11

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. What will be one of the zeroes of $p(x) = ax^2 + bx + c$ if $a + c = b$?

(a) 3 (b) 0
(c) 1 (d) – 1

2. How many number of solutions are there for the following pair of linear equation?

$$x - 2y + 4 = 0 \text{ and } 3x + 4y + 2 = 0$$

(a) Unique (b) Infinite
(c) No solution (d) Two solution

3. The total number of students in class X are 54, out of which there are 32 girls and rest are boys. The class teacher has to select one class representative. She writes the name of each student on a separate card and put the cards in one bag. She randomly draw one card from the bag. What is the probability that the name written on card is of a girl?

(a) $\frac{7}{27}$ (b) $\frac{11}{27}$
(c) $\frac{16}{27}$ (d) $\frac{4}{27}$

4. If $2x + 3y = 5$ and $3x + 2y = 10$, then what is the value of $x - y$?

(a) 3 (b) 4
(c) 5 (d) 6

5. What is value of 'k' if the point $(-3, k)$ divides the line-segment joining the points $(-5, -4)$ and $(-2, 3)$ in a certain ratio?

(a) –1 (b) 3
(c) 2 (d) $\frac{2}{3}$

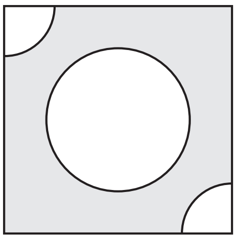
6. Kavita decorated her home beautifully with lights on Diwali. She had three strings of blinking lights with different light colours. The lights of first string remain off for 3 seconds, the second string for 5 seconds and the third string for 6 seconds.

The time interval after which lights of the three strings will glow again after switching them on at the same time is :

(a) 10 seconds (b) 30 seconds
(c) 60 seconds (d) 90 seconds

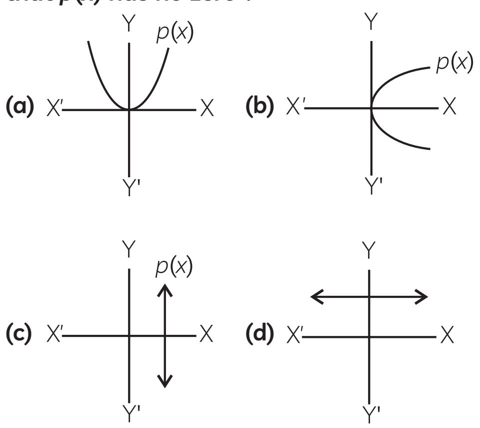
7. For any event E, if P(E) = 1, the E is called a:
(a) Equally likely event
(b) Impossible event
(c) Sure event
(d) Mutually exclusive event

8. From a square of side 8 cm, two quadrants of a circle of radii 1.4 cm are cut from two corners. Another circle of radius 4.2 cm is also cut from the centre as shown in the figure. Find the area of the remaining (shaded) portion of the square. [Take $\pi = \frac{22}{7}$]



(a) 6.12 cm^2 (b) 5.48 cm^2
(c) 5.76 cm^2 (d) 6.45 cm^2

9. The graphs of $y = p(x)$ are given in figure below. Which among the following shows that $p(x)$ has no zero ?



10. If the points A (1, 2), O (0, 0) and C (a, b) are collinear, than:
(a) $a = 2b$ (b) $2a = b$
(c) $a = b$ (d) $a = 3b$

11. Polynomial $f(x) = x^2 - 5x + k$ has zeroes α and β such that $\alpha - \beta = 1$, then find the value of $4k$.
(a) 6 (b) 12
(c) 18 (d) 24

12. 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

13. What are the coordinates of the point, which divides the join of the points (5, 0) and (0, 4) in the ratio 2 : 3 internally?
(a) (8, –3) (b) (6, 5)
(c) $\left(3, \frac{8}{5}\right)$ (d) $\left(\frac{5}{2}, 2\right)$

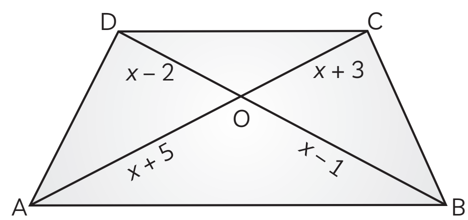
14. The events which have equal chances of occuring and no one is preferred over the other are called events:
(a) Complementary
(b) Probable
(c) Equally likely
(d) Most likely

15. If the graph would be parallel to x-axis, then its number of zeros for the graph would be:
(a) 0 (b) 1
(c) more than 1 (d) 2

16. Calculate the distance between the points P(0, 6) and Q(0, –2).
(a) 8 units (b) 10 units
(c) 6 units (d) 4 units

17. The HCF of two numbers is 9 and their LCM is 2016. If one number is 54, then find the other number?
(a) 386 (b) 336
(c) 428 (d) 328

18. Evaluate for x, if AB || CD in the given figure.



(a) 6 (b) 7
(c) 8 (d) 4

19. In what ratio does x-axis divides the join of A(2, –3) and B(5, 6)?
(a) 1 : 1 (b) 2 : 1
(c) 1 : 2 (d) 1 : 3

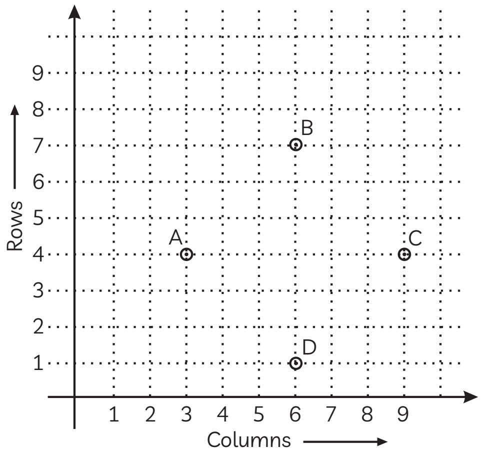
20. What name is given to a largest positive integer that divides given two positive integers ?
(a) Coprime (b) HCF
(c) LCM (d) both (a) and (c)

SECTION - B

16 marks

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

21. *In a playground, 4 friends are standing at the points A, B, C and D as shown in given figure, to play a game.*



The distance AB is:

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

(c) 6 units (d) $3\sqrt{2}$ units

22. Evaluate $\alpha\beta$, if α and β are the zeroes of the polynomial $x^2 + 5x + 8$.

(a) 4 (b) – 5

(c) 16 (d) None of these

23. The decimal representation of $\frac{17}{8}$ will be.

(a) Terminating

(b) Non-terminating

(c) Non-terminating and repeating

(d) Non-terminating and non-repeating

24. In a given fraction, y is subtracted from the numerator and 2 is added to the denominator it becomes $\frac{1}{2}$. If 7 is subtracted from the numerator and 2 from denominator, then it becomes $\frac{1}{3}$. Then, what is the fraction?

(a) $\frac{23}{27}$ (b) $\frac{1}{5}$

(c) $\frac{15}{26}$ (d) $\frac{13}{27}$

25. Which one of the following is an irrational number.

(a) $\sqrt{4}$ (b) $3\sqrt{8}$

(c) $\sqrt{100}$ (d) $-\sqrt{0.64}$

26. Evaluate $\sin^2\theta - \cos^2\theta$. If $\sqrt{3}\tan\theta = 3\sin\theta$, $\theta \neq 0$ and θ is an acute angle.

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

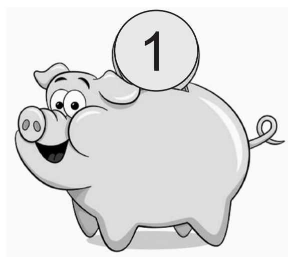
(c) $-\frac{1}{3}$ (d) – 1

27. What is the value of 'k' in the quadratic polynomial $kx^2 + 4x + 3k$, if the sum of the zeroes is equal to their product ?

(a) $\frac{-4}{3}$ (b) $\frac{2}{3}$

(c) $\frac{1}{0}$ (d) – 5

28. Priyanka, a X standard student, has only ₹ 1 and ₹ 2 coins in her piggy bank. While counting she found that total number of coins are 50 and amount of money with her is ₹ 75. Observing that certain question arises into her mind. She denote the number of ₹ 1 coins by x and ₹ 2 coins by y.

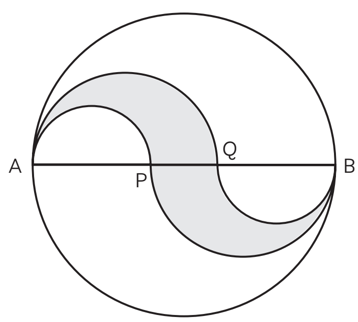


What are the number of ₹ 1 coins in her piggy bank?

(a) 10 (b) 20

(c) 22 (d) 25

29. What is the area of shaded region in the given figure where diameter AB is 12 cm long and AB is trisected at points P and Q.



(a) 14π cm^2 (b) 12π cm^2

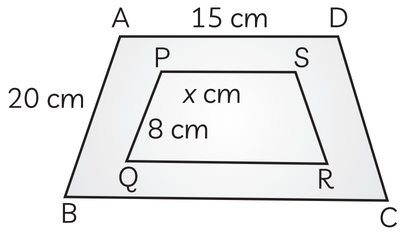
(c) 22π cm^2 (d) 13π cm^2

30. What is the decimal representation of $\frac{17}{125}$?

(a) 0.136 (b) 0.017

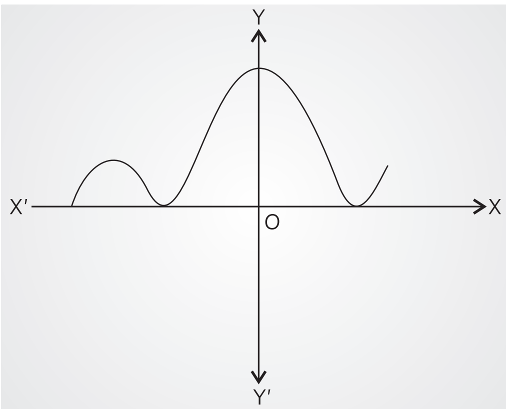
(c) 0.125 (d) 0.163

31. Determine the value of x, if two quadrilaterals ABCD and PQRS are similar.



(a) 8.3 (b) 6
(c) 7.6 (d) 8

32. In the graph shown below the number of zeroes of the polynomial are :



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

33. At what point, does the linear equation $y - 2x = 1$ intersect the y-axis?

(a) (0, 1) (b) $\left(-\frac{1}{2}, 0\right)$

(c) $\left(0, \frac{14}{5}\right)$ (d) (0, –14)

34. School is organising a webinar for the students of class fifth, sixth and seventh regarding the cyber crime awareness. He asked the teacher incharges of these classes, to arrange all the students in the same hall. There are 84 students in fifth class, 63 students in sixth class and 42 students in seventh class.

What is minimum number of rows in which the students can be seated so that students of same class sit in a same row?

(a) 9 (b) 21
(c) 7 (d) 42

35. What is the area of a sector, whose perimeter is 30 cm and radius of circle is 6.4 cm?

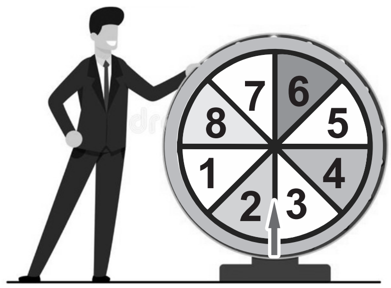
(a) 55 cm^2 (b) 38 cm^2
(c) 42 cm^2 (d) 57 cm^2

36. What is the value of 'k' such that $k > 0$ if the difference between the zeroes of $4x^2 - 8kx + 9$ is 4?

(a) $\frac{1}{4}$ (b) $\frac{3}{2}$

(c) $\frac{5}{2}$ (d) $\frac{1}{2}$

37. Rohit is playing a game of spinning a wheel. It is a game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7 and 8 (figure) and these are equally likely outcomes.

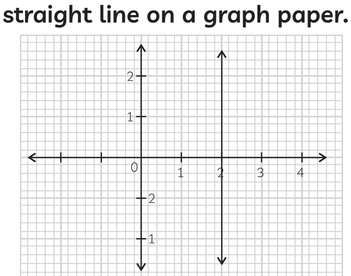


What is the probability that the arrow rest on even number?

(a) $\frac{5}{8}$ (b) $\frac{1}{6}$

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

38. In the cross country race, the runners had to run along a fixed track. A runner is running along a straight path parallel to a given boundary. This could be represented by an equation of a straight line on a graph paper.



The path of the runner represents the graph of which polynomial?

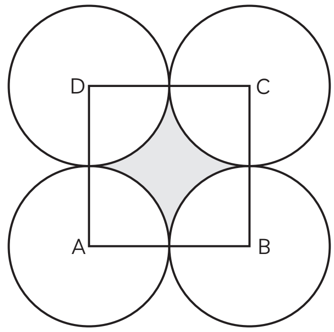
(a) Linear polynomial
(b) Quadratic polynomial
(c) Cubic polynomial
(d) None of these

39. 250 lottery ticket were sold, out of which 5 had prizes. If Rahul had purchased one lottery ticket, then the probability that he wins the prize is:

(a) $\frac{1}{25}$ (b) $\frac{1}{50}$

(c) $\frac{3}{17}$ (d) $\frac{2}{25}$

40. 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

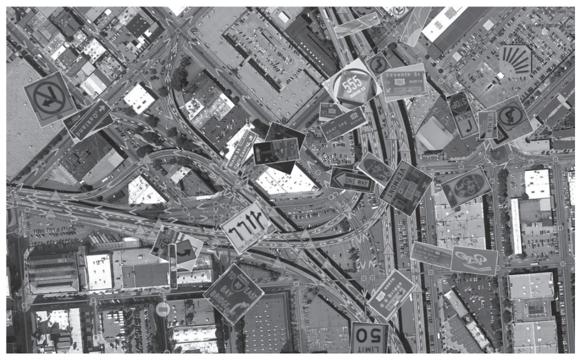
SECTION - C **8 marks**

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

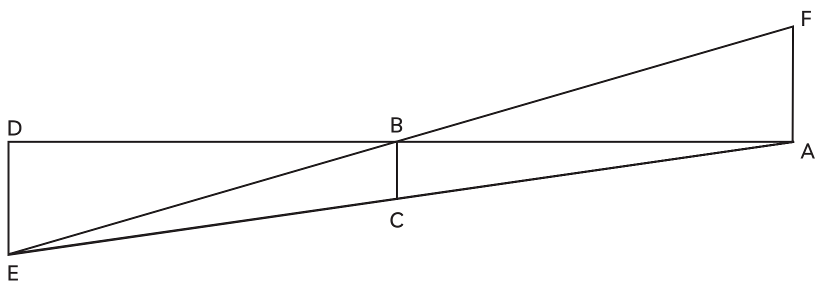
Q 41 to Q 45 Based on Case Study–1:

Case Study–1:

Google maps cartography team is working on improving the scalability quality of maps when you use the app on your phones to zoom in using 4 fingers. They are using a proprietary tool called 'MapMaker' to figure out scalability factors. A mathematical model is created for a type of object (below cross-section) to test its scalability on maps app.



In the diagram, AC = 8 cm, CE = 4 cm and the area of the triangle BEC is 4.2 sq cm.
Another enlargement with centre E, maps ΔEBC onto ΔEFA. BC = 3.6 cm.



41. An enlargement , with centre A, maps ΔABC onto ΔADE, then the scale factor of the enlargement is:

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

(c) $\frac{4}{3}$ (d) $\frac{2}{3}$

42. The area of ΔABC is:
(a) 4.2 sq cm (b) 6.3 sq cm
(c) 8.4 sq cm (d) 12.6 sq cm

43. The length of AF is:
(a) 7.2 cm (b) 8.4 cm
(c) 10.2 cm (d) 10.8 cm

44. The area of ΔEFA is:
(a) 8.4 sq cm (b) 16.8 sq cm
(c) 25.2 sq cm (d) 37.8 sq cm

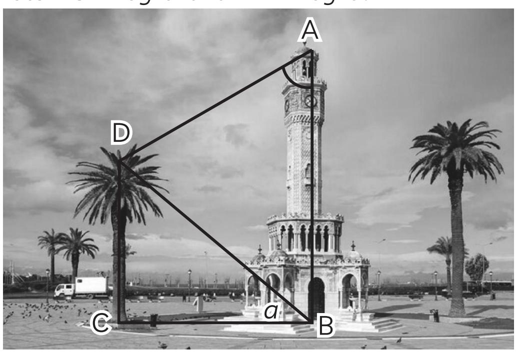
45. The area of ΔBAF is:
(a) 8.4 sq cm (b) 16.8 sq cm
(c) 25.2 sq cm (d) 37.8 sq cm

Q 46 to Q 50 Based on Case Study–2:

Case Study–2:

Izmir Clock Tower is a historic clock tower in Konak Square in the center of Izmir, Turkey. The French architect Raymond Charles Pere designed the Izmir Clock Tower. It was built in 1901 to commemorate the 25th anniversary of Abdulhamid II's accession to the throne. Four fountains with three water taps each are set around the base of the tower in a circular pattern, and the columns are inspired by Moorish designs. The clock tower has become the symbol of Izmir, and it appeared on the back of Turkish 500 lira banknotes from 1983 to 1989.

Let us assume that the height of the tower AB = 14 m, height of tree CD = 5 m and BD – BC = 1 m. As the tower is vertical, ∠ABC = 90°. Further, let us denote ∠CBD by 'a' and ∠BAD by 'b'.



46. **The value of sin *a* is :**

(a) $\frac{12}{13}$ (b) $\frac{13}{12}$

(c) $\frac{13}{5}$ (d) $\frac{5}{13}$

47. **The value of tan *b* is :**

(a) $\frac{12}{9}$ (b) $\frac{9}{12}$

(c) $\frac{15}{12}$ (d) $\frac{15}{9}$

48. **The value of $\sec^2 a + \operatorname{cosec}^2 b$ is:**

(a) $\frac{255}{144}$ (b) $\frac{197}{72}$

(c) 1 (d) $\frac{72}{197}$

49. **The value of $\sin^2 a + \cos^2 a$ is :**

(a) 0 (b) –1

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

50. **The value of $\cot^2 b$ is:**

(a) $\frac{81}{144}$ (b) $\frac{144}{225}$

(c) $\frac{81}{225}$ (d) $\frac{225}{44}$

SOLUTION

SAMPLE PAPER - 11

SECTION - A

1. *(d)* -1

Explanation: We have,

$$p(x) = ax^2 + bx + c$$

Put $x = -1$, we get

$$p(-1) = a - b + c$$
$$= (a + c) - b$$
$$= b - b = 0 \qquad (\text{as } a + c = b)$$

$\therefore$ -1 is a zero of $p(x)$.

2. *(d) Unique*

Here, pair of equations are :

$$x - 2y + 4 = 0$$

and $\quad 3x + 4y + 2 = 0$

Then; $\quad \frac{a_1}{a_2} = \frac{1}{3}, \frac{b_1}{b_2} = \frac{-2}{4} = \frac{-1}{2}$

$$\frac{c_1}{c_2} = \frac{4}{2} = \frac{2}{1}$$

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

3. *(c)* $\frac{16}{27}$

Explanation: Total number of students = 54

Number of girls = 32

$\therefore$ P (getting a girl's name) = $\frac{32}{54} = \frac{16}{27}$

4. *(c)* 5

Explanation: Here, equations are:

$$2x + 3y = 5 \quad \text{...(i)}$$
$$3x + 2y = 10 \quad \text{...(ii)}$$

By applying (i) × 2 – (ii) × 3

$$4x + 6y = 10$$
$$9x + 6y = 30$$
$$- \quad - \quad -$$
$$-5x = -20$$

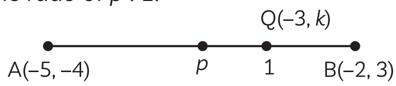
$\Rightarrow \quad x = 4$

$\therefore \quad y = -1$

$\therefore \quad x - y = 4 + 1 = 5$

5. *(d)* $\frac{2}{3}$

Explanation: Let point Q(-3, k) divides AB in the ratio of p : 1.



$\therefore \quad -3 = \frac{-2p - 5}{p + 1}$

$\Rightarrow \quad -3p - 3 = -2p - 5 \Rightarrow p = 2$

$\therefore$ Ratio is 2 : 1.

Then, $\quad k = \frac{2 \times 3 - 4}{2 + 1} = \frac{2}{3}$

6. *(b) 30 seconds*

Explanation: To find the time after which the three lights will glow again, we will find their LCM by prime factorization.

$$3 = 3^1$$
$$5 = 5^1$$
$$6 = 2^1 \times 3^1$$

Therefore, LCM = $2^1 \times 3^1 \times 5^1 = 30$

So, that lights of the three strings will glow again together after 30 seconds.

7. *(c) Sure event*

Explanation: The event with probability 1 is called a sure event, which has a surety of occuring.

8. *(b) 5.48 cm^2*

Explanation: Area of shaded portion = Area of square – 2 × Area of quadrant – Area of circle

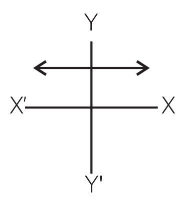
$= 8 \times 8 - 2 \times \frac{1}{4} \times \frac{22}{7} \times 1.4 \times 1.4 - \frac{22}{7} \times 4.2 \times 4.2$

$= 64 - 11 \times 0.2 \times 1.4 - 22 \times 0.6 \times 4.2$

$= 64 - 3.08 - 55.44$

$= 5.48$ cm^2

9. *(d)*



Explanation: The graph does not intersect x-axis at any point. So, it has no zero.

10. *(b)* $2a = b$

Explanation: The given points are O (0, 0), A (1, 2) and C (a, b)

Now, 3 points are collinear

$$\therefore \quad OC = \sqrt{(0-a)^2+(0-b)^2} = \sqrt{a^2+b^2}$$

$$OA = \sqrt{(0-1)^2+(0-2)^2} = \sqrt{1+4} = \sqrt{5}$$

$$AC = \sqrt{(1-a)^2+(2-b)^2}$$

Since, points are collinear

$$\therefore \quad AO + OC = AC$$

$$\sqrt{5}+\sqrt{a^2+b^2} = \sqrt{(1-a)^2+(2-b)^2}$$

On squaring both sides, we get

$$5 + a^2 + b^2 + 2\sqrt{5}\times\sqrt{a^2+b^2} = 1 + a^2 - 2a + 4 + b^2 - 4b$$

$$\Rightarrow \quad 2\sqrt{5(a^2+b^2)} = -2(a+2b)$$

On again squaring, we get

$$\Rightarrow \quad 4a^2 + b^2 - 4ab = 0$$

$$\Rightarrow \quad (2a - b) = 0 \Rightarrow 2a = b$$

11. *(d) 24*

Explanation : Given α and β are the zeroes of the given polynomial.

$$\therefore \quad \alpha + \beta = -\left(-\frac{5}{1}\right) = 5$$

and $\quad \alpha\beta = \frac{k}{1} = k$

Since, $\quad \alpha - \beta = 1$

$$\Rightarrow \quad (\alpha - \beta)^2 = 1$$

$$\Rightarrow \quad (\alpha + \beta)^2 - 4\alpha\beta = 1$$

$$\Rightarrow \quad (5)^2 - 4 \times k = 1$$

$$\Rightarrow \quad 25 - 4k = 1$$

$$\Rightarrow \quad 4k = 24$$

12. *(b)* 2

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

$$\Rightarrow \quad OA = OB$$

$$\Rightarrow \sqrt{(4-2)^2+(3-3)^2} = \sqrt{(x-2)^2+(5-3)^2}$$

$$\Rightarrow \quad 2 = \sqrt{(x-2)^2+4}$$

$$\Rightarrow \quad 4 = (x-2)^2 + 4$$

$$\Rightarrow \quad (x-2)^2 = 0 \Rightarrow x = 2$$

13. *(c)* $\left(3, \frac{8}{5}\right)$

Explanation: Let P(x, y) be the point which divides the join of A(5, 0) and B(0, 4) in the ratio 2 : 3 internally.

$$\therefore \ x = \frac{2(0)+3(5)}{2+3} = 3 \text{ and } y = \frac{2(4)+3(0)}{2+3} = \frac{8}{5}$$

Hence, the required point is $\left(3, \frac{8}{5}\right)$

14. *(c) Equally likely*

Explanation: All the events have equal chances of occuring.

15. *(a) 0*

Explanation: If the graph would be parallel to x-axis it would have no zero, as it will not intersect x-axis at any point.

16. *(a) 8 units*

Explanation: Distance PQ = $\sqrt{(0-0)^2+(-2-6)^2}$

= 8 units

17. *(b) 336*

Explanation: Let, the other number be x.

Then, by formula,

$$\text{LCM} \times \text{HCF} = 54 \times x$$

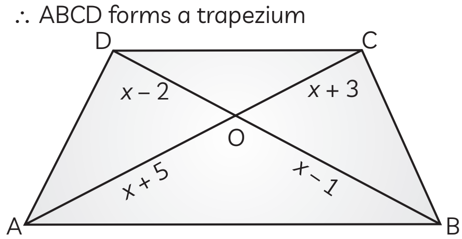
$$x = \frac{2016 \times 9}{54}$$

$$= 336$$

18. *(b) 7*

Explanation : Here, AB || DC

$\therefore$ ABCD forms a trapezium



$\therefore$ Also $\quad \Delta AOB \sim \Delta COD \quad$ (AA similarity)

$$\therefore \quad \frac{OA}{OC} = \frac{OB}{OD}$$

$$\Rightarrow \quad \frac{x+5}{x+3} = \frac{x-1}{x-2}$$

$$\Rightarrow \quad (x+5)(x-2) = (x-1)(x+3)$$

$$\Rightarrow \quad x^2 + 3x - 10 = x^2 + 2x - 3$$

$$\Rightarrow \quad x = 7$$

19. *(c) 1 : 2*

Explanation: Let the required ratio be k : 1.

We know, y-coordinate of any point on x-axis is zero.

$\therefore$ Using section formula,

$$\frac{6k-3}{k+1} = 0 \Rightarrow 6k - 3 = 0 \Rightarrow k = \frac{1}{2}$$

$\therefore$ Required ratio = 1 : 2

20. *(b) HCF*

Explanation: A largest positive integer that divides given two positive integers completely is called HCF.

SECTION - B

21. *(d)* $3\sqrt{2}$ *units*

Explanation: Coordinates of A (3, 4) and B(6, 7)

$$\therefore \quad AB = \sqrt{(6-3)^2+(7-4)^2}$$
$$= \sqrt{3^2+3^2} = \sqrt{9+9}$$
$$= \sqrt{18} = 3\sqrt{2}$$

22. *(d) None of these*

Explanation: α and β are the zeroes of the polynomial $x^2 + 5x + 8$.

$$\therefore \quad \alpha\beta = \frac{8}{1} = 8$$

Hence, none of the given options is correct.

23. *(a) terminating*

Explanation: As $\frac{17}{8} = \frac{17}{2^3} = \frac{17}{2^3 \times 5}$

Since, denominator is of the form $2^m \times 5^n$, where m and n are integers. So given rational number is a terminating decimal.

24. *(c)* $\frac{15}{26}$

Explanation: Consider the fraction as $\frac{x}{y}$.

A.T.Q., $\frac{x-1}{y+2} = \frac{1}{2}$

$\Rightarrow \quad 2x - 2 = y + 2$

$\Rightarrow \quad 2x - y = 4 \quad$ ...(i)

$\frac{x-7}{y-2} = \frac{1}{3}$

$\Rightarrow \quad 3x - 21 = y - 2$

$\Rightarrow \quad 3x - y = 19 \quad$ ...(ii)

On applying (i) - (ii), we get

$x = 15$ and $y = 26$

$\therefore$ Required fraction $= \frac{15}{26}$

25. *(b)* $\sqrt[3]{8}$

26. *(b)* $\frac{1}{3}$

Explanation:

We have, $\sqrt{3}\tan\theta = 3\sin\theta$

$\Rightarrow \quad \sqrt{3}\frac{\sin\theta}{\cos\theta} = 3\sin\theta$

$\Rightarrow \quad \frac{\sqrt{3}}{\cos\theta} = 3$

$\Rightarrow \quad \frac{\sqrt{3}}{3} = \cos\theta$

$\therefore \quad \cos\theta = \frac{1}{\sqrt{3}} \quad$ ...(i)

Now, $\sin^2\theta - \cos^2\theta = 1 - \cos^2\theta - \cos^2\theta$

$= 1 - 2\cos^2\theta$

$= 1 - 2 \times \left(\frac{1}{\sqrt{3}}\right)^2$ [Using (i)]

$= 1 - \frac{2}{3} = \frac{1}{3}$

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

Explanation: Let α and β be the zeroes of polynomial $kx^2 + 4x + 3k$.

According to the question.

$$\alpha + \beta = \alpha\beta$$

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

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

28. *(d)* 25

Explanation: The system of linear equations, representing the given situation, is

$x + y = 50 \quad$ ...(i)

and $\quad x + 2y = 75 \quad$ ...(ii)

On subtracting (i) from (ii), we get

$y = 25$

On substituting $y = 25$ in (i), we get

$x = 25$

Thus, total number of ₹ 1 coins is 25.

29. *(b)* $12\pi\ cm^2$

Explanation: Here, AP = PQ = QB = $\frac{AB}{3}$ = 4 cm

$\therefore$ Area of shaded region $= 2 \times \left[\frac{\pi}{2}(4)^2 - \frac{\pi}{2} \times (2)^2\right]$

$= 2 \times [8\pi - 2\pi]$

$= 12\pi\ cm^2$

30. *(a)* 0.136

Explanation: We have,

$$\frac{17}{125} = \frac{17}{5^3} = \frac{17 \times 2^3}{2^3 \times 5^3}$$
$$= \frac{136}{(10)^3} = 0.136$$

31. *(b)* 6

Explanation : Quadrilaterals ABCD and PQRS are similar.

$\therefore \quad \frac{PS}{AD} = \frac{PQ}{AB}$

(Ratio of corresponding sides are similar)

$\Rightarrow \quad \frac{x}{15} = \frac{8}{20}$

$\Rightarrow \quad x = \frac{8 \times 15}{20} = 6$

32. *(d) 3*

Explanation: Here, graph touches or cuts the x-axis at 3 points. So, number of zeroes are 3.

33. *(a) (0, 1)*

Explanation: The point at which line cuts the y-axis, x-coordinate is zero.

$\therefore \quad y - 2 \times 0 = 1$

$y = 1$

$\therefore$ Point is (0, 1)

34. *(a) 9*

Explanation: *Here, numbers are 84, 63, and 42*

So we need to find their HCF.

$\therefore \quad 84 = 2^2 \times 3 \times 7$

$63 = 3^2 \times 7$

$42 = 2 \times 3 \times 7$

$\therefore \quad HCF = 3 \times 7$

$= 21$

$\therefore$ *Number of rows for class fifth* $= \frac{84}{21} = 4$

$\therefore$ *Number of rows for class sixth* $= \frac{63}{21} = 3$

$\therefore$ *Number of rows for class seventh* $= \frac{42}{21} = 2$

$\therefore$ *Total number of rows = 4 + 3 + 2 = 9*

35. *(a) 55 cm^2*

Explanation: Perimeter of a sector of a circle = 2 × radius + length (l) of an arc of sector

$\therefore \quad 30 = 2 \times 6.4 + l$

$\Rightarrow \quad l = 30 - 12.8 = 17.2$ cm

Now, area of sector

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

$= \frac{1}{2} \times 17.2 \times 6.4$

$= 55.04 \text{ cm}^2$

$\cong 55 \text{ cm}^2$ (approx)

36. *(a)* $\frac{5}{2}$

Explanation: Here, equation is $4x^2 - 8kx + 9 = 0$

Let, α and β be the zeroes of the given polynomial.

Then, $\quad \alpha + \beta = -\frac{(-8k)}{4} = -2k$

$\alpha\beta = \frac{9}{4}$

Since, $\quad (\alpha - \beta)^2 = (\alpha + \beta)^2 - 4\alpha\beta$

$4^2 = (-2k)^2 - 4 \times \frac{9}{4}$

$\Rightarrow \quad 16 = 4k^2 - 9$

$\Rightarrow \quad 4k^2 = 25$

$\Rightarrow \quad k^2 = \frac{25}{4}$

$\Rightarrow \quad k = \sqrt{\frac{25}{4}} = \pm \frac{5}{2}$

But $\quad k > 0$

$\therefore \quad k = \frac{5}{2}$

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

Explanation: $\because$ Total number of numbers on the wheel = 8

Let E = Event of getting an even number.

$\therefore$ Number of outcomes favourable to E = 4

Probability that arrow comes at number 8

$= P(E) = \frac{\text{Outcomes favourable to } E_1 = 4}{\text{Total number of outcomes}} = \frac{4}{8}$

38. *(a) linear polynomial*

Explanation: As it is a straight line

39. *(b)* $\frac{1}{50}$

Explanation: Since, total number of tickets = 250

$\therefore$ Total number of outcomes = 250

Number of tickets having prize *i.e.* favourable outcomes = 5

$\therefore$ P(getting a prize) $= \frac{5}{250}$

$= \frac{1}{50}$

40. *(a) 10.5 cm^2*

Explanation: Radius of each quadrant

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

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

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

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

$= 10.5 \text{ cm}^2$

SECTION - C

41. *(d)* $\frac{2}{3}$

$$\text{Scale factor} = \frac{AC}{AE}$$

$$= \frac{AC}{AC + CE} = \frac{8}{8 + 4}$$

$$= \frac{8}{12} = \frac{2}{3}$$

42. *(d) 12.6 sq. cm*

In ΔABC, using Pythagoras theorem, we have

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

$$AB^2 = 64 - 12.96$$

$$= 51.04$$

$$\Rightarrow \quad AB = 7.15 \simeq 7.$$

$$\therefore \text{ Area of } \Delta ABC = \frac{1}{2} \times BC \times AB$$

$$= \frac{1}{2} \times 3.6 \times 7$$

$$= 12.6 \text{ cm}^2$$

43. *(d) 10.8 cm*

Since, $\Delta EBC \sim \Delta EAF$

$$\frac{EC}{EA} = \frac{BC}{AF}$$

$$\Rightarrow \quad \frac{4}{12} = \frac{3.6}{AF}$$

$$\Rightarrow \quad AF = 3.6 \times 3$$

$$= 10.8 \text{ cm}$$

44. *(d) 37 : 8 sq. cm*

Since, with centre E enlargement as done to ΔEBC and ΔEFA.

$$\therefore \quad \Delta EBC \sim \Delta EFA$$

$$\frac{ar(\Delta EBC)}{ar(\Delta EFA)} = \frac{EC^2}{AE^2}$$

$$\Rightarrow \quad \frac{4.2}{ar(\Delta EFA)} = \frac{4^2}{12^2}$$

$$\Rightarrow \quad ar\,(\Delta EFA) = \frac{12 \times 12}{4 \times 4} \times 4.2$$

$$= 3 \times 3 \times 4.2$$

$$= 37.8 \text{ sq. cm}$$

45. *(d) 37.8 sq. cm*

$$ar \text{ of } (\Delta BAF) = \frac{1}{2} \times AF \times AB$$

$$= \frac{1}{2} \times 10.8 \times 7$$

$$= 37.8 \text{ sq. cm}$$

46. *(d)* $\frac{5}{13}$

Explanation: To find sin *a*, we will first find BD. It is given that BD – BC = 1 m and CD = 5 m. Therefore, applying Pythagoras theorem in triangle BCD, we get :

$$BD^2 = BC^2 + CD^2 \Rightarrow BD^2 = (BD - 1)^2 + 5^2$$

$$\Rightarrow BD^2 = BD^2 - 2BD + 1 + 25$$

Solving further, 2BD = 26, or BD = 13 m

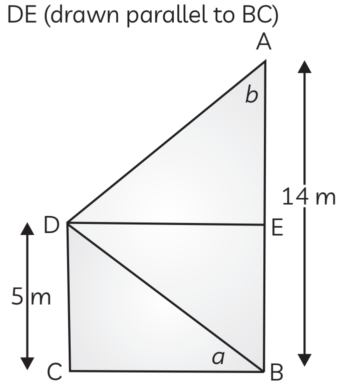
Therefore, BC = 12 m.

$$\text{In } \Delta BCD, \quad \sin a = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$$

$$= \frac{CD}{BD} = \frac{5}{13}$$

47. *(a)* $\frac{12}{9}$

Explanation: To find tan *b*, we will find AE and DE (drawn parallel to BC)



We construct DE || BC and we get a rectangle.

$\therefore$ AB = BE + AE or 14 = 5 + AE

Therefore, AE = 9 m.

and, DE = BC = 12 m

$$\text{Therefore,} \quad \tan b = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$$

$$\frac{DE}{AE} = \frac{12}{9}$$

48. *(b)* $\frac{197}{72}$

Explanation:

$$\sec a = \frac{\text{Hypotenuse}}{\text{Base}}$$

$$= \frac{BD}{BC} = \frac{13}{12}$$

$$\text{and} \quad \text{cosec } b = \frac{\text{Hypotenuse}}{\text{Perpendicular}}$$

$$= \frac{AD}{DE} = \frac{15}{12}$$

In ΔAED, by pythagoras theorem

$$AD^2 = AE^2 + DE^2 = 9^2 + 12^2$$
$$= 81 + 144 = 225 \Rightarrow AD$$
$$= 15 \text{ m}$$

Therefore, $\sec^2 a + \text{cosec}^2 b = \left(\frac{13}{12}\right)^2 + \left(\frac{15}{12}\right)^2$

$$= \frac{169 + 225}{144} = \frac{394}{144} = \frac{197}{72}$$

49. *(c) 1*

Explanation: We know,

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

$$\therefore \quad \sin^2 a + \cos^2 a = 1$$

50. *(a)* $\frac{81}{144}$

Explanation: $\cot b = \frac{\text{Base}}{\text{Perpendicular}}$

$$= \frac{AE}{DE} = \frac{9}{12}$$

Therefore, $\cot^2 b = \left(\frac{9}{12}\right)^2 = \frac{81}{144}$