7

TERM-1
SAMPLE PAPER
SOLVED

MATHEMATICS
(STANDARD)

Time Allowed: 90 Minutes *Maximum Marks: 40*

General Instructions: Same instructions as given in the Sample Paper 1.

SECTION - A **16 marks**

(Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

1. If $0.3\overline{73}$ is expressed in the form $\frac{a}{b}$, then $\frac{a}{b}$ is:

(a) $\frac{373}{999}$ (b) $\frac{37}{99}$

(c) $\frac{3}{9}$ (d) $\frac{373.36...}{999}$

2. If $2\cos 3\theta = \sqrt{3}$, $0° < \theta < 90°$, then the value of θ is:

(a) 10° (b) 20°

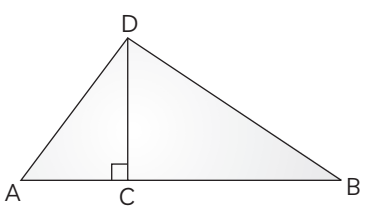
(c) 30° (d) 15°

3. If in two triangles ABC and PQR, $\frac{AB}{PQ} = \frac{BC}{RP}$, then for the two triangles to be similar, which of the following condition is necessary?

(a) $\angle B = \angle Q$ (b) $\angle A = \angle P$

(c) $\angle B = \angle P$ (d) $\angle A = \angle Q$

4. In the figure, AC = 3 cm, BC = 6 cm and CD = 4 cm. Then sin A + cos B =



(a) $\frac{3}{10}$ (b) $\frac{7}{5}$

(c) $\frac{1}{2}$ (d) $\frac{4}{13}$

5. The dependent pair of linear equations is always:

(a) Inconsistent (b) Parallel

(c) Straight (d) Consistent

6. A circle's circumference is equal to the sum of the circumferences of two circles having diameters 34 cm and 28 cm. What is the radius of the new circle?

(a) 31 cm (b) 62 cm

(c) 38 cm (d) 28 cm

7. A box contains 8 red balls and some blue balls. If the probability of drawing a blue ball is three times that of red ball, then the number of blue balls in the bag is:

(a) 36 (b) 24

(c) 18 (d) 12

8. Consider points A(4, 3) and B(x, 5) on the circle with centre O(2, 3). Then the value of x is:

(a) 3 (b) 2

(c) 1 (d) 0

9. Write the algebraic representation of the situation, "the sum of two numbers is 137 and their difference is 43."

(a) $x - y = 137, x + y = 43$

(b) $x + y = 137, x - y = 43$

(c) $2x + y = 137, x - y = 43$

(d) $x + 2y = 137, x - 2y = 43$

10. Calculate the value of c for which pair of linear equations $cx - y = 2$ and $6x - 2y = 4$ will have infinitely many solutions.

(a) 3 (b) 5

(c) –1 (d) 0

11. Calculate the ratio between the LCM and HCF of the numbers 5, 15 and 20.

(a) 5 : 3 (b) 7 : 2

(c) 9 : 4 (d) 12 : 1

12. Consider two similar triangles ABC and LMN, whose perimeters are respectively 60 cm and 48 cm. If the length of LM is 8 cm, the length of AB is:

(a) 10 cm (b) 6 cm

(c) 12 cm (d) 14 cm

13. What is the value of $\frac{\cos^2 A}{\cos^2 B}$, if $\tan^2 A = 1 + 2\tan^2 B$?

(a) $\sqrt{3}$ (b) $\frac{1}{2}$

(c) $\frac{1}{\sqrt{3}}$ (d) 1

14. Find the coordinates of third vertex of a triangle, if centroid of the triangle is (3, – 5) and two of its vertices are (4, –8) and (3, 6).

(a) (1, 5) (b) (2, –13)

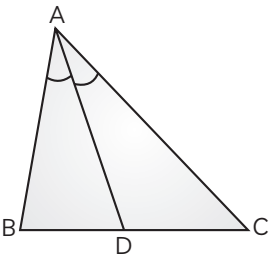
(c) (5, 6) (d) (–1, 3)

15. After how many places of decimal will the number $\frac{343}{1400}$ terminate?

(a) Two (b) Three

(c) Four (d) Five

16. In the given figure in ΔABC, AD is the internal bisector of $\angle A$ and BD = 5 cm, BC = 7.5 cm. Then what is the value of AB : AC?



(a) 1 : 2 (b) 2 : 1

(c) 3 : 1 (d) 1 : 3

17. What is the area of sector of a circle whose radius is r and length of the arc is l?

(a) $\frac{1}{2}lr$ (b) lr

(c) $\frac{\theta}{360^\circ} \times lr$ (d) $\frac{\theta}{180^\circ} \times lr$

18. If HCF (209, 737) = 11 and LCM (209, 737) = $209x$, then the value of x is :

(a) 67 (b) 72

(c) 77 (d) 81

19. What is the probability of getting different numbers on dice, if two dice are thrown at the same time?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$

(c) $\frac{5}{6}$ (d) $\frac{1}{4}$

20. If we draw $x = a$ and $y = b$ graphically, then these two lines will intersect at:

(a) (a, b) (b) $(a, 0)$

(c) $(0, b)$ (d) $(-a, -b)$

SECTION - B

16 marks

(Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

21. If the LCM of two prime numbers 47 and x is 517, then the value of x is:

(a) 1 (b) 47

(c) 11 (d) 51

22. The value of $\frac{4\cos^2 60^\circ + 3\sec^2 30^\circ - \cot^2 45^\circ}{\cos^2 60^\circ + \sin^2 60^\circ}$ is:

(a) 2 (b) 4

(c) 6 (d) 5

23. If $\Delta ABC \sim \Delta PQR$ and $\frac{BC}{QR} = \frac{1}{4}$ then $\frac{ar(\Delta PQR)}{ar(\Delta ABC)} =$

(a) $\frac{1}{4}$ (b) $\frac{4}{1}$

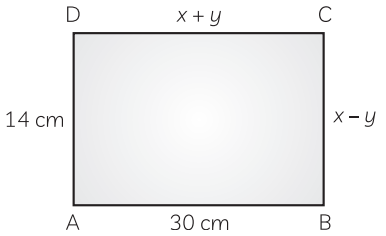
(c) $\frac{1}{16}$ (d) $\frac{16}{1}$

24. If $P(9a-2, -b)$ divides the line segment joining $A(3a + 1, -3)$ and $B(8a, 5)$ in the ratio 3 : 1, then the values of a, b respectively are:

(a) –1, 3 (b) 1, 3

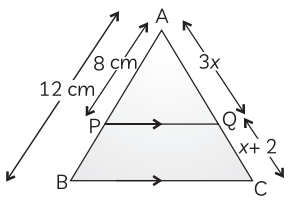
(c) –1, –3 (d) 1, –3

25. ABCD is a rectangle with dimensions mentioned in the figure. Find the value of y.



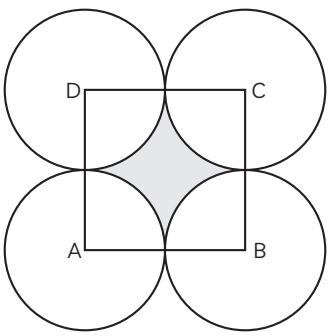
(a) 21 (b) 7
(c) 22 (d) 8

26. In the given figure, PQ || BC. Then the value of x is:



(a) 1 (b) 4
(c) $\frac{8}{7}$ (d) $\frac{4}{7}$

27. As shown in the figure, ABCD is a square of side 7 cm and A, B, C and D are centres of equal circles touching externally in pairs. The area of the shaded region is:



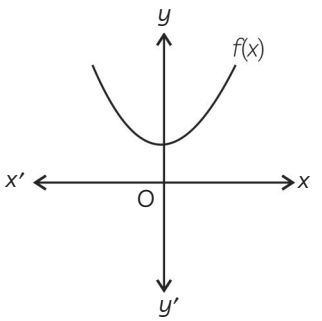
(a) 10.5 cm^2 (b) 11.7 cm^2
(c) 7.7 cm^2 (d) 22 cm^2

28. What is the number of bad eggs in a lot of 400, if, the probability of getting a bad egg is 0.035?
(a) 14 (b) 21
(c) 28 (d) 7

29. In ΔABC right angled at B, if the two sides AB and BC are in the ratio 1 : 3, evaluate the value of sin C.
(a) $\frac{\sqrt{10}}{3}$ (b) $\frac{3}{\sqrt{10}}$
(c) $\frac{1}{3}$ (d) $\frac{1}{\sqrt{10}}$

30. If two irrational numbers are multiplied, then their product is:
(a) zero
(b) always rational
(c) always irrational
(d) rational or irrational

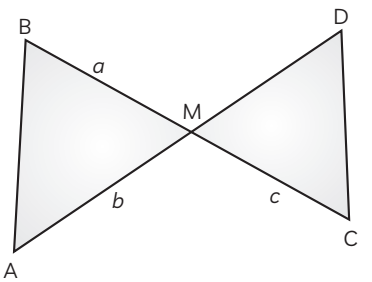
31. For the graph of $y = f(x)$ shown below, how many zeroes of $f(x)$ are there?



(a) 0 (b) 1
(c) 2 (d) 3

32. A man is going from his office to his house. He goes 15 m due West and then 8 m due North. What is the shortest distance between starting point and end point?
(a) 19 m (b) 20 m
(c) 18 m (d) 17 m

33. If $\Delta AMB \sim \Delta CMD$, then what is the measure of DM (in terms of a, b and c)?



(a) $\frac{a^2c^2}{b}$ (b) $\frac{ac}{b^2}$
(c) $\frac{ac}{b}$ (d) $\frac{a^2c^2}{b^2}$

34. Which of the following incorrect ?
(a) $\cos 90° = 0$ (b) $\sin^2\theta - \cos^2\theta = 1$
(c) $\sec^2\theta - \tan^2\theta = 1$ (d) $\text{cosec}^2\theta - \cot^2\theta = 1$

35. A box had 24 marbles of which x are red, $2x$ are white and $3x$ are blue. A marble is selected at random from it. What is the probability that it is white?
(a) $\frac{1}{3}$ (b) $\frac{1}{8}$
(c) $\frac{1}{4}$ (d) $\frac{1}{6}$

36. **The number of revolutions made by a wheel of diameter 1 m to cover a distance of 22 km will be:**

(a) 4,000

(b) 5,500

(c) 7,000

(d) 2,800

37. **Find the value of *k*, if the lines given by $4x + 5ky = 10$ and $3x + y + 1 = 0$ are parallel.**

(a) 7

(b) $\frac{3}{8}$

(c) $\frac{4}{15}$

(d) –1

38. *Three elderly men Mr. Sharma, Mr. David and Mr. Abdul regularly went for a morning walk in their neighbourhood park. The time taken by Mr. Sharma, Mr. David and Mr. Abdul to complete one round of the park is 8 minutes, 10 minutes and 12 minutes respectively.*

If all the three men start walking in the same direction from one point of the park, the time interval after which all three will meet again at the starting point is:

(a) 8 minutes **(b) 240 minutes**

(c) 960 minutes **(d) 120 minutes**

39. **What is the value of $\sec^2\theta$, if $\sin\theta - \cos\theta = 0$?**

(a) 1 **(b) 2**

(c) –1 **(d) 0**

40. **Find the radius of a circle, if the end points of diameter of the circle are (2, 4) and (–3, –1).**

(a) $3\sqrt{2}$ **units** **(b)** $5\sqrt{2}$ **units**

(c) $\frac{5\sqrt{2}}{3}$ **units** **(d)** $\frac{5\sqrt{2}}{2}$ **units**

SECTION - C

8 marks

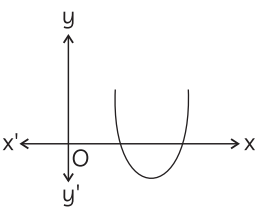
(Case Study Based Questions.)

(Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.)

Q. 41-45 are based on case study–1

Case Study–1:

Radha decorated the door of her house with garlands on the occassion of Diwali. Each garland forms the shape of a parabola.



41. **What type of polynomial does the parabola formed by the garland represent?**

(a) Linear **(b) Quadratic**

(c) Cubic **(d) Biquadratic**

42. **Evaluate the number of zeroes of a quadratic polynomial.**

(a) more than 2 **(b) atmost 2**

(c) less than 2 **(d) equal to 1**

43. **A quadratic polynomial with the sum and product of its zeroes as –1 and –2 respectively, is:**

(a) $x^2 + x - 2$ **(b)** $x^2 - x - 2$

(c) $x^2 + 2x - 1$ **(d)** $x^2 - 2x - 1$

44. **What is the value of *k*, if one of the zeroes of the quadratic polynomial $(k - 2)x^2 - 2x - 5$ is –1?**

(a) 5 **(b) 3**

(c) –5 **(d) 0**

45. **If α, β are the zeroes of the polynomial $f(x) = x^2 - 7x + 12$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.**

(a) 12 **(b)** $\frac{-7}{12}$

(c) –7 **(d)** $\frac{7}{12}$

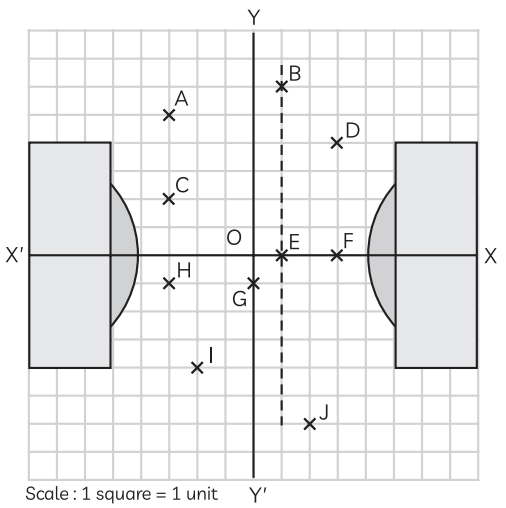
Q. 46-50 are based on case study–2

Case Study–2:

Interschool tournament matches of basketball are going to happen very soon. The coach is making his team practicing very hard. He guided his team, the

various tactics how to perform and their respective positions on the ground.

A coach is discussing the strategy of the game with his players. The position of players is marked with cross '×' in the grid.



46. **If we consider O as the origin, then the point shown on the grid whose abscissa is zero, is:**

(a) E **(b) G**

(c) F **(d) H**

47. **Evaluate the distance between the players C and B.**

(a) $4\sqrt{2}$ **units** **(b)** $2\sqrt{5}$ **units**

(c) $5\sqrt{2}$ **units** **(d) 5 units**

48. **Which among the following is a player whose position is 6 units from *x*-axis and 2 units to the right of *y*-axis?**

(a) A **(b) J**

(c) B **(d) I**

49. **If we consider (*x*, *y*) as the coordinates of the mid-point of the line segment joining A and H, then:**

(a) $x = -2, y = 3$ **(b)** $x = -3, y = -2$

(c) $x = -3, y = 2$ **(d)** $x = 2, y = 3$

50. **According to sudden requirement, coach of the team decided to increase one player in the 4th quadrant without increasing the total number of players, so he decided to change the position of player F in such a way that F becomes symmetric to D w.r.t. *x*-axis. Then new position of F is:**

(a) (4, 3) **(b) (–4, 3)**

(c) (3, –4) **(d) (3, 4)**

SOLUTION

SAMPLE PAPER - 7

SECTION - A

1. *(b)* $\frac{37}{99}$

Explanation:

Let $x = 0.\overline{373} = 0.3737373$ ...(i)

$\Rightarrow 100x = 37.373737$ ...(ii)

[multiplying by 100]

Subtracting (i) from (ii), we get

$99x = 37$

$\Rightarrow x = \frac{37}{99}$

$0.\overline{373} = \frac{37}{99}$

2. *(a) 10°*

Explanation:

$2\cos 3\theta = \sqrt{3}$

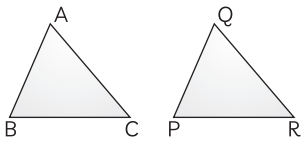
$\Rightarrow \cos 3\theta = \frac{\sqrt{3}}{2} = \cos 30°$

$\Rightarrow 3\theta = 30° \Rightarrow \theta = 10°$

3. *(c) $\angle B = \angle P$*

Explanation:

By SAS similarity axiom,



If $\frac{AB}{PQ} = \frac{BC}{PR}$

and $\angle B = \angle P$

then $\Delta ABC \sim \Delta QPR$

4. *(b) $\frac{7}{5}$*

Explanation:

In ΔACD, using pythagoras theorem,

$$AD^2 = AC^2 + CD^2$$
$$= 3^2 + 4^2$$
$$AD^2 = 25$$
$$\Rightarrow \quad AD = 5$$

Similarly, in ΔBCD,

$$BD^2 = BC^2 + CD^2$$
$$= 6^2 + 4^2$$
$$BD^2 = 100$$
$$\Rightarrow \quad BD = 10$$

Now, $\sin A + \cos B = \frac{CD}{AD} + \frac{BC}{BD}$

$$= \frac{4}{5} + \frac{6}{10} = \frac{4}{5} + \frac{3}{5} = \frac{7}{5}$$

5. *(d) Consistent*

6. *(a) 31 cm*

Explanation: Let the radius of new circle be *r*. Then,

$$2\pi r = 2\pi\left(\frac{34}{2}\right) + 2\pi\left(\frac{28}{2}\right)$$
$$\Rightarrow \quad r = 17 + 14 = 31 \text{ cm}$$

7. *(b) 24*

Explanation: Let there be *x* blue balls in the bag.

$\therefore$ Total number of balls in the bag = $(8 + x)$

Now, P_1 = Probability of drawing a blue ball

$$= \frac{x}{8+x}$$

and P_2 = Probability of drawing a red ball

$$= \frac{8}{8+x}$$

It is given that, $P_1 = 3P_2$

$$\Rightarrow \quad \frac{x}{8+x} = 3 \times \frac{8}{8+x}$$
$$\Rightarrow \quad \frac{x}{8+x} = \frac{24}{8+x} \Rightarrow x = 24$$

Hence, there are 24 blue balls in the bag.

8. *(b) 2*

Explanation: Since, A and B lie on the circle having centre O.

$$\Rightarrow \quad OA = OB \quad \text{[Radii]}$$
$$\Rightarrow \quad \sqrt{(4-2)^2 + (3-3)^2} = \sqrt{(x-2)^2 + (5-3)^2}$$
$$\Rightarrow \quad 2 = \sqrt{(x-2)^2 + 4}$$
$$\Rightarrow \quad 4 = (x-2)^2 + 4$$
$$\Rightarrow \quad (x-2)^2 = 0 \Rightarrow x = 2$$

9. *(b) $x + y = 137, x - y = 43$*

Explanation: Let the two numbers be *x* and *y*, where $x > y$.

Then, according to the question, we have

$x + y = 137$ and $x - y = 43$.

10. *(a) 3*

Explanation: We have

$$cx - y = 2$$
and $$6x - 2y = 4$$

For infinitely many solutions,

$$\frac{c}{6} = \frac{-1}{-2} = \frac{2}{4}$$

$$\frac{c}{6} = \frac{1}{2} \Rightarrow c = 3$$

11. *(d) 12 : 1*

Explanation: $\because \quad 5 = 5 \times 1$

$$15 = 5 \times 3$$
$$20 = 5 \times 2 \times 2$$
$$\therefore \quad HCF = 5$$

and, $$LCM = 5 \times 2 \times 2 \times 3 = 60$$

$$\therefore \quad \text{Ratio} = \frac{LCM}{HCF} = \frac{60}{5} = \frac{12}{1}$$
$$= 12 : 1$$

12. *(a) 10 cm*

Explanation: $\because \Delta ABC \sim \Delta LMN$

$$\therefore \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta LMN} = \frac{AB}{LM}$$
$$\Rightarrow \quad \frac{60}{48} = \frac{AB}{8}$$
$$\Rightarrow \quad AB = \frac{60 \times 8}{48} = 10 \text{ cm}$$

13. *(b) $\frac{1}{2}$*

Explanation: We have,

$$\tan^2 A = 1 + 2\tan^2 B$$
$$\Rightarrow \quad \sec^2 A - 1 = 1 + 2(\sec^2 B - 1)$$
$$[\because \tan^2\theta = \sec^2\theta - 1]$$

$\Rightarrow \quad \sec^2 A = 2 + 2\sec^2 B - 2$

$\Rightarrow \quad \sec^2 A = 2\sec^2 B$

$\Rightarrow \quad \frac{1}{\cos^2 A} = \frac{2}{\cos^2 B} \Rightarrow \frac{\cos^2 A}{\cos^2 B} = \frac{1}{2}$

14. *(b) (2, –13)*

Explanation: Coordinates of centroid (G)

$$= \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

$\Rightarrow \quad (3, -5) = \left(\frac{4 + 3 + x_3}{3}, \frac{-8 + 6 + y_3}{3}\right)$

$\Rightarrow \quad 7 + x_3 = 9$ and $-2 + y_3 = -15$

$\Rightarrow \quad x_3 = 2$ and $y_3 = -13$

15. *(b) Three*

Explanation: We have,

$$\frac{343}{1400} = \frac{49 \times 7}{2^3 \times 5^2 \times 7} = \frac{49}{2^3 \times 5^2} = \frac{49 \times 5}{2^3 \times 5^3} = \frac{245}{(10)^3}$$

$= 0.245$

Hence, the given rational number terminates after three decimal places.

16. *(b) 2 : 1*

Explanation: Since, AD is the internal bisector of $\angle A$

$\therefore \quad \frac{AB}{AC} = \frac{BD}{DC} = \frac{BD}{BC - BD}$

$= \frac{5}{7.5 - 5} = \frac{5}{2.5} = \frac{2}{1}$

$\therefore \quad AB : AC = 2 : 1$

17. *(a)* $\frac{1}{2}lr$

Explanation: Area of sector of a circle with radius $r = \frac{\theta}{360°} \times \pi r^2 = \frac{\theta}{360°} \times 2\pi r \times \frac{r}{2}$

$= \frac{1}{2} lr$ sq. units $\quad \left(\because l = \frac{\theta}{360°} \times 2\pi r\right)$

18. *(a) 67*

Explanation: We know,

HCF × LCM = Product of two numbers

$\Rightarrow \quad 11 \times 209x = 209 \times 737$

$\Rightarrow \quad 11x = 737$

$\Rightarrow \quad x = \frac{737}{11} = 67$

19. *(c)* $\frac{5}{6}$

Explanation: Total number of possible outcomes = 6 × 6 = 36

Number of possible outcomes for getting same numbers on both dice = 6

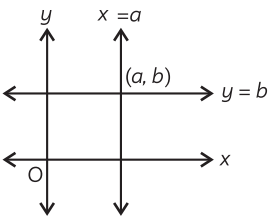
$\therefore$ P(getting same number) $= \frac{6}{36} = \frac{1}{6}$

Since, P(getting same numbers) + P(getting different numbers) = 1

$\Rightarrow$ P(getting different numbers) $= 1 - \frac{1}{6} = \frac{5}{6}$

20. *(a) (a, b)*

Explanation:



SECTION - B

21. *(c) 11*

Explanation: $\because$ The two numbers are prime

$\therefore$ HCF (47, x) = 1

Now, we know,

LCM × HCF = Product of two numbers

$\Rightarrow \quad 517 \times 1 = 47 \times x$

$\Rightarrow \quad x = \frac{517}{47} = 11$

22. *(b) 4*

Explanation: We have,

$$\frac{4\cos^2 60° + 3\sec^2 30° - \cot^2 45°}{\cos^2 60° + \sin^2 60°}$$

$$= \frac{4 \times \left(\frac{1}{2}\right)^2 + 3 \times \left(\frac{2}{\sqrt{3}}\right)^2 - (1)^2}{1}$$

$[\because \sin^2\theta + \cos^2\theta = 1]$

$= 1 + 4 - 1$

$= 4$

23. *(d)* $\frac{16}{1}$

Explanation:

$\because \quad \Delta ABC \sim \Delta PQR$

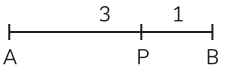
$\therefore \quad \frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$

$$\Rightarrow \quad \frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \left(\frac{BC}{QR}\right)^2 = \left(\frac{1}{4}\right)^2 = \frac{1}{16}$$

$$\Rightarrow \quad \frac{ar(\Delta PQR)}{ar(\Delta ABC)} = \frac{16}{1}$$

24. *(d) 1, –3*

Explanation: Using section formula,



P $(9a - 2, -b)$

$$= \left(\frac{3 \times 8a + 1 \times (3a + 1)}{3 + 1}, \frac{3 \times 5 + 1 \times (-3)}{3 + 1}\right)$$

$$\Rightarrow \quad (9a - 2, -b) = \left(\frac{27a + 1}{4}, \frac{12}{4}\right)$$

$$\Rightarrow \quad 9a - 2 = \frac{27a + 1}{4}; \quad -b = \frac{12}{4}$$

$\Rightarrow \quad 36a - 8 = 27a + 1 \; ; -b = 3$

$\Rightarrow \quad 9a = 9 \; ; b = -3$

$\Rightarrow \quad a = 1 \; ; b = -3$

25. *(d) 8*

Explanation:

We have, $x + y = 30$ ...(i)

[$\because$ ABCD is a rectangle]

and $x - y = 14$ ...(ii)

On adding equations (i) and (ii), we get

$$2x = 44 \Rightarrow x = 22$$

Putting $x = 22$ in equation (i), we get

$$y = 30 - 22 = 8$$

$\therefore \quad x = 22, y = 8$

Caution

➥ Use the properties of rectangle to find the values of x and y.

26. *(b) 4*

Explanation: We have, AB = 12 cm and AP = 8 cm

$\therefore \quad$ PB = AB – AP = 12 – 8 = 4 cm

Now, PQ || BC

By Thales theorem,

$$\frac{AP}{PB} = \frac{AQ}{QC} \Rightarrow \frac{8}{4} = \frac{3x}{x+2} \Rightarrow 2 = \frac{3x}{x+2}$$

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

27. *(a) 10.5 cm^2*

Explanation: Radius of each quadrant

$$= \frac{\text{Side of square}}{2} = \frac{7}{2}\text{cm}$$

$\therefore$ Area of shaded region = Area of square ABCD – 4 × Area of quadrant.

$$= 7 \times 7 - 4 \times \frac{1}{4} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$$

$$= 49 - \frac{77}{2} = 49 - 38.5$$

$$= 10.5 \text{ cm}^2$$

28. *(a) 14*

Explanation: P(bad egg)

$$= \frac{\text{Number of bad eggs}}{\text{Total number of eggs}}$$

$$\Rightarrow \quad 0.035 = \frac{\text{Number of bad eggs}}{400}$$

$\Rightarrow$ Number of bad eggs

$$= 400 \times 0.035 = 14$$

29. *(d)* $\frac{1}{\sqrt{10}}$

Explanation: Let AB = x, BC = $3x$

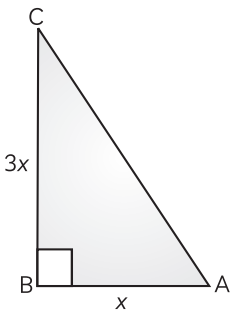
In right ΔABC, we have

$AC^2 = AB^2 + BC^2$

[Pythagoras theorem]

$$= (x)^2 + (3x)^2 = x^2 + 9x^2$$

$$\Rightarrow \quad AC^2 = 10x^2 \Rightarrow AC = \sqrt{10}\, x$$



$$\therefore \quad \sin C = \frac{\text{Perpendicular}}{\text{Hypotenuse}} = \frac{AB}{AC}$$

$$= \frac{x}{\sqrt{10}x} = \frac{1}{\sqrt{10}}$$

30. *(d) Rational or Irrational*

Explanation: For the irrational numbers $\sqrt{2}$ and $\sqrt{5}$,

$\sqrt{2} \times \sqrt{5} = \sqrt{10}$, which is irrational.

And for irrational numbers $(2+\sqrt{3})$ and $(2-\sqrt{3})$, $(2+\sqrt{3}) = 4 - 3 = 1$, which is rational.

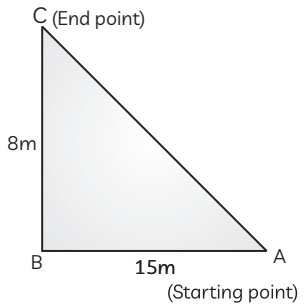
Thus, product of two irrational numbers may be rational or irrational.

31. *(a) 0*

Explanation: $f(x)$ has no zero, as it does not intersect x-axis at any point.

32. *(d) 17 m*

Explanation: Let the shortest distance be AC.



By Pythagoras theorem,

We have, $AC^2 = AB^2 + BC^2$

$= 15^2 + 8^2$

$= 225 + 64 = 289$

$\Rightarrow \quad AC = 17$ m

33. *(c)* $\frac{ac}{b}$

Explanation:

$\because \quad \Delta AMB \sim \Delta CMD$

$\therefore \quad \frac{AM}{CM} = \frac{BM}{DM} = \frac{AB}{CD}$

[Corresponding sides of similar triangles]

$\Rightarrow \quad \frac{AM}{CM} = \frac{BM}{DM}$

$\Rightarrow \quad \frac{b}{c} = \frac{a}{DM}$

$\Rightarrow \quad DM = \frac{ac}{b}$

34. *(b)* $\sin^2\theta - \cos^2\theta = 1$

Explanation: The correct identity is $\sin^2\theta + \cos^2\theta = 1$

35. *(a)* $\frac{1}{3}$

Explanation: According to question,

$x + 2x + 3x = 24$

$\Rightarrow \quad 6x = 24 \Rightarrow x = 4$

$\therefore$ Number of white balls $= 2x = 2 \times 4 = 8$

$\therefore$ Probability of getting white ball

$= \frac{8}{24} = \frac{1}{3}$

36. *(c) 7,000*

Explanation: Total distance covered = 22 km

$= 22 \times 1000$ m

Distance covered in 1 revolution = Circumference of the wheel $= 2\pi r$

$= 2\pi \times \frac{1}{2} = \pi$ m

$\therefore$ No. of revolutions $= \frac{\text{Total distance covered}}{\text{Distance covered in 1 revolution}}$

$= \frac{22 \times 1000}{\pi}$

$= \frac{22 \times 1000}{22} \times 7$

$= 7000$

37. *(c)* $\frac{4}{15}$

Explanation: Since the given lines are parallel.

$\therefore \quad \frac{4}{3} = \frac{5k}{1} \neq \frac{-10}{1}$ *i.e.*, $k = \frac{4}{15}$.

38. *(d) 120* minutes

Explanation: To find the time after which the three men will meet again at the starting point, we will find the LCM.

The prime factors of 8, 10 and 12 are given below :

$\because \quad 8 = 2^3$

$10 = 2 \times 5$

$12 = 2^2 \times 3$

Therefore, $LCM = 2^3 \times 3 \times 5$

$= 120$

So, the three men will meet again after 120 minutes.

39. *(b) 2*

Explanation: We have,

$\sin\theta - \cos\theta = 0$

$\Rightarrow \quad \sin\theta = \cos\theta \Rightarrow \frac{\sin\theta}{\cos\theta} = 1$

$\Rightarrow \quad \tan\theta = 1 = \tan 45°$

$\Rightarrow \quad \theta = 45°$

$\therefore \quad \sec^2\theta = \sec^2 45° = (\sqrt{2})^2 = 2$

40. *(d)* $\frac{5\sqrt{2}}{2}$ *units*

Explanation: Here, length of diameter of circle

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

$= \sqrt{(-5)^2 + (-5)^2}$

$= \sqrt{25 + 25}$

$= \sqrt{50} = 5\sqrt{2}$

$\therefore$ Radius of circle $= \frac{5\sqrt{2}}{2}$ units

SECTION - C

41. *(b) quadratic*

Explanation: A parabola represents a quadratic polynomial.

42. *(b) atmost 2*

Explanation: A quadratic polynomial has atmost two zeroes.

43. *(a)* $x^2 + x - 2$

Explanation: A quadratic polynomial is written as

x^2 – (sum of zeroes)x + product of zeroes

So, required polynomial

$$= x^2 - (-1)x + (-2)$$
$$= x^2 + x - 2$$

44. *(a) 5*

Explanation: Let $p(x) = (k - 2)x^2 - 2x - 5$

Since (–1) is a zero of the given polynomial,

So, $p(-1) = 0$

$(k - 2)(-1)^2 - 2(-1) - 5 = 0$

$\Rightarrow$ $k - 2 + 2 - 5 = 0$

$\Rightarrow$ $k = 5$

45. *(d)* $\frac{7}{12}$

Explanation: $\alpha + \beta = -\frac{b}{a} = 7$, $\alpha\beta = \frac{c}{a} = 12$.

Now, $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \frac{7}{12}$

46. *(b) G*

Explanation: The abscissa, *i.e.*, x-coordinate of G is 0 as it lies on y-axis.

47. *(a)* $4\sqrt{2}$ *units*

Explanation: Distance between C(–3, 2) and B (1, 6)

$$= \sqrt{(1+3)^2 + (6-2)^2} = \sqrt{16+16}$$
$$= 4\sqrt{2} \text{ units.}$$

48. *(b) J*

Explanation: Coordinates of the required player are (2, –6) or (2, 6) and J is at (2, –6).

49. *(c)* $x = -3, y = 2$

Explanation: Let (x, y) is the mid-point of A (–3, 5) and H(–3, – 1).

So, $x = \frac{-3-3}{2}$

and $y = \frac{5-1}{2}$

$\Rightarrow$ $x = -3, y = 2$

50. *(c) (3, –4)*

Explanation: If player F is shifted to IV Quadrant symmetric to D *w.r.t.* x-axis, then coordinates of F are (3, –4).