3

TERM-1
SAMPLE PAPER
SOLVED

MATHEMATICS
(BASIC)

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. Evaluate sin θ. cos θ, if sin θ + cos θ = $\sqrt{2}$.
(a) $\sqrt{2}$ (b) 1
(c) 0 (d) $\frac{1}{2}$

2. 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) $x + y = 137, x - y = 137$
(c) $2x + y = 137, x - y = 43$
(d) $3x + y = 137, x + y = 137$

3. On rolling two dice at once, what is the probability of getting a sum of doublets less than 5?
(a) $\frac{1}{6}$ (b) $\frac{2}{9}$
(c) $\frac{1}{18}$ (d) $\frac{3}{7}$

4. Calculate the number of solutions for the pair of linear equations $y = 0$ and $y = 7$.
(a) Two solution (b) Three solution
(c) No solution (d) One solution

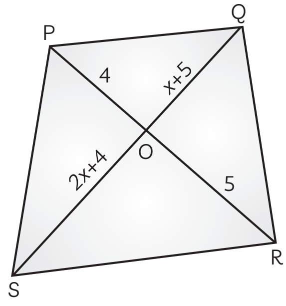
5. In △ABC, right angled at B, if Sin A = $\frac{1}{2}$, Then the value of sin C cos A – cos C sin A is :
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) 1 (d) 0

6. 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) $\frac{\theta}{360°} \times lr$ (d) $\frac{\theta}{180°} \times lr$

7. A box had tickets, numbered from 11, 12, 13 ......, 30. A ticket is taken out from it at random. Find the probability that the number on the drawn ticket is greater than 15 and a multiple of 5.
(a) $\frac{1}{21}$ (b) $\frac{1}{7}$
(c) $\frac{7}{20}$ (d) $\frac{3}{20}$

8. What is the ratio which in the line $3x + y - 9 = 0$ divides the line segment joining the points A(1, 3) and B(2, 7)?
(a) 4 : 3 (b) 3 : 4
(c) 4 : 7 (d) 7 : 4

9. In the given figure, PQRS is a trapezium, such that PQ || SR. Find x.



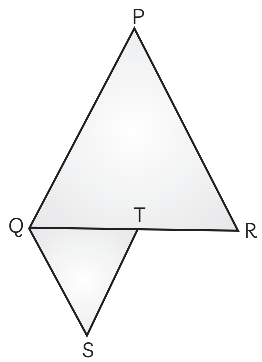
(a) 2 (b) 5
(c) 3 (d) 4

10. Calculate the least positive integer which is divisible by 20 and 24.
(a) 120 (b) 200
(c) 150 (d) 480

11. Calculate the value of x, if LCM (x, 18) = 36 and HCF (x, 18) = 2.
(a) 4 (b) 8
(c) 2 (d) 6

12. After how many places, the decimal form of the number $\frac{27}{2^3 5^4 3^2}$ will terminate?
(a) one (b) two
(c) three (d) four

13. $\triangle$PQR and $\triangle$QST are two equilateral triangles such that T is the mid-point of QR. Find the ratio of the areas of $\triangle$PQR and $\triangle$QST.



(a) 1 : 1 (b) 1 : 2
(c) 2 : 1 (d) 4 : 1

14. For some integer m, every odd integer is of the form:
(a) m (b) $m + 1$
(c) $2m$ (d) $2m + 1$

15. If $\frac{241}{400} = \frac{241}{2^m \times 5^n}$, then find the value of $m + n$, where m and n are non-negative integers.
(a) 10 (b) 8
(c) 6 (d) 7

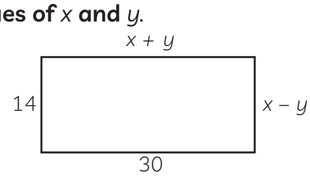
16. In which quadrant does the mid-point of the line segment joining the points (–1, 2) and (3, 4) lies?
(a) I (b) II
(c) III (d) IV

17. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is either a king or an ace.
(a) $\frac{2}{13}$ (b) $\frac{1}{13}$
(c) $\frac{4}{13}$ (d) $\frac{3}{13}$

18. What is the value of k, if one of the zeroes of the quadratic polynomial $(k - 1)x^2 + kx + 1$ is – 3?
(a) $\frac{4}{3}$ (b) $\frac{2}{3}$
(c) $\frac{1}{5}$ (d) $\frac{5}{7}$

19. Consider an isosceles right angled triangle $\triangle$ABC at C, then AB^2 = ... times AC^2.
(a) one (b) two
(c) three (d) four

20. From the adjoining figure of a rectangle, find the values of x and y.



(a) 12, 18 (b) 8, 16
(c) 22, 8 (d) 20, 10

SECTION - B **16 marks**

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

21. What is the perimeter of the semi-circular field, whose area is 15400 sq. m?
(a) $460\sqrt{2}$ m (b) $360\sqrt{2}$ m
(c) $260\sqrt{2}$ m (d) $160\sqrt{2}$ m

22. What is probability that leap year, selected at random, will have 53 Sundays?
(a) $\frac{1}{7}$ (b) $\frac{2}{7}$
(c) $\frac{3}{7}$ (d) $\frac{4}{7}$

23. In a $\triangle$ABC right angled at B, if the two legs 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) $\frac{1}{\sqrt{10}}$

24. Evaluate the area of a quadrant of a circle, provided that its circumference is 22 cm.
(a) 9.625.3 cm^2 (b) 10.25 cm^2
(c) 11.275 cm^2 (d) 8.625 cm^2

25. Find the value of k for which the system of linear equations $x + ky = 0$, $2x - y = 0$ has unique solution.

(a) $k \neq -\frac{1}{2}$ (b) $k \neq \frac{3}{2}$

(c) $k \neq \frac{1}{2}$ (d) $k \neq -\frac{3}{2}$

26. The diagonals of a rhombus are of length 10 cm and 24 cm, then the length of each side is :

(a) 9 cm (b) 13 cm

(c) 15 cm (d) Both (a) and (b)

27. Find $x^2 + y^2$, where x and y are related as : $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$.

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

(c) $\frac{1}{2}$ (d) 0

28. A situation is given. Represent it in the form of linear equations. 5 books and 7 pens together cost ₹ 79 whereas 7 books and 5 pens together cost ₹ 77. Here consider cost of each book as ₹ x and that of each pen as ₹ y.

(a) $17x + 7y = 79$, $5x + 5y = 77$

(b) $5x + 7y = 79$, $7x + 5y = 77$

(c) $5x + 5y = 79$, $7x + 7y = 77$

(d) Data is insufficient

29. The HCF of 85 and 153 can be expressed in the form of $85m - 153$. Calculate the value of m.

(a) 1 (b) 5

(c) –1 (d) 2

30. Tours of the regional capital and the white house begin at 8.30 am from tour agency. Tours for the regional capital leave after every 15 min. Tours for the white house leave after every 20 min. After how many minutes do the tours leave at the same time?

(a) 60 min (b) 50 min

(c) 1 hr 5min (d) 15 min

31. 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

32. Evalate $(1 - \sin^2 \theta) - \cos^2 \theta$.

(a) 0 (b) 1

(c) – 1 (d) 2

33. What is the type of solution the pair of linear equation $x + 3y = 4$ and $2x + y = 5$ have.

(a) unique (b) Infinite

(c) No Solution (d) Both (a) and (b)

34. A ladder which is 17 m long, reaches the window of a building which is 15 m above the ground. What is the distance of the foot of the ladder from the building?

(a) 8 m (b) 12 m

(c) 10 m (d) 13 m

35. What is the area of a quadrant of a circle whose circumference is 44 cm.

(a) $\frac{77}{2}$ cm^2 (b) 77 cm^2

(c) $\frac{44}{7}$ cm^2 (d) 44 cm^2

36. Out of 2000 tickets of a lottery there are 16 tickets, which have prizes. Abhishek purchased one lottery ticket. What is the probability that he wins a prize?

(a) 0.006 (b) 0.005

(c) 0.007 (d) 0.008

37. ABC is an isosceles triangle, which is right angled at B with AB = 4 cm. What is the length of AC ?

(a) 2 cm (b) $2\sqrt{2}$ cm

(c) 4 cm (d) $4\sqrt{2}$ cm

38. If in $\triangle ABC$, $\angle B = 90°$, $AB = 6\sqrt{3}$ and AC = 12 cm, find BC.

(a) 5 cm (b) 6 cm

(c) 7 cm (d) 8 cm

39. On selecting a letter randomly from the word PROBABILITY, the probability that the letter selected is a vowel is:

(a) $\frac{4}{11}$ (b) $\frac{5}{11}$

(c) $\frac{6}{11}$ (d) $\frac{7}{11}$

40. If in two triangles ABC and PQR, $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$, then which of the following in true ?

(a) $\triangle BCA \sim \triangle PQR$

(b) $\triangle PQR \sim \triangle CAB$

(c) $\triangle PQR \sim \triangle ABC$

(d) $\triangle CBA \sim \triangle PQR$

SECTION - C **16 marks**

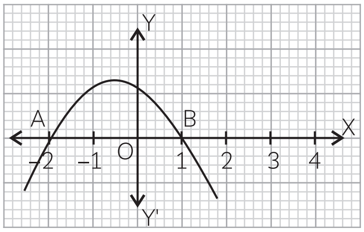
(Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.)

Q. 41 to 45 are based on Case Study - 1

Case Study – 1

Last month, heavy storm came in Kerala. Due to which lots of damage had occured Due to this storm thousands of trees got broke and electric poles bent out. Place picture of the storm in which trees and electric poles are bent.

Some of the electric poles bent into the shape of parabola. One of the images of bent electric pole is shown in the figure below:



41. **Calculate the zeroes of the given curve.**

(a) −2 and 1 (b) −2 and −1

(c) 2 and −1 (d) Both (a) and (b)

42. **What is the polynomial expression of given curve ?**

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

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

43. **If $x = 2$, then what will be the value of the polynomial?**

(a) 3 (b) −4

(c) 2 (d) 4

44. **If the parabola is moved towards the right side by one unit, then find the polynomial expression.**

(c) $x^2 - 3x + 2$ (d) $x^2 + x + 2$

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

45. **Suppose the quadratic polynomial for given curve is $ax^2 + bx + c$. Then 'a' always is :**

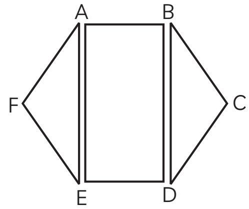
(a) > 0 (b) < 0

(c) ≥ 0 (d) ≤ 0

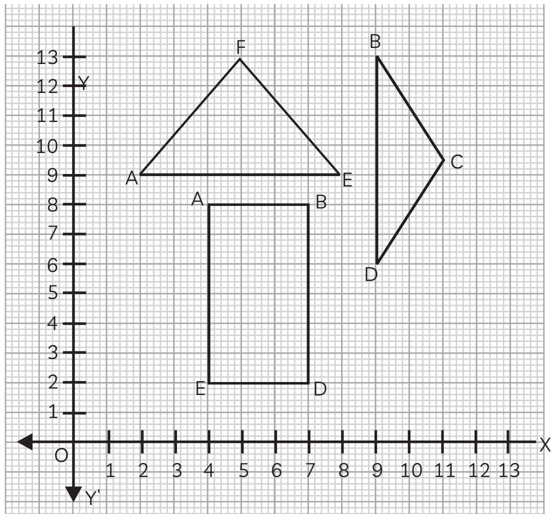
Q. 46 to 50 are based on Case Study - 2

Case Study – 2

Radhika and Samira are playing with a dice. The dice is a hexagonal three-dimensional shaped. They cut the dice into three parts as shown in the coordinate axes along the figure.



Scale : One block is of 1 × 1 squares.



46. **What are the coordinates of points E and B of rectangle ABDE?**

(a) (4, 2), (6, 8) (b) (3, 2), (7, 8)

(c) (4, 2), (7, 8) (d) Both (a) and (b)

47. **What is the length AE of △AEF?**

(a) 3 (b) 4

(c) 5 (d) 6

48. **Evaluate : ar (△BCD)**

(a) 5 sq. units (b) 6 sq. units

(c) 8 sq. units (d) 7 sq. units

49. **Evaluate perimeter of the rectangle ABDE.**

(a) 16 units (b) 17 units

(c) 18 units (d) 19 units

50. **What are the coordinate of intersection point of diagonals in the rectange ABDE.**

(a) $\left(\frac{11}{2}, 5\right)$ (b) $\left(\frac{11}{3}, 5\right)$

(c) $\left(\frac{11}{2}, 6\right)$ (d) Both (a) and (b)

SOLUTION
SAMPLE PAPER - 3

SECTION - A

1. *(d)* $\frac{1}{2}$

Explanation: Given, $\sin\theta + \cos\theta = \sqrt{2}$

Squaring both sides, we get :

$$(\sin\theta + \cos\theta)^2 = (\sqrt{2})^2$$

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

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

$$\Rightarrow 2\sin\theta\cos\theta = 1$$

$$\Rightarrow \sin\theta\cos\theta = \frac{1}{2}$$

2. *(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 $x - y = 43$.

3. *(c)* $\frac{1}{18}$

Explanation: When two dice are rolled,

Total number of possible outcomes = 36

Doublets with sum less than 5 are (1, 1), (2, 2).

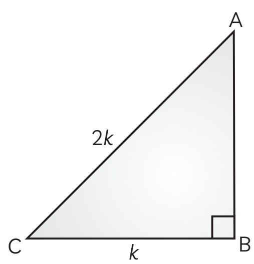
$\therefore$ Number of favourable cases = 2

$\therefore$ Required probability $= \frac{2}{36} = \frac{1}{18}$

4. *(c) no solution*

Explanation: The pair of linear equations $y = 0$ and $y = 7$ are parallel lines and these have no solution.

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



Explanation: Here,

$$\sin A = \frac{1}{2}$$

BC = k and AC = 2k

$$AB^2 = AC^2 - BC^2 = 4k^2 - k^2 = 3k^2$$

$$AB = \sqrt{3}\,k$$

Then, sin C cos A – cos C sin A

$$= \frac{AB}{AC} \times \frac{AB}{AC} - \frac{BC}{AC} \times \frac{BC}{AC}$$

$$= \frac{AB^2}{AC^2} - \frac{BC^2}{AC^2}$$

$$= \frac{(\sqrt{3}k)}{(2k)^2} - \frac{k^2}{(2k)^2} = \frac{3k^2}{4k^2} - \frac{k^2}{4k^2}$$

$$= \frac{1}{2}$$

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

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

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

7. *(d)* $\frac{3}{20}$

Explanation: Total number of tickets in the bag = 20

Number of tickets greater than 15 and multiple of 5 are {20, 25, 30} *i.e.*, 3

$\therefore$ P(greater than 15 and multiple of 5) $= \frac{3}{20}$

8. *(b) 3 : 4*

Explanation: Suppose the line $3x + y - 9 = 0$ divides the line segement joining A(1, 3) and B(2, 7) in the ratio k : 1 at point C.

Then, coordinates of C are $\left(\frac{2k+1}{k+1}, \frac{7k+3}{k+1}\right)$

But point C lies on the line $3x + y - 9 = 0$.

$\therefore$ It must satisfy the equation

$$\Rightarrow 3\left(\frac{2k+1}{k+1}\right) + \frac{7k+3}{k+1} - 9 = 0$$

$$\Rightarrow (6k+3) + (7k+3) - 9k - 9 = 0 \Rightarrow 4k - 3 = 0$$

$$\therefore k = \frac{3}{4}$$

So, the required ratio is $\frac{3}{4}$: 1 *i.e.* 3 : 4.

9. *(c) 3*

Explanation: Since PQ || SR, therefore ΔPOQ ~ ΔSOR (By AA similarity criteria)

$$\therefore \quad \frac{PO}{OR} = \frac{QO}{OS}$$

$$\Rightarrow \quad \frac{4}{5} = \frac{x+5}{2x+4}$$

$$\Rightarrow \quad 8x + 16 = 5x + 25$$

$$\Rightarrow \quad 3x = 9$$

$$\Rightarrow \quad x = 3$$

10. *(a) 120*

Explanation: We have,

$$20 = 2^2 \times 5 \text{ and } 24 = 2^3 \times 3$$

∴ Required number = LCM(20, 24)

$$= 2^3 \times 3 \times 5$$

$$= 120$$

11. *(a) 4*

Explanation: We have

LCM $(x, 18) \times \text{HCF}(x, 18) = x \times 18$

$$\Rightarrow \quad 36 \times 2 = 18x$$

$$\Rightarrow \quad x = \frac{36 \times 2}{18}$$

$$\therefore \quad x = 4$$

12. *(d) four*

Explanation:

$$\frac{27}{2^3 \times 5^4 \times 3^2} = \frac{3^3 \times 2}{2^3 \times 5^4 \times 3^2 \times 2}$$

$$= \frac{3 \times 2}{(2 \times 5)^4}$$

So, the decimal form will end after four decimal places.

13. *(d) 4 : 1*

Explanation: Since, ΔPQR and ΔQST are two equilateral triangles.

∴ ΔPQR~ ΔQST

[By AA similarity criterion]

$$\Rightarrow \quad \frac{ar(\Delta PQR)}{ar(\Delta QST)} = \frac{QR^2}{QT^2}$$

[∵ By property of similar triangles]

$$= \frac{(2QT)^2}{(QT)^2} = \frac{4}{1}$$

[∵T is mid-point of QR]

14. *(d) 2m + 1*

Explanation: As the number 2m will always be even so if we add 1 to in it then, the number will always be odd.

15. *(b) 8*

Explanation: Given

$$\frac{241}{400} = \frac{241}{2^m \times 5^n}$$

$$\Rightarrow \quad \frac{241}{2^5 \times 5^3} = \frac{241}{2^m \times 5^n}$$

On compoaring, we get $m = 5$, $n = 3$

16. *(a) I*

Explanation:

Mid-point of line segment

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

∴ (1, 3) lies in quadrant I.

17. *(a)* $\frac{2}{13}$

Explanation: Number of kings = 4

Number of aces = 4

Probability that card drawn is either a king or an ace = $\frac{4+4}{52} = \frac{8}{52} = \frac{2}{13}$

18. *(a)* $\frac{4}{3}$

Explanation: Let $p(x) = (k - 1)x^2 + kx + 1$

Since, –3 is a zero of the polynomial

$$\therefore \quad p(-3) = 0$$

$$\therefore \quad (k - 1)(-3)^2 + k(-3) + 1 = 0$$

$$\Rightarrow \quad 9(k - 1) - 3k + 1 = 0$$

$$\Rightarrow \quad 9k - 9 - 3k + 1 = 0$$

$$\Rightarrow \quad 6k - 8 = 0$$

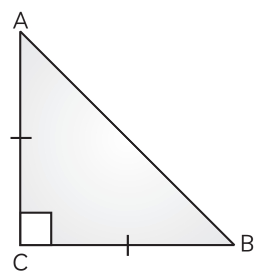
$$\Rightarrow \quad 6k = 8$$

$$\therefore \quad k = \frac{8}{6}$$

$$\Rightarrow \quad k = \frac{4}{3}$$

19. *(b) two*

Explanation : Here, AC = BC



∴ Using Pythagoras theorem,

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

$$= 2AC^2$$

20. *(c) 22, 8*

Explonation : Since, sides of rectangles are equal

$$x + y = 30 \quad ...(i)$$

and $$x - y = 14 \quad (ii)$$

Adding equations (i) and (ii) we, get

$$x + y = 30$$
$$x - y = 14$$

$\Rightarrow$ $2x = 44 \Rightarrow x = 22$ and $y = 8$

SECTION - B

21. *(b)* $360\sqrt{2}\,m$

Explanation: Let the radius of the field be r.

Then, $\dfrac{\pi r^2}{2} = 15400$

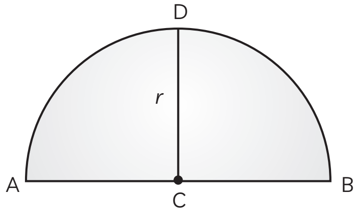
$\Rightarrow$ $\dfrac{1}{2} \times \dfrac{22}{7} \times r^2 = 15400$

$\Rightarrow$ $r^2 = 15400 \times 2 \times \dfrac{7}{22} = 9800$

$\Rightarrow$ $r = 70\sqrt{2}$ m

Thus, perimeter of the field = $\pi r + 2r$

$= \dfrac{22}{7} \times 70\sqrt{2} + 2 \times 70 \times \sqrt{2}$



$= 220\sqrt{2} + 140\sqrt{2}$

$= 360\sqrt{2}$ m

22. *(b)* $\dfrac{2}{7}$

Explanation:

Number of days in a leap year = 366 days

Now, 366 days = 52 weeks and 2 days

The remaining two days can be Sunday and Monday; Monday and Tuesday; Tuesday and Wednesday, Wednesday and Thursday, Thursday and Friday, Friday and Saturday; Saturday and Sunday.

For the leap year to contain 53 Sundays, last two days must be either Sunday and Monday or Saturday and Sunday.

$\therefore$ Number of such favourable outcomes = 2

Total number of possible outcomes = 7

$\therefore$ P (a leap year contains 53 Sundays) = $\dfrac{2}{7}$

23. *(d)* $\dfrac{1}{\sqrt{10}}$

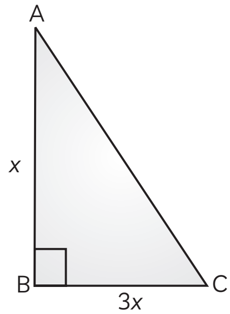
Explanation: Let AB = x, BC = $3x$

In right ΔABC, we have

$AC^2 = AB^2 + BC^2$ [Pythagoras theorem]

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

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



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

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

24. *(a) 9.625 cm^2*

Explanation:

Given, circumference of circle = 22 cm

$\Rightarrow$ $\pi r = 22 \Rightarrow \dfrac{22}{2} = \pi r \Rightarrow 11 = \pi r \Rightarrow r = \pi r$

Now, area of a quadrant

$= \dfrac{\pi r^2}{4}$

$= \dfrac{\pi}{4} \times \left(\dfrac{11}{\pi}\right)^2$

$= \dfrac{\pi}{4} \times \dfrac{121}{\pi^2} = \dfrac{121 \times 7}{4 \times 22}$

$= \dfrac{77}{8}$ cm^2

= 9.625 cm^2

25. *(a)* $k \neq -\dfrac{1}{2}$

Explanation: Given system of equations is

$x + ky = 0$ and $2x - y = 0$

On comparing these equations with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get

$a_1 = 1, b_1 = k, c_1 = 0$

and $a_2 = 2, b_2 = -1, c_2 = 0$

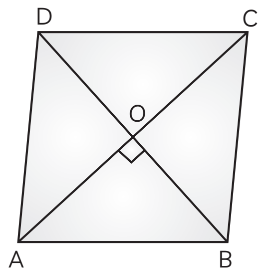
Condition for unique solution is:

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$\Rightarrow$ $\dfrac{1}{2} \neq \dfrac{k}{-1}$

$\Rightarrow$ $k \neq -\dfrac{1}{2}$

26. *(b) 13 cm*



Explanation: Let ABCD be a rhombus whose diagonals AC = 10 cm and BD = 24 cm.

Since, diagonals bisect each other at right angles.

$\therefore$ AO = 5 cm, BO = 12 cm, $\angle$AOB = 90°

In right ΔAOB, we have

$$AB^2 = AO^2 + OB^2$$
$$AB^2 = (5)^2 + (12)^2$$
$$= 25 + 144 = 169$$

$\therefore$ $AB = \sqrt{169} = 13$ cm

$\therefore$ Length of each side is 13 cm.

27. *(c)* $\frac{1}{2}$

Explanation: We have,

$$x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$$

$\Rightarrow$ $(x \sin \theta) \sin^2 \theta + (y \cos \theta) \cos^2 \theta = \sin \theta \cos \theta$

$\Rightarrow$ $x \sin \theta (\sin^2 \theta) + (x \sin \theta) \cos^2 \theta = \sin \theta \cos \theta$

[$\because x \sin \theta = y \cos \theta$]

$\Rightarrow$ $x \sin \theta (\sin^2 \theta + \cos^2 \theta) = \sin \theta \cos \theta$

$\Rightarrow$ $x \sin \theta = \sin \theta \cos \theta$

$\Rightarrow$ $x = \cos \theta$ ... (i)

Now, $x \sin \theta = y \cos \theta$

$\Rightarrow$ $\cos \theta \sin \theta = y \sin \theta$ [(from (i)]

$\Rightarrow$ $y = \sin \theta$ ... (ii)

Hence, $x^2 + y^2 = \cos^2 \theta + \sin^2 \theta = 1$

28. *(b) 5x + 7y = 79, 7x + 5y = 77*

Explanation: Consider x and y as the cost of the each book and each pen respectively.

$\therefore$ According to questions, we have

$$5x + 7y = 79$$

and $$7x + 5y = 77$$

29. *(d) 2*

Explanation: We have,

$$153 = 3 \times 3 \times 17 = 3^2 \times 17$$

and $$85 = 5 \times 17$$

$\therefore$ HCF of 85 and 153 is 17.

According to the question,

$$17 = 85m - 153$$

$\Rightarrow$ $85m = 170$

$\therefore$ $m = \frac{170}{85} = 2$

30. *(a) 60 min*

Explanation: Required time

= LCM (15, 20)

By using prime factorisation method,

$$15 = 3 \times 5$$

and $$20 = 2 \times 2 \times 5 = 2^2 \times 5$$

$\therefore$ LCM (15, 20) = $2^2 \times 3 \times 5$ = 60 min

$\therefore$ In every 60 min, tour leaves at the same time.

31. *(c) 7,000*

Explanation: Total distance covered = 22 km

= 22 × 1000 m

Distance covered in 1 revolution =

Circumference of the wheel = $2\pi r$

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

$\therefore$ Number of revolutions = Total distance covered circumference of wheel

$$= \frac{22 \times 1000}{\pi}$$
$$= \frac{22 \times 1000}{22} \times 7$$
$$= 7000$$

32. *(a) 0*

Explanation:

$$(1 - \sin^2 \theta) - \cos^2 \theta = 1 - (\sin^2 \theta + \cos^2 \theta)$$
$$= 1 - 1 = 0$$

33. *(a) unique*

Explanation: Equations are

$$x + 3y = 4$$

and $$2x + y = 5$$

Here, $a_1 = 1, b_1 = 3, c_1 = -4$

$a_2 = 2, b_2 = 1, c_2 = -5$

$\therefore$ $\frac{a_1}{a_2} = \frac{1}{2}; \frac{b_1}{b_2} = \frac{3}{1}; \frac{c_1}{c_2} = \frac{4}{5}$

$\Rightarrow$ $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

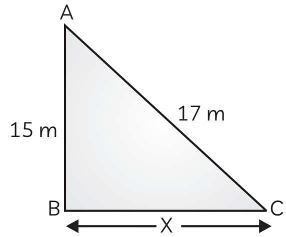
$\therefore$ Equations have unique solution.

Caution

➥ *Here compare the coefficients of given equations to find the type of solution equations have.*

34. *(a) 8 m*

Explanation: Use Pythagoras theorem, to find the distance of the foot of the ladder from the building.



$\therefore \quad AC^2 = AB^2 + BC^2$

$\Rightarrow \quad 17^2 = 15^2 + x^2$

$\Rightarrow \quad x = \sqrt{17^2 - 15^2}$

$= \sqrt{289 - 225} = \sqrt{64}$

$= 8$ m

35. *(a)* $\frac{77}{2} cm^2$

Explanation: Circumference of circle = 44 cm

$\therefore \quad 2\pi r = 44$ cm

$r = \frac{44 \times 7}{2 \times 22} = 7$ cm

$\therefore$ Area of quadrant of a circle

$= \frac{1}{4}\pi r^2$

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

$= \frac{77}{2} cm^2$

36. *(d) 0.008*

Explanation: Number of lottery tickets = 2000

Total number of tickets with prizes = 16

$\therefore$ Probability that Abhinav wins a prize

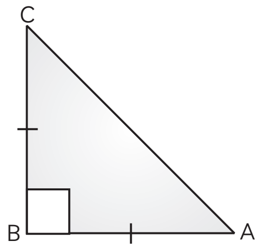
$= \frac{16}{2000} = \frac{1}{125}$

$= 0.008$

37. *(d)* $4\sqrt{2}$ *cm*

Explanation: Since ΔABC is an isosceles, then AB = BC.

$\therefore \quad AB = BC = 4$ cm



Using Pythagoras theorem, we have

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

$= (4)^2 + (4)^2$

$= 16 + 16$

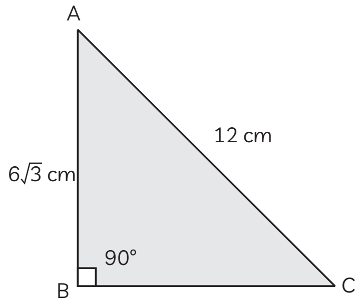
$\Rightarrow \quad AB^2 = 32$

$AB = \sqrt{32}$

$= 4\sqrt{2}$ cm

38. *(b) 6 cm*

Explanation:



In ΔABC, by pythagoras theorem,

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

$\Rightarrow \quad (12)^2 = (6\sqrt{3})^2 + BC^2$

$\Rightarrow \quad BC^2 = 144 - 108 = 36$

$\Rightarrow \quad BC = 6$ cm

39. *(a)* $\frac{4}{11}$

Explanation: Total number of letter = 11

Number of vowels are : 4 *i.e.* o, a, i, i

$\therefore$ P(selecting a vowel) = $\frac{4}{11}$

40. *(b)* $\Delta PQR \sim \Delta CAB$

Explanation: According to the proportional sides given.

SECTION - C

41. *(a) –2 and 1*

Explanation: Given curve intersect the *x*-axis at two points *i.e.*, – 2 and 1.

Hence, zeroes of the given curve are –2 and 1.

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

Explanation: Since, zeroes of the given polynomial are – 2 and 1.

$\therefore$ Polynomial expression is :

$p(x) = x^2 -$ (sum of zeroes) x + product of zeroes

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

$= x^2 + x - 2$

43. *(d) 4*

Explanation: We have,

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

When $x = 2$, then

$$p(2) = 2^2 + 2 - 2 = 4$$

44. *(b)* $x^2 - x - 2$

Explanation: If we move the parabola towards the right side by one unit, then zeroes polynomial becomes –1 and 2.

∴ Polynomials is:

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

i.e. , $x^2 - x - 2$

45. *(b) < 0*

Explanation: Here, we see that shape of the parabola is downward.

So, in the given quadratic polynomial $ax^2 + bx + c$. a is less than 0.

46. *(c) (4, 2), (7, 8)*

47. *(d) 6*

Explanation: The coordinates of A and E of ΔAEF are A(2, 10) and E(8, 10).

∴ The length of AE $= \sqrt{(8-2)^2 + (10-10)^2}$

$= \sqrt{(6)^2 + 0^2} = 6$

48. *(b) 6 sq units*

Explanation:

$$\text{Area of } \Delta BCD = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times (BD) \times \text{height}$$

$$= \frac{1}{2} \times (12 - 6) \times (11 - 9)$$

$$= \frac{1}{2} \times 6 \times 2 = 6$$

49. *(c) 18 units*

Explanation: The perimeter of a rectangle ABDE

$= 2[ED + BD]$

$= 2[(7 - 4) + (8 - 2)]$

$= 2[3 + 6] = 18$

50. *(a)* $\left(\frac{11}{2}, 5\right)$

Explanation: The intersection point of diagonals of a rectangle is equal to the mid point of BE.

∴ Coordinates of mid point BE $= \left(\frac{7+4}{2}, \frac{8+2}{2}\right)$

$= \left(\frac{11}{2}, \frac{10}{2}\right)$

$= \left(\frac{11}{2}, 5\right)$