1 $\int \frac{sin2x}{cos2x-1}\,dx$

is equal to

A) $ln|tanx| + C$

B) $-ln|cosx| + C$

C) $-ln|sinx| + C$

D) $ln|sinx| + C$

E) $ln|cosx| + C$

Doğru Cevap : C

2 Given that

$f(x) = \int_0^x e^{sint}\,cost\,dt,$

the value of $f'(0)$ *is*

A) -1

B) $\frac{1}{e}$

C) 1

D) 0

E) $\frac{2}{e}$

Doğru Cevap : C

3 $\int \frac{x^3}{x-1}dx + \int \frac{1}{1-x}dx$

What is the result of the integral above?

A) $-\frac{x^3}{3}+\frac{x^2}{2}+x+c$

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

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

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

E) $\frac{x^3}{3}+\frac{x^2}{2}+x+c$

Doğru Cevap : E

4 Which of the following is

$\frac{d}{dx}[ln^2(x^2)]$ equal to?

A) $\frac{4}{x}(lnx^2)$

B) $2ln^2(x)$

C) $\frac{2}{x}\ ln(x^2)$

D) $ln^2(x)$

E) $\frac{1}{x}\ ln(x^2)$

Doğru Cevap : A

5 The curve *C* has equation $y = f(x)$, where

$$\frac{dy}{dx} = 3x - \frac{5}{\sqrt{x}} - 2$$

$x > 0$
An equation of the tangent to *C* at the point (1,-10), is $ax + by + c = 0$,where *a*, *b* and *c* are integers.

Which of the following is a possible value for $a + b + c$?

A) –1
B) 24
C) 1
D) –24
E) –11

Doğru Cevap : E

6 $f(x) = \sqrt{x-1}$

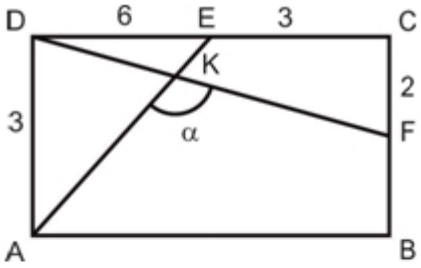
$g(x) = x^3 - 4x$

Given the functions above, what is (gof)'(5)?

A) 4
B) 8
C) 2
D) 6
E) 0

Doğru Cevap : C

7



$ABCD$ is a rectangle
$[DF] \cap [AE] = [K]$

$|AD| = |EC| = 3\ cm$
$|DE| = 3|CF| = 6\ cm$

$m(A\hat{K}F) = \alpha$

What is the value of cot α ?

A) $-\frac{15}{16}$

B) $\frac{-16}{13}$

C) $\frac{15}{16}$

D) $-\frac{13}{16}$

E) $\frac{13}{16}$

Doğru Cevap : B

8 **What is the value of**

$$\frac{1-sinx}{1+sinx}+\frac{1-cosecx}{1+cosecx}$$

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

Doğru Cevap : A

9 $x = \sin 70^o$

$y = \sin 50^o$

Given the above, what is y in terms of x?

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

Doğru Cevap : B

10 $z.(2+i)+2=\bar{z}$

Given the above, what is Im(z) – Re(z)?

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

Doğru Cevap : E

11 Given that
$z = i^{-35} + i^{-34} + i^{-33} + \cdots + i^{34} + i^{35}$
then

what is the value of $Re(z) + \text{Im}(z)$?

A) 1
B) *i*
C) –*i*
D) –1
E) 0

Doğru Cevap : D

12 $P(x)$ is a third degree polynomial in x.

If $P(-2) = P(1) = P(2) = 0$

then what is the value of $\frac{P(3)}{P(0)}$?

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

Doğru Cevap : B

13 $P(x+3) = (x^2 - 2x + 3).Q(x+1) + x - 5$

Given the polinomials in the equation above, the sum of the coefficients of Q(x) is -2.

What is the remainder when P(x) is divided by x-3?

A) -9
B) -11
C) -7
D) -13
E) -15

Doğru Cevap : B

14 If $f(-1) = 1$

and $f(n) - f(n-1) = 2n$

then the value of $f(8)$ is

A) 75

B) 73

C) 144

D) 71

E) 72

Doğru Cevap : B

15 **Let** $f, g : \mathbb{K} \to \mathbb{K}$ **be two functions.**

$$f(x) = \frac{x + |x|}{2}, g(x) = \begin{cases} x, for & x < 0 \\ x^2, for & x \geqslant 0 \end{cases}$$

Then which of the following is/are true?
I) gof is defined
II) fog is defined
III) $fog = gof$

A) Only II

B) I and III

C) Only I

D) I, II and III

E) I and II

Doğru Cevap : D

16

If $\frac{x^2+ax+b+3}{x^2-2x-15} \equiv \frac{x-1}{x+3}$

then $a+b$ is equal to

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

Doğru Cevap : A

17

What is the sum of the values of m which make

$$4x^2+mx+(m-3)$$

perfect square?

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

Doğru Cevap : E

18

The equations $x^2 + 3x + 2k + 1 = 0$ and $x^2 + (k + 4)x + k = 0$ have only one common solution.

What is the value of k?

A) -2

B) $-\frac{5}{2}$

C) -1

D) $-\frac{1}{2}$

E) -3

Doğru Cevap : B

19 x_1 and x_2 are the roots of the equation $x^2 - 4x + a + 2 = 0$.

If $x_1 - 2x_2 = -5$, what is a?

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

Doğru Cevap : E

20 What is the sum of the integer solutions of the following system of inequalities?

$$\frac{x^3 - 1}{x^2(x-2)} \leq 0$$

$$\frac{-x+4}{x+3} \geq 0$$

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

Doğru Cevap : D

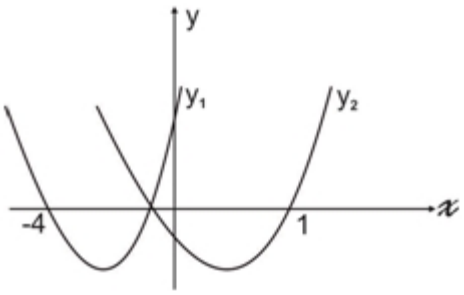
21 $3x^2 - 4x \geq x^2 - 2x + 24$

Given the inequality above, what is the broadest solution set for x?

A) R - [-3, 4]
B) R - (-3, 4)
C) (-3, 4)
D) [-3, 4]
E) R – {-3, 4}

Doğru Cevap : B

22



$y_1 = x^2 + bx + c$

$y_2 = x^2 + mx + n$

The parabolas y_1 and y_2 intersect at a point on the $x - axis$.
What is the value of $b - m$?

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

Doğru Cevap : D

23 The parabola y = 2x^2 + 4x + k does not meet the parabola y = — x^2 +2x —2.

What is the minimum integer value of *k*?

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

Doğru Cevap : E

24 In how many rearrangements of the word AMAZED, is the letter E positioned anywhere between the 2 A's ?

A) 24
B) 240
C) 48
D) 120
E) 72

Doğru Cevap : D

25 **Since the four-digit numbers formed using the elements of set A = {2, 4, 6, 8} are ordered from smallest to largest, which number is the 206th from the top?**

A) 8668
B) 8468
C) 8284
D) 8286
E) 8862

Doğru Cevap : C

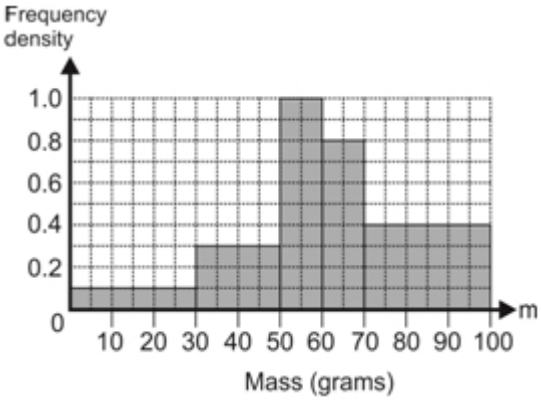
26 In a set of data which contains positive numbers, the mode is 6, the median is 9 and the range is 18.

What is the least value of the upper bound for this data?

A) 22
B) 24
C) 21
D) 19
E) 20

Doğru Cevap : D

27 The histogram shows some information about the masses (m grams) of 39 apples.



In which interval does the median mass of apples lie?

A) (50, 55)
B) (55, 60)
C) (60, 65)
D) (65, 70)
E) (70, 75)

Doğru Cevap : C

28 A and B are any two events in a space.

$P(A') = \frac{1}{7}$

$P(B') = \frac{1}{3}$

$P(A \cup B) = \frac{20}{21}$

What is $P(A \cap B)$?

A) $\frac{4}{7}$

B) $\frac{6}{7}$

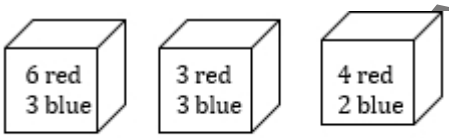
C) $\frac{1}{3}$

D) $\frac{2}{3}$

E) $\frac{5}{7}$

Doğru Cevap : A

29



Three boxes with red and blue marbles are given in figure above.

What is the probability that a marble drawn from a random bag is blue?

A) 8/63

B) 7/18

C) 1/3

D) 8/21

E) 4/9

Doğru Cevap : B

30 $(x^2 + y^3)^{10} = \ldots + m.x^k.y^{21} + \ldots$

Given the expression above, what is m + k?

A) 120
B) 122
C) 126
D) 123
E) 127

Doğru Cevap : C

31 Which of the following is a vector equation of the line which passes through the point $A(1,2,3)$ and is parallel to the vector $\begin{pmatrix} 3 \\ -2 \\ 4 \end{pmatrix}$

A) $r = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -2 \\ 4 \end{pmatrix}$

B) $r = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 2 \\ 4 \end{pmatrix}$

C) $r = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} -3 \\ -2 \\ -4 \end{pmatrix}$

D) $r = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -2 \\ -4 \end{pmatrix}$

E) $r = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} -3 \\ -2 \\ 4 \end{pmatrix}$

Doğru Cevap : A

32 $A = i + 2j + 3k$, $B = ni + 6j + 9k$ and $C = -2i + 4j + mk$ are vectors. Given that A and B are parallel and B and C are perpendicular.

What is the value of m?

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

Doğru Cevap : C

33 The function $f(x)$ is defined as

$$f(x) = \begin{cases} \dfrac{15x - 45}{x^2 - x - 6} & x < 3 \\ x + 1 & x = 3 \\ \dfrac{x^2 - 9}{x^2 - 4x + 3} & x > 3 \end{cases}$$

At how many points is the function f discontinuous?

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

Doğru Cevap : D

34 f is a function defined in real numbers set,

$$\lim_{x\to 2^+} f(x) = -2$$

$$\lim_{x\to 2^-} f(x) = 1$$

$$\lim_{x\to -1^+} \frac{f(3+x)}{f(x^2+1)} = L$$

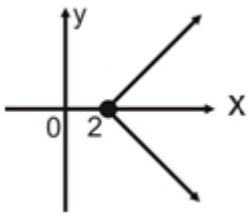
Given the above limits, what is L?

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

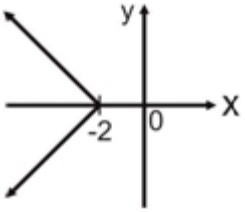
Doğru Cevap : C

35 Which of the following could be the graph of
$\beta = \{(x, y): |y| + x + 2 = 0 \quad x, y \in R\}$

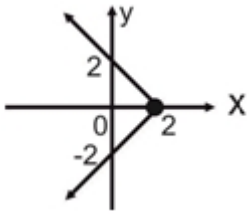
A)



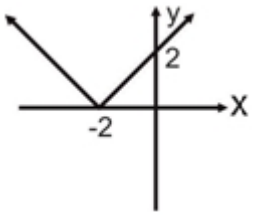
B)



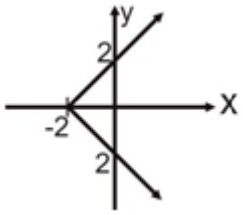
C)



D)



E)



Doğru Cevap : B

36

What is the domain of the $f(x) = \frac{\sqrt[4]{-x^2+8x-7}}{[\![2x-10]\!]-4}$ **function?**

A) $[7, \frac{15}{2}]$

B) $[7, \frac{15}{2})$

C) $[1, \frac{15}{2})$

D) [1,7)

E) [1,7]

Doğru Cevap : D

37 What is the sum of x, y and z in the following matrix multiplication?

$$\begin{pmatrix} 2 & -1 \\ 3 & 1 \\ -2 & 3 \end{pmatrix}\begin{pmatrix} 1 & 3 & 2 \\ 3 & 1 & 4 \end{pmatrix} = \begin{pmatrix} - & - & x \\ - & y & - \\ z & - & - \end{pmatrix}$$

A) -2

B) 19

C) -5

D) 11

E) 17

Doğru Cevap : E

38

$$A = \begin{bmatrix} 4 & 6 & x-1 \\ 12 & 18 & 15 \\ 7 & 11 & 13 \end{bmatrix}$$

is a singular matrix.

What is the value of x?

A) 5

B) 6

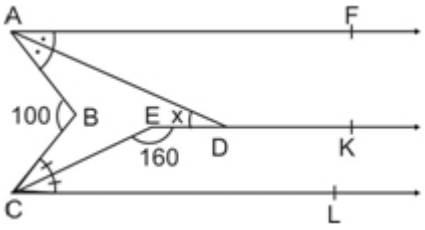
C) 8

D) 7

E) 9

Doğru Cevap : B

39



$[AF \;//\; [EK \;//\; [CL$

$[AD]$ and $[CE]$ are bisectors of the angles FAB and BCL respectively.

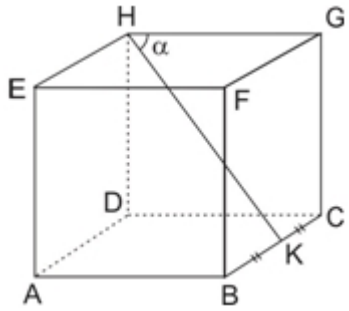
$s(A\hat{B}C) = 100^{\circ}, \quad s(C\hat{E}K) = 160^{\circ}$

What is the size of the angle $ADE = x$ in degrees?

A) 50
B) 45
C) 60
D) 30
E) 20

Doğru Cevap : D

40



$ABCDEFGH$ is a cube.
$CK = KB$
$K\hat{H}G = \propto$

What is the value of $\sin \propto$?

A) $\frac{\sqrt{3}}{4}$

B) $\frac{\sqrt{5}}{5}$

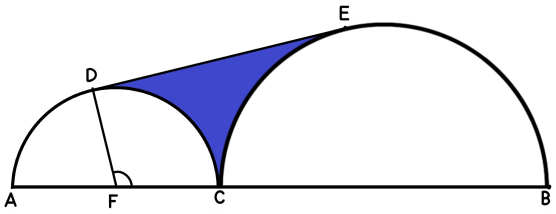
C) $\frac{\sqrt{5}}{4}$

D) $\frac{\sqrt{5}}{3}$

E) $\frac{\sqrt{3}}{5}$

Doğru Cevap : D

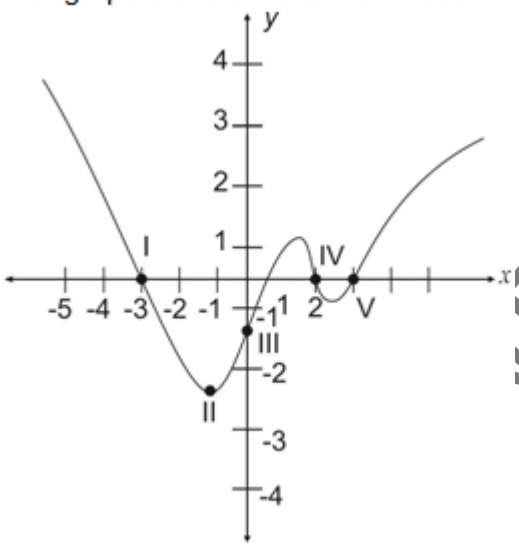
41 **There are two semicircles in the figure. Since |AC|= 4 cm, |BC|= 8 cm, F is the centre of small the circle and $m(\widehat{CFD}) = 120^\circ$, find the area of the blue region (take π=3).**



A) $8\sqrt{2}$
B) $12\sqrt{2} - 12$
C) $2\sqrt{3} + 6$
D) $4\sqrt{2} + 4$
E) 12

Doğru Cevap : B

42 The graph of a function is shown below



If the reflection $y = f(-x)$ is applied to the graph, the invariant point is

A) I
B) IV
C) II
D) III
E) V

Doğru Cevap : D

43 Let $f(x) = |x-3| - 2, x \in R$ and $g(x) = 2f(x+1) + 4$. What is the coordinates of the vertex point of $g(x)$?

A) (4,4)
B) (4,0)
C) (2,0)
D) (0,0)
E) (2,4)

Doğru Cevap : C

44

#	M	İ	N	E
M	İ	N	E	M
İ	N	E	M	İ
N	E	M	İ	N
E	M	İ	N	E

Given above is the table corresponding to binary operation # on a set {M, İ, N, E).

Then, from the table which of the following is equal to $(M^{-2}\#N^{3})$?

A) N#İ
B) E#İ
C) M#N
D) E#M
E) İ#M

Doğru Cevap : E

45 Which of the following is the solution of the equation $3^{logx} + x^{log3} = 18$?

A) 36
B) 9
C) 10
D) 18
E) 100

Doğru Cevap : E

46 $a^x + 32a^{-x} - 12 = 0$

x_1 and x_2 are the roots of the above equation.

If $x_1 + x_2 = -5$, what is a?

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

Doğru Cevap : B

47 **Let $3^x = a$ and $\left(\frac{1}{4}\right)^{1-a} = 16$. What is the value of $\left(\frac{1}{27}\right)^{-\frac{x}{a}}$?**

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

Doğru Cevap : D

48 Which of the following is equal to

$$\sqrt{(\sqrt{3}-2)^2} + \frac{2}{\sqrt{4-2\sqrt{3}}} ?$$

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

Doğru Cevap : B

49 $\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\ldots+\frac{1}{\sqrt{35}+\sqrt{36}}$

What is the result of the operation above?

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

Doğru Cevap : E

50 Given that $\frac{1}{a}-b=3$ and $\frac{1}{b}-a=\frac{1}{4}$.

What is the value of $\frac{b}{a}$?

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

Doğru Cevap : E

51 $\frac{x}{3}-\frac{3}{3-b}=3+\frac{b}{b-3}$ *and* $b\neq 3$

Given the above, what is x?

A) 4
B) 12
C) 15
D) 3
E) 7

Doğru Cevap : B

52 $3 \leq x \leq 6$

$2 \leq y \leq 8$

What is the minimum value of $\frac{28}{x+y}$ **?**

A) 0,5
B) 28
C) 14
D) 4
E) 2

Doğru Cevap : E

53

Which of the following is the solution set of the inequality $\frac{(x^2+4x-5).\sqrt{x^2-1}}{|x+5|} \geq 0$ **?**

A) $(-\infty, -5) \cup [1, \infty) \cup \{-1\}$
B) $(-\infty, -5) \cup (1, \infty) \cup \{-1\}$
C) $(-1, 1)$
D) $(-\infty, -5) \cup [1, \infty)$
E) $(-\infty, -5] \cup [1, \infty) \cup \{-1\}$

Doğru Cevap : A

54 $|1 - x| < 5$

$|2x - 1| \geq 3$

Which of the following is the solution set of the above system?

A) $[-4, -1) \cup (2, 6]$
B) $(-4, -1] \cup [2, 6)$
C) $[-4, -1] \cup (2, 6]$
D) $(-4, -1) \cup [2, 6)$
E) $[-4, -1] \cup [2, 6]$

Doğru Cevap : B

55 $|a+5|+|a-3|=9$

What is the sum of the real numbers x that satisfy the equation above?

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

Doğru Cevap : A

56 Given that

$$\frac{x-y}{2}=\frac{y-z}{2}=k$$

What is the value of $x^2+z^2-2y^2$?

A) 8k
B) 2k
C) 4k
D) $4k^2$
E) $8k^2$

Doğru Cevap : D

57 A group of 55 consists of smokers and non-smokers. In this group, the number of female non-smokers is four times the number of male smokers. The number of non-smoking males is twice the number of female smokers.

13 members of this group are smokers.
How many male smokers are there in this group?

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

Doğru Cevap : E

58 **For the sets A, B, C, D ⊂ E which of the following is <u>false?</u>**

A) If B ⊂ C then B ∪ C ⊂ C

B) If A ⊂ B then A ∩ (E − B) = Ø

C) (A ∪ B) − (A ∩ B) = A ∪ (A − B)

D) If A ∩ B = Ø and A ∪ B =C then A = C − B

E) (A × B) ∩ (C × D) = (A ∩ C) × (B ∩ D)

Doğru Cevap : C

59 x and $2x + y$ are relatively prime, positive numbers.

If $2x^2 + xy = 36$

then what is the largest value of $x + y$?

A) 9

B) 21

C) 16

D) 35

E) 5

Doğru Cevap : D

60 *a* and *b* are consecutive odd integers. *a* < *b* and *a* . *b* = *c*

What is the value of
(*a* + 1) . (*b* - 1) in terms of *c*?

A) *c*

B) 2*c*

C) *c* + 1

D) *c* - 1

E) 2*c* + 1

Doğru Cevap : C

61 **If a is an integer and b is a natural number, how many the possible values of b given that**

$$b = \frac{3a + 21}{a}$$ **?**

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

Doğru Cevap : A

62

$$3 + 6 + 9 + \cdots + 81 = \sum_{k=0}^{n} (x.k + y)$$

Given the expression above, what is x+y+n?

A) 26
B) 32
C) 20
D) 29
E) 23

Doğru Cevap : B

63

$$\sum_{n=2}^{m} \log\left(1 - \frac{1}{n}\right)$$

Which of the below is equal to the expression given above?

A) $\log m$
B) $\log(m + 1)$
C) $-\log m$
D) $\log\left(\frac{m-1}{m}\right)$
E) $-\log(n + 1)$

Doğru Cevap : C

64 How many positive terms are there in the sequence

$$\left(\frac{-n^2+2n+24}{n+3}\right)?$$

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

Doğru Cevap : C

65 First three term of an arithmetic sequence is

$$4x-1, 5x+2, 3x+11$$

What is the fourth term of the sequence?

A) 15
B) 20
C) 22
D) 12
E) 17

Doğru Cevap : C

66 The sum of ages of Steve and Jen is 52. When Jen was at Steve's age, Jen's age was 4 less than three times Steve's age then.

How old is Jen now?

A) 32
B) 31
C) 28
D) 36
E) 30

Doğru Cevap : A

67 A rod is divided into 15 equal pieces. If the same rod were divided into 18 equal pieces, each piece would be 3 cm shorter.

What is the length of the rod in centimeters?

A) 220
B) 250
C) 240
D) 270
E) 260

Doğru Cevap : D

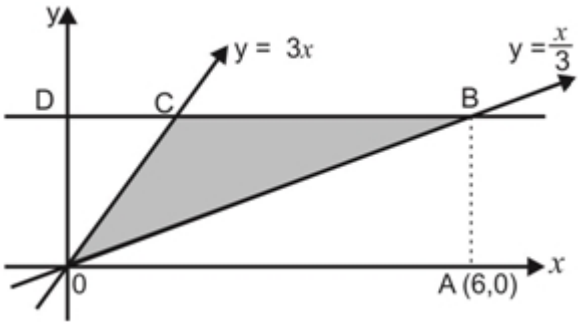
68 If a store offers 20% discount on products, the number of customers increases by 20%.

What is the resulting profit or loss in percentage?

A) 4% loss
B) 8% profit
C) Break-even
D) 8% loss
E) 4% profit

Doğru Cevap : A

69



$OABD$ is a rectangle. The points B and C lie on the given lines.

Calculate the area of triangle OBC, in square units

A) $\frac{13}{2}$

B) $\frac{15}{2}$

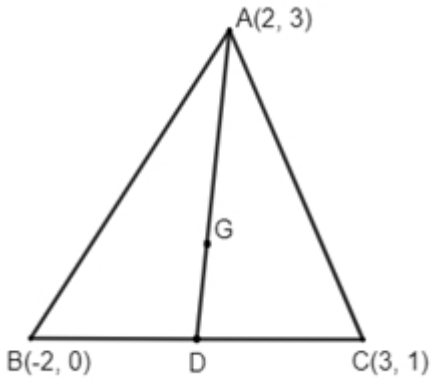
C) 7

D) 6

E) $\frac{16}{3}$

Doğru Cevap : E

70



G is on the line segment [AD] and is the centroid of the triangle ABC.

Given the above, what is the slope of [GD]?

A) 4/3
B) 3/2
C) 5/2
D) 7/4
E) 5/3

Doğru Cevap : E