This Question Paper contains 4 Printed Pages.

New Pattern

16E(A)

MATHEMATICS, Paper - II

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.] ***[Maximum Marks : 40***

Instructions :

1. *15 minutes of time is allotted exclusively for reading the Question Paper and 2.30 hours for writing the answers.*
2. ***Part - A** answers should be written in separate answer book.*
3. *There are three sections in **Part-A**.*
4. *Answer **all** questions.*
5. *Every answer should be written visibly and clearly.*
6. *There is internal choice in section - III.*

Part - A

Time : 2 Hours ***Marks : 30***

SECTION - I

(Marks : 4×1=4)

Note :

*(i) Answer **all** the questions.*

*(ii) Each question carries **1** mark.*

1. Find the co-ordinates of the point, which divides the line segment joining (2, 0) and (0, 2) in the ratio 1 : 1.

2. 'O' is the centre of a circle. PQ is a tangent to the circle at Q from the external point P. If radius of the circle is 9 cm and PQ = 12 cm, find the distance of P from O.

3. Find the value of x, if $2 \sin x = \sqrt{3}$.

4. You are writing a test of 40 objective type questions. Each question carries 1 mark. What is the probability of marks you may get to be in multiple of 5 ?

SECTION - II

(Marks : 5×2=10)

Note :

(i) *Answer **all** questions.*

(ii) *Each question carries **2** marks.*

5. Find the value of k, for which the points (7, 2), (5, 1) and (3, k) are collinear.

6. Find $\angle B$, if $\tan (A - B) = \frac{1}{\sqrt{3}}$ and $\sin A = \frac{\sqrt{3}}{2}$. Also find cos B. (A, B < 90°)

7. Give two different examples of pair of

(i) Similar figures.

(ii) Non-similar figures.

8. There are 5 cards in a box with numbers 1 to 5 written on them. If 2 cards are picked out from the box, write all the possible outcomes and find the probability of getting both even numbers.

9. A tower is $100\sqrt{3}$ m high. Find the angle of elevation of its top when observed from a point 100 m away from the foot of the tower.

SECTION - III

(Marks : 4×4=16)

Note :

(i) *Answer **all** questions.*

(ii) *Each question carries **4** marks.*

10. *(a)* A wire of length 18 m had been tied to an electric pole at angle of elevation 30° with the ground. As it is covering a long distance, it was cut and tied to the pole at an angle of 60° with the ground. Now, find how much length of the wire was cut ?

OR

OR

(b) Consider the following distribution of daily wages of 50 workers of a factory.

Daily Wages (in Rs)	200-250	250-300	300-350	350-400	400-450
No. of Workers	12	14	8	6	10

Find the mean daily wage of the workers by choosing an appropriate method.

11. *(a)* Prove that

$$(\sin\theta - \operatorname{cosec}\theta)^2 + (\cos\theta - \sec\theta)^2 = \cot^2\theta + \tan^2\theta - 1$$

OR

(b) Check whether the points (3, 0), (6, 4) and (–1, 3) are the vertices of a right-angled isosceles triangle or not. Also find the area of the triangle.

12. *(a)* A chord of circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding :

(i) Minor segment.

(ii) Major segment.

(use $\pi = 3.14$)

OR

(b) From a deck of 52 playing cards, King, Ace and 10 of Clubs were removed and remaining cards were well shuffled. If a card is drawn at random from the remaining, find the probability of getting a card of

(i) Club

(ii) Ace

(iii) Diamond king

(iv) Club 5.

13. *(a)* Draw a circle of radius 3 cm. Take a point 'P' at a distance of 5 cm from the centre of the circle. From P, draw 2 tangents to the circle.

OR

(b) Draw "greater than Ogive curve" for the following data.

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	8	10	12	8	4

This Question Paper contains 4 Printed Pages.

New Pattern

16E(B)

MATHEMATICS, Paper - II

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.] ***[Maximum Marks : 40***

Instructions : *Write the answers to the questions in this* ***Part-B*** *on the Question paper itself and attach it to the answer book of* ***Part-A.***

Part - B

Time : 30 minutes ***Marks : 10***

(i) *Each question has four options. Write the CAPITAL LETTERS (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.*

(ii) *Marks will* ***not*** *be awarded for overwritten answers.*

(iii) *All questions carry equal marks.*

SECTION - IV *(Marks : 20 × ½ = 10)*

Note :

(i) *Answer* ***all*** *questions.*

(ii) *Each question carries* $\frac{1}{2}$ *mark.*

14. If origin is the centroid of a triangle, whose vertices are $(3, 2), (-6, y)$ and $(3, -2)$, then y = ... [ ]

(A) 0 (B) 3

(C) 2 (D) 6

15. Areas of 2 similar triangles are 100 cm^2 and 64 cm^2.
If the median of bigger triangle is 10 cm,
then the median of the smaller triangle is ..... [ ]

(A) 10 cm (B) 6 cm
(C) 4 cm (D) 8 cm

16. If $\sin x = \frac{5}{7}$, then $\operatorname{cosec} x$ = ... [ ]

(A) $\frac{5}{7}$ (B) $\frac{7}{5}$

(C) $\frac{2}{5}$ (D) $\frac{2}{7}$

17. Given $\angle A = 75°$, $\angle B = 30°$, then $\tan (A - B)$ = ... [ ]

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$

(C) 1 (D) $\frac{1}{\sqrt{2}}$

18. If P(E) = 0.26, then $P(\overline{E})$ = ... [ ]

(A) 0.74 (B) 0
(C) 0.26 (D) 1

19. Median of 2, 3, 4, 5, 6, 7 is ..... [ ]

(A) 2 (B) 5.5
(C) 5 (D) 4.5

20. Which of the following cannot be a point on X-axis ? [ ]

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

21. Radius of a circle with centre 'O' is 5 cm. P is a point at a distance of 3 cm from 'O'. Then the number of tangents that can be drawn to the circle is ..... [ ]

(A) 1 (B) 2
(C) 0 (D) 3

22. If $\sec\theta + \tan\theta = \frac{1}{3}$, then $\sec\theta - \tan\theta =$ ..... [ ]

(A) 3 (B) $\frac{1}{3}$

(C) 1 (D) 0

23. Probability of getting 7, when a dice is rolled, is ..... [ ]

(A) $\frac{1}{6}$ (B) $\frac{1}{7}$

(C) $\frac{6}{7}$ (D) 0

24. To elect the leader of your class from 3 contestants, which of the following measures are to be considered ? [ ]

(A) Mean (B) Mode

(C) Median (D) Range

25. In Heron's formula, area of triangle $= \sqrt{s(s-a)(s-b)(s-c)}$, s is ..... of the triangle. [ ]

(A) Perimeter. (B) Height.

(C) Half of perimeter. (D) None.

26. Angle made by the minutes-hand in a clock during a period of 20 minutes is ..... [ ]

(A) 120° (B) 20°

(C) 360° (D) 90°

27. Which of the following situations have equally likely events ? [ ]

(1) Getting 1 or 2 or 3 or 4 or 5 or 6 when a dice is rolled.

(2) Winning or loosing a game.

(3) Head or Tail, when a coin is tossed.

(A) 1 and 2 (B) 2 and 3

(C) 1 and 3 (D) All

28. The probability of picking a letter from the set of English alphabets is $\frac{5}{26}$. That alphabet can be ..... [ ]

(A) consonant. (B) vowel.

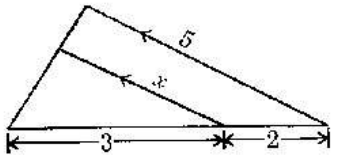
(C) any alphabet. (D) none.

29. If $\Delta PQR \sim \Delta XYZ$ and $\angle X = 30°$, $\angle Q = 50°$, then $\angle Z$ = ... [ ]

(A) 100° (B) $\angle R$

(C) both A and B. (D) not known.

30. From the given figure, x = ... [ ]



(A) 3 (B) 2

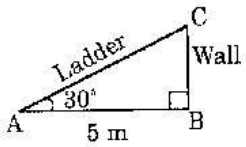
(C) 5 (D) 1

31. Which of the following is the point of intersection of X - axis and the line $y = x + 5$? [ ]

(A) (0, 5) (B) (5, 0)

(C) (0, – 5) (D) (– 5, 0)

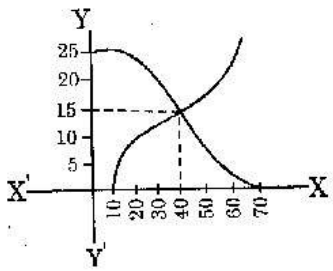
32. Observe the figure. Length of the ladder = ... [ ]



(A) 5 m (B) 10 m

(C) 20 m (D) 2.5 m

33. From the given graph of Ogives, median is ..... [ ]



(A) 15

(B) 10

(C) 40

(D) 20

Andhra Pradesh SSC Class 10th Maths Question Paper 2 With Solution 2017

QUESTION PAPER CODE 16E(A)

SECTION - I

(4 * 1 = 4)

Question 1: Find the coordinates of the point, which divides the line segments joining (2, 0) and (0,2) in the ratio 1:1

Solution:

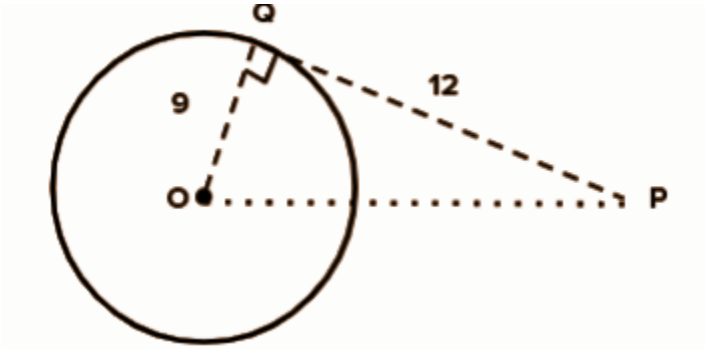
$[m_1x_2 + m_2x_1] / (m + n), [m_1y_2 + m_2y_1] / (m + n)$

$= (1 * 0) + (1 * 2) / [1 + 1], (1 * 2) + (1 * 0) / [1 + 1]$

$= 2 / 2, 2 / 2$

$= 1, 1$

Question 2: 'O' is the centre of a circle. PQ is a tangent to the circle at Q from the external point P. If the radius of the circle is 9 cm and PQ = 12 cm, find the distance of P from O.



In Δ PQO,

$PO^2 = PQ^2 + OQ^2$

$= 9^2 + 12^2$

$= 81 + 144$

$PO = \sqrt{225}$

PO = 15cm

Question 3: Find the value of x, if 2sinx = √3.

Solution:

2sinx = √3

sinx = √3 / 2

sinx = 60^o

x = 60^o

Question 4: You are writing a test of 40 objective type questions. Each question carries 1 mark. What is the probability of marks you may get to be in multiples of 5?

Solution:

Event = {5, 10, 15, 20, 25, 30, 35, 40}

n(A) = 40

P(E) = 8 / 40

= 1 / 5

SECTION - II

(5 * 2 = 10)

Question 5: Find the value of k, for which the points (7, 2), (5, 1) and (3, k) are collinear.

Solution:

$(1 / 2) (x_1 [y_2 - y_3] + x_2 [y_3 - y_1] + x_3 [y_1 - y_2]) = 0$

$(1 / 2) (\{7 (1 - k) + 5 (k - 2) + 3 (2 - 1)\} = 0$

7 - 7k + 5k - 10 + 3 = 0

- 2k = 0

k = 0

Question 6: Find the angle B, if tan (A − B) = 1 / √3 and sin A = √3 / 2. Also find cos B.

Solution:

$\sin A = \sqrt{3} / 2$

=> sin A = sin 60

$\Rightarrow \angle A = 60^\circ$

So, cos A = cos 60° = 1 / 2

$\tan (A - B) = 1 / \sqrt{3}$

=> tan(60 - B) = tan30

=> 60 - B = 30

$\Rightarrow \angle B = 30$

So, cos B = cos 30 = $\sqrt{3} / 2$

Question 7: Give two different example of a pair of
(i) Similar figures
(ii) Non-similar figures

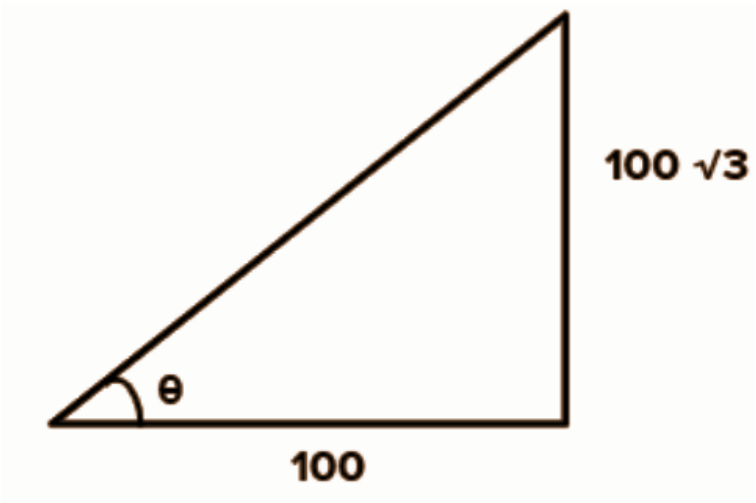
Solution:
(i) Two triangles
(ii) A square and A triangle

Question 8: There are 5 cards in a box with numbers 1 to 5 written on them. If 2 cards are picked out from the box, write all the possible outcomes and find the probability of getting both even numbers.

Solution:
Sample space = n(s) = {(1, 1) (1, 2) (1, 3) (1, 4) (1, 5) (2, 1) (2, 2) (2, 3) (2, 3) (2, 4) (2, 5) (3, 1) (3, 2) (3, 3) (3, 4) (3, 5) (4, 1) (4, 2) (4, 3) (4, 4) (4, 5) (5, 1) (5, 2) (5, 3) (5, 4) (5, 5)}
Event = {(2, 2) (2, 4) (4, 2) (4, 4)}
P(E) = 4 / 25

Question 9: A tower is $100\sqrt{3}$ m high. Find the angle of elevation of its top when observed from a point 100m away from the food of the tower.

Solution:



$\tan \theta = 100\sqrt{3} / 100$

$= \sqrt{3}$

$\theta = 60^{o}$

SECTION - III

(4 * 4 = 16)

Question 10:

(a) A wire of length 18 cm had been tied to an electric pole at an angle of elevation 30 with the ground. As it is covering a long distance, it was cut and tied to the pole at an angle of 60 with the ground. Now, find how much length of the wire was cut?

OR

(b) Consider the following distribution of daily wages of 50 workers of a factory.

Daily Wages	**200 - 250**	**250 - 300**	**300 - 350**	**350 - 400**	**400 - 450**
Number of Workers	**12**	**14**	**8**	**6**	**10**

Find the mean daily wages of the workers by choosing an appropriate method.

Solution:

(a) First, sinA = perpendicular / hypotenuse

sin 30 = 1 / 2

H = 18 m

P / H = 1 / 2

P = H / 2

= 9 m

In the second case, the length of the pole P = 9 m will be the same.

$\sin 60 = \sqrt{3} / 2 = P / H$

To find H.

$H = (9 \times 2) / \sqrt{3}$

$= 18 / \sqrt{3}$

$= (18 \times \sqrt{3}) / 3$

$= 6 \times \sqrt{3}$

= 6 x 1.72

= 10.32

The new length = 10.32m

The decrease in length = 18 - 10.32 m = 7.68 m

(b)

Daily Wages	200 - 250	250 - 300	300 - 350	350 - 400	400 - 450
Number of Workers (x_i)	12	14	8	6	10
Midpoint (a_i)	225	275	325	375	425
$a_i x_i$	2700	3850	2600	2250	4250

$\text{Mean} = \sum a_i x_i / \sum x_i = 15650 / 50 = 313$

Question 11:

[a] Prove that $(\sin \theta - \text{cosec } \theta)^2 + (\cos \theta - \sec \theta)^2 = \cot^2 \theta + \tan^2 \theta - 1$

OR

[b] Check whether the points (3, 0), (6, 4) and (-1, 3) are the vertices of a right-angle isosceles triangle or not. Also, find the area of the triangle.

Solution:

[a] LHS $= (\sin \theta - \text{cosec } \theta)^2 + (\cos \theta - \sec \theta)^2$

$= (\sin \theta - 1 / \sin \theta)^2 + (\cos \theta - 1 / \cos \theta)^2$

$= \sin^2 \theta + 1 / \sin^2 \theta - 2 + \cos^2 \theta + 1 / \cos^2 \theta - 2$

$\sin^2 \theta + \cos^2 \theta = 1$

$= 1 - 2 - 2 + 1 / \sin^2 \theta + 1 / \cos^2 \theta$

$= \text{cosec}^2 \theta + \sec^2 \theta - 3$

$\text{cosec}^2 \theta = 1 + \cot^2 \theta$, $\sec^2 \theta = 1 + \tan^2 \theta$

$= 1 + \cot^2 \theta + 1 + \tan^2 \theta - 3$

$= \cot^2 \theta + \tan^2 \theta - 1$

= RHS

[b] Let the A(3, 0), B(6, 4) and C(- 1, 3) are three vertices.

Using the distance formula for two points A (x_1, y_1) and B(x_2, y_2)

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$AB = \sqrt{(6 - 3)^2 + (4 - 0)^2}$

$= \sqrt{(9) + (16)}$

$= \sqrt{25}$

= 5 units

$BC = \sqrt{(-1 - 6)^2 + (3 - 4)^2}$

$= \sqrt{(49) + (1)}$

$= \sqrt{50}$

$AC = \sqrt{(-1 - 3)^2 + (3 - 0)^2}$

$= \sqrt{(16) + (9)}$

$= \sqrt{25}$

= 5 units

AB = AC [they are isosceles]

AB > BC = AC

Therefore, if ABC is a right-angled triangle, AB should be the hypotenuse, BC and AC should be the other two sides. (i.e. perpendicular and base)

Question 12:

(a) A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding:

(i) Minor segment.

(ii) Major segment

OR

(b) From a deck of 52 playing cards, King, Ace and 10 of clubs were removed are remaining cards were well shuffled. If a card is drawn at random from the remaining, find the probability of getting a card of

(i) Club

(ii) Ace

(iii) Diamond King

(iv) Club 5

Solution:

(a) Radius r = 10cm

Angle = 90^o

Area of sector A = $90 / 360\pi r^2$

A = 3.14 x 10 x 10 / 4

A = 25 x 3.14

A = 78.5 sq.cm

Let the angle subtended and radius form an arc AOB, then

Area of AOB = r x r sin90 / 2

AOB = 10 x 10 x 1 / 2

Area of AOB = 50 sq.cm

Area of minor segment = 78.5 - 50 = 28.5 q.cm
Area of circle = πr^2
= 3.14 x 10 x 10
= 314 Sq.cm
Area of major segment = area of circle - area of minor segment
= 314 - 28.5
= 285.5 sq.cm

[b] King, Ace and 10 of Club were removed
=> Club remained = 13 - 3 = 10
Total cards remaining = 52 - 3 = 49
Ace remaining = 4 - 1 = 3
Probability of club = 10/49
Probability of Ace = 3/49
Probability of Diamond king = 1/49
Probability of Club 5 = 1/49

Question 13:
(a) Draw a circle of radius 3 cm. Take a point 'P' at a distance of 5 cm from the centre of the circle. From P, draw 2 tangents to the circle.

(or)

(b) Draw "greater than Ogive curve" for the following data.

Classes	**0 - 10**	**10 - 20**	**20 - 30**	**30 - 40**	**40 - 50**	**50 - 60**	**60 - 70**
Frequency	**4**	**4**	**8**	**10**	**12**	**8**	**4**

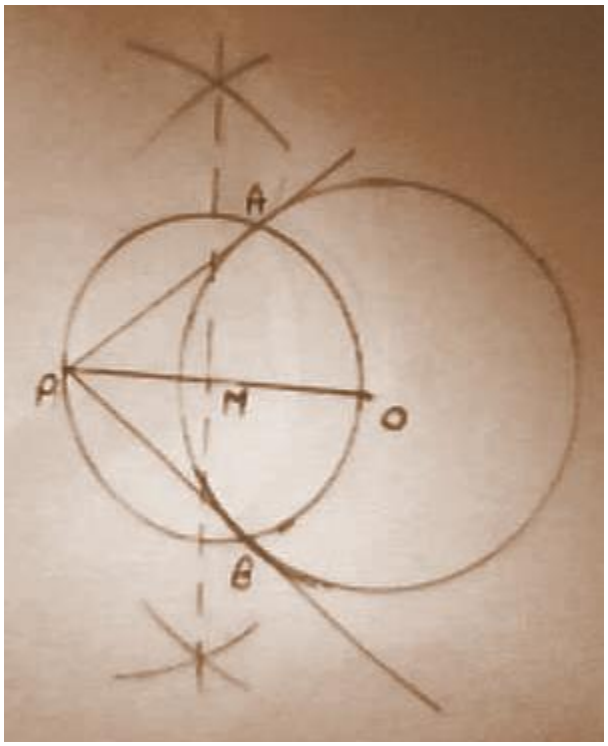
Solution:
(a) Steps of construction :
1. Take a point O as the center and with radius 3 cm, draw a circle.
2. Mark a point P outside the circle such that OP = 5 cm. Join O to P.
3. Draw a perpendicular bisector of the OP that cuts OP at M.

4. With M as a centre and radius MO (or MP), draw a circle cutting the first circle at A and B.

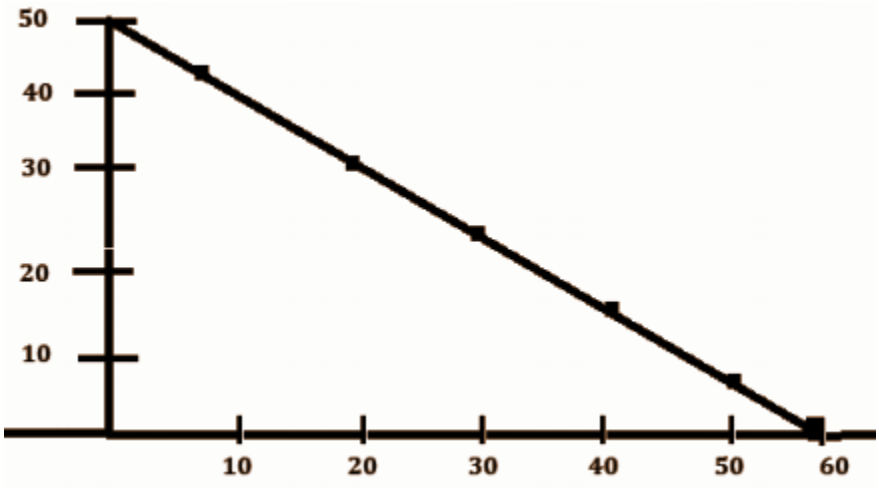
5. Join P to A and P to B

Then PA and PB are the required two tangents

The length of the tangent is PA = PB = 4 cm.



(b)



SECTION - IV

(20 * 0.5 = 10)

Question 14: If origin is the centroid of a triangle, whose vertices are (3, 2), (-6, y), (3, -2), then y =

(A) 0 **(B) 3** **(C) 2** **(D) 6**

Answer: A

Question 15: Areas of 2 similar triangles are 100 cm^2 and 64 cm^2. If the median of the bigger triangle is 10 cm, then the median of the smaller triangle is …..

(A) 10 cm **(B) 6 cm** **(C) 4 cm** **(D) 8 cm**

Answer: D

Question 16: If sin x = 5 / 7 , then cosec x = …….

(A) 5 / 7 **(B) 7 / 5** **(C) 2 / 5** **(D) 2 / 7**

Answer: B

Question 17: Given $\angle A = 75^o$, $\angle B = 30^o$, then tan (A - B) = …..

(A) √3 **(B) 1 / √3** **(C) 1** **(D) 1 / √2**

Answer: C

Question 18: If P(E) = 0.26, then P(E bar) = ……

(A) 0.74 **(B) 0** **(C) 0.26** **(D) 1**

Answer: A

Question 19: Median of 2, 3, 4, 5, 6, 7 is …….

(A) 2 **(B) 5.5** **(C) 5** **(D) 4.5**

Answer: D

Question 20: Which of the following cannot be a point on the x-axis?
(A) (-2, 0) **(B) (0, 2)** **(C) (2, 0)** **(D) (4, 0)**

Answer: B

Question 21: Radius of a circle with centre 'O' is 5 cm. P is a point at a distance of 3 cm from 'O'. Then the number of tangents that can be drawn to the circle is ……
(A) 1 **(B) 2** **(C) 0** **(D) 3**

Answer: C

Question 22: If sec θ + tan θ = 1 / 3, then sec θ - tan θ = ____
(A) 3 **(B) 1 / 3** **(C) 1** **(D) 0**

Answer: A

Question 23: Probability of getting 7, when dice are rolled, is ……
(a) 1 / 6 **(b) 1 / 7** **(c) 6 / 7** **(d) 0**

Answer: D

Question 24: To elect the leader of your class from 3 contestants, which of the following measures are to be considered?
(A) Mean **(B) Mode** **(C) Median** **(D) Range**

Answer: B

Question 25: In Heron's formula, the area of triangle = √s (s − a) (s − b) (s − c), s is …. of the triangle.
(A) perimeter **(B) height** **(C) half of perimeter** **(D) none**

Answer: C

Question 26: Angle made by the minutes-hand in a clock during a period of 20 minutes is ……

(A) 120 (B) 20 (C) 360 (D) 90

Answer: A

Question 27: Which of the following situations have equally likely events?

(1) Getting 1 or 2 or 3 or 4 or 5 or 6 when a dice is rolled.

(2) Winning or losing a game.

(3) Head or Tail, when a coin is tossed.

(A) 1 and 2 (B) 2 and 3 (C) 1 and 3 (D) All

Answer: D

Question 28: The probability of picking a letter from the set of English alphabets is 5 / 26. That alphabet can be …..

(A) consonant (B) vowel (C) any alphabet (D) none

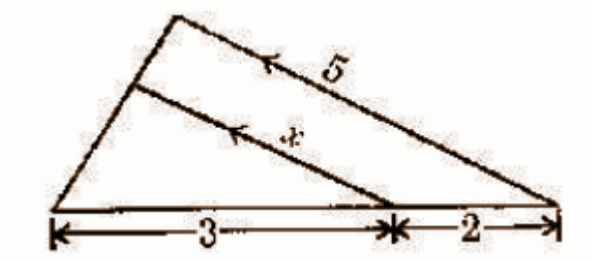
Answer: B

Question 29: If $\triangle PQR \sim \triangle XYZ$ and $\angle X = 30$, $\angle Q = 50$, then $\angle Z$ = ……

(a) 100 (b) $\angle R$ (c) both A and B (d) not Known

Answer: B

Question 30: From the given figure, x = ……..



(A) 3 (B) 2 (C) 5 (D) 1

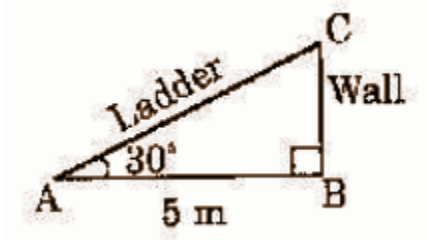
Answer: A

Question 31: Which of the following is the point of intersection of the x-axis and the line y = x + 5?

(A) (0, 5) **(B) (5, 0)** **(C) (0, -5)** **(D) (-5, 0)**

Answer: D

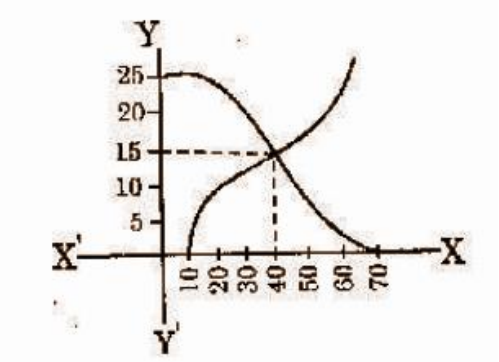
Question 32: Observe the figure. Length of the ladder = …….



(A) 5 cm **(B) 10 cm** **(C) 20 cm** **(D) 2.5 cm**

Answer: A

Question 33: From the given graph of Ogives, the median is …….



(A) 15 **(B) 10** **(C) 40** **(D) 20**

Answer: A