3}$

$\Rightarrow$ **sinx . cosx – tanx = ?**

A) 2,1 B) 2,3 C) 2,5 D) 2,7 E) 3,1

8. $x \cdot (x+1) < 2 \cdot (x+1)$

$\Rightarrow$ **S. S. = ?**

A) $(-\infty, 2)$ B) $(-1, 2)$ C) $(2, \infty)$

D) $(-1, 1)$ E) $(-2, 2)$

9. $\dfrac{(x^3-1)\cdot(x^4-1)}{x^2-4x+3} \geq 0$

$\Rightarrow$ **S. S. = ?**

A) $(2, \infty)$ B) $(-1, 1)$ C) $[-1, 1) \cup (3, \infty)$

D) $[-1, 3)$ E) $(-\infty, 1)$

10. $x \in N$

$\sqrt{3-|x-5|} < 1$

$\Rightarrow$ **Πx = ?**

A) 16 B) 10 C) 8 D) 6 E) 2

11. $1 + \dfrac{1}{x} + \dfrac{1}{x^2} + \dfrac{1}{x^3} \leq 0$

$\Rightarrow$ **S.S. = ?**

A) $(-3, -1]$ B) $[-1, 5)$ C) $(-1, 1)$

D) $[-1, 0)$ E) $\varnothing$

12. $a \neq 5$

$(a-5)^2 + b^3 \cdot (b-1) = 0$

aşağıdakilerden hangisi <u>kesinlikle</u> doğrudur?

Which of the following is absolutely true?

A) $b < 0$ B) $-1 < b < 0$ C) $0 < b < 1$

D) $1 < b < 5$ E) $-5 < b < 0$

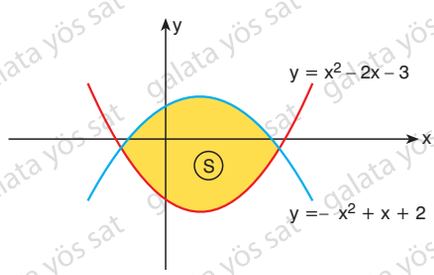
13. $2^{x^2-2x+1} = \dfrac{3}{2}$

S. S. = ?

A) (0, 2) B) $(-\infty, \infty)$ C) $(2, \infty)$

D) $(0, 2) \setminus \{1\}$ E) $(-1, 1)$

14.



(x, y) ∈ S ise (x, y) aşağıdakilerden hangisi olabilir?

Which one of the following can be (x, y)?

A) (0, 3) B) (2, – 1) C) (– 1, 1)

D) (0, – 4) E) (1, 3)

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

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

⇒ **P(11) − P(7) = ?**

A) 92 B) 93 C) 94 D) 95 E) 96

2. $P(x) = (a - 2)x^3 + 5x^2 + bx + a + 1$

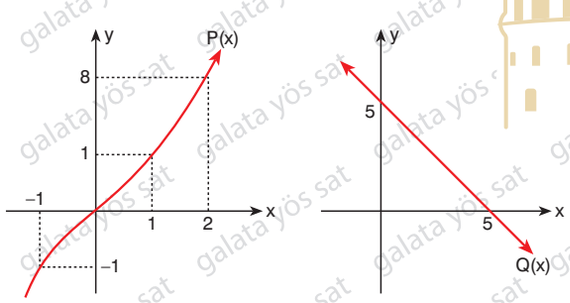
$\text{der}[P(x)] = 2$

ise P(x) polinomunun sabit terimi kaçtır?

If P(x) is a polynomial, what is the constants term of P(x) polynomial?

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

3.



P(x)	Q(x)
−	
K	

⇒ **K = ?**

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

4. $P(x) = x^3 + x + 2P(1)$

⇒ **P(3) = ?**

A) 8 B) 16 C) 20 D) 26 E) 32

5. $P(x) = x^{2020} - x^{2019}$

$P(2) \equiv m \pmod 5$

⇒ **m = ?**

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

6. $P(x) = x^2 - 4x + m + 2$

$P(x_1) = P(x_2) = 0$

$x_1 = x_2$

⇒ **P(m) = ?**

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

7. $(3x - 2)^3 = ax^3 + bx^2 + cx + d$

⇒ **a + b + c = ?**

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

1. $A, B \in R$

$$\frac{6x-10}{x^2-6x+5} = \frac{A}{x-5} + \frac{B}{x-1}$$

$\Rightarrow$ **A = ?**

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

2. $P(x) + Q(x) = x^5 - x^4 - 2x + 5$

$Q(-x) = -x^5 - 2x^4 - x + 3$

$\Rightarrow$ **P(x) = ?**

A) $x^4 - 3x + 2$ B) $-x^4 - 3x + 2$

B) $x^4 + 3x - 2$ D) $-x^4 + 3x + 1$

E) $-x^4 + 3x + 2$

3. $\boxed{1} \rightarrow 3$

$\boxed{2} \rightarrow 7$

$\boxed{3} \rightarrow 13$

$\vdots$

$\boxed{x} \rightarrow P(x)$

$\Rightarrow$ **P(x) + P(** $\boxed{2}$ **) = ?**

A) $x^2 + x + 8$ B) $x^2 - x - 8$

B) $x^2 - x + 58$ D) $x^2 + x + 11$

E) $x^2 + x + 58$

4. $P(x) = Ax^3 + Bx^2 + Cx + D$

$P(1) = P(3) = P(-1) = 0$

$P(0) = 3$

$\Rightarrow$ **P(2) = ?**

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

5. $(3x-1)^4 = Ax^4 + Bx^3 + Cx^2 + Dx + E$

$\Rightarrow$ **A + C + E = ?**

A) 130 B) 134 C) 136 D) 140 E) 150

6. $P(x) = (x+2)^4 + 3(x+1)^3$

$P(x) = a_4 . x^4 + a_3 . x^3 + a_2 . x^2 + a_1 . x + a_0$

$\Rightarrow$ **a_1 = ?**

A) 41 B) 39 C) 37 D) 35 E) 33

7. $a, b \in Z^+$

$P(x) = (x+a) \cdot (x+b)$

$P(1) = 15$

$\Rightarrow$ **a + b = ?**

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