10

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**

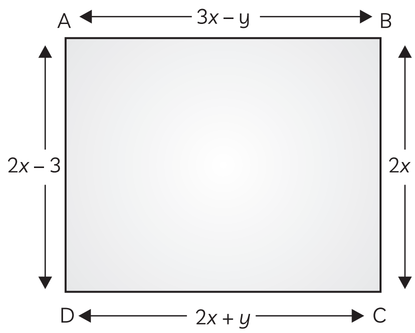
(Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

1. **What is the other zero of the polynomial, if one zero of the quadratic polynomial $2x^2 - 8x - m$ is $\frac{5}{2}$?**

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

(c) $\frac{5}{2}$ (d) $\frac{7}{2}$

2. **The figure shows a rectangle with its length and breadth as indicated?**

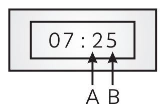


Find the value of x and y if perimeter of rectangle is 120 cm ?

(a) 14, 7 (b) 13, 9

(c) 12, 8 (d) 15, 6

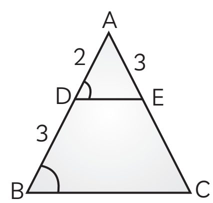
3. **Rajesh wakes up in the morning and notices that his digital clock reads 7:25 am. After noon, he looks at the clock again what is the probability that the number in column A is 4?**



(a) $\frac{1}{3}$ (b) $\frac{1}{9}$

(c) $\frac{1}{6}$ (d) $\frac{1}{2}$

4. **In $\triangle$ABC, if $\angle$ADE = $\angle$ABC, then what is the value of CE? (See Figure).**



(a) 6 cm (b) 3 cm

(c) 4.5 cm (d) 5 cm

5. **Find the radius of a circle whose centre is at the origin and a point P(5, 0) lies on its circumference.**

(a) 34 units (b) 8 units

(c) 5 units (d) 7 units

6. **Parmeet had been collecting chalk pieces since his childhood and one day he counted**

the chalk pieces he had. To his surprise, he had 129 chalk pieces!

The decimal representation of $\frac{129}{60}$ will:

(a) not terminate

(b) terminate after 1 decimal place

(c) terminate after 2 decimal places

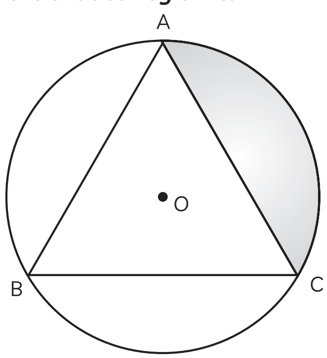
(d) terminate after 3 decimal places

7. At letter is drawn at random from the letters of the word ERROR. What is the probability that drawn letter is R?

(a) $\frac{1}{5}$ (b) $\frac{2}{5}$

(c) $\frac{3}{5}$ (d) $\frac{4}{5}$

8. ΔABC is an equilateral triangle which is inscribed in a circle of radius 4 cm with centre O, as shown in the figure Then, the area of the shaded region is:



(a) $\frac{4}{3}(4\pi - 3\sqrt{3})\text{cm}^2$ (b) $\frac{2}{3}(2\pi - \sqrt{3})\text{cm}^2$

(c) $\frac{7}{3}(7\pi - 3\sqrt{3})\text{cm}^2$ (d) $\frac{5}{3}(5\pi - 3\sqrt{3})\text{cm}^2$

9. Evaluate the zeroes of the polynomial $2x^2 + 14x + 20$.

(a) –2, –5 (b) 2, 5

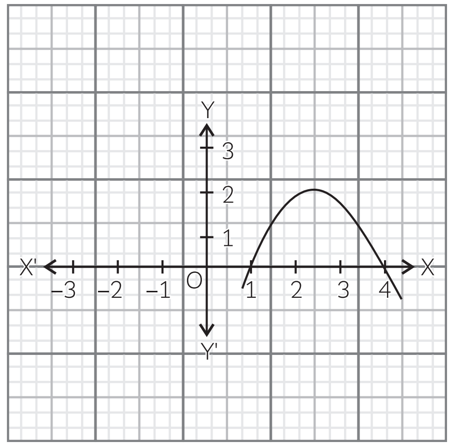
(c) –2, 5 (d) –5, 2.

10. If areas of two similar triangles are equal, then they are ………… triangles.

(a) equilateral (b) Isosceles

(c) congruent (d) right-angled

11. The entrance gate of the fort has a shape of a quadratic polynomial (parabolic). The mathematical representation of the gate is shown in the figure.



If one zero of the polynomial is 7 and product of zeroes is –35, then polynomial representation of the gate is:

(a) $x^2 + 12x - 35$ (b) $x^2 - 12x - 35$

(c) $-x^2 + 2x + 35$ (d) $x^2 + 2x + 35$

12. In the figure, MN || BC and AM : MB = $\frac{1}{2}$.

Then find the ratio of $\frac{ar(\Delta AMN)}{ar(\Delta ABC)}$

(a) 1 : 4 (b) 1 : 9

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

13. Consider a ΔPQR, in which PQ = 7 cm, QR = 25 cm, RP = 24 cm, then the triangle is right angled at

(a) Q (b) R

(c) P (d) can't say

14. From the 1000 sealed envelopes in a box, 10 of them contain a cash prize of ₹ 100 each, 100 of them contain a cash prize of ₹ 50 each and 200 of them contain a cash prize of ₹ 10 each and rest do not contain any cash prize. They are well-shuffled and an envelope is picked up out of them. The probability that it contains no cash prize is:

(a) 0.54 (b) 0.57

(c) 0.69 (d) 0.65

15. For two linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, the condition $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ is for.

(a) Unique solution

(b) Infinite solution

(c) No solution

(d) Data insufficient

16. If in triangles PQR and XYZ, $\frac{PQ}{XZ} = \frac{PR}{XY} = \frac{QR}{YZ}$, then:

(a) $\Delta PRQ \sim \Delta XZY$ (b) $\Delta QRP \sim \Delta YXZ$

(c) $\Delta PQR \sim \Delta XYZ$ (d) $\Delta PQR \sim \Delta XZY$

17. Calculate the minimum number by which $\sqrt{8}$ should be multipled so as to get a rational number.

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

(c) $\sqrt{5}$ (d) $\sqrt{6}$

18. Two trees are standing parallel to each other. The bigger tree 8m high, casts a shadow of 3m. The smaller tree of height 4m cast a shadow of:

(a) 6 m (b) 8 m

(c) 4 m (d) 5 m

19. Find the distance 2AB, where A and B are the points (–6, 7) and (–1, –5) respectively.

(a) 28 units (b) 24 units

(c) 25 units (d) 26 units

20. For any two numbers '*a*' and '*b*', if 3 is the least prime factor of *a* and 7 is the least prime factor of, *b* then find the least prime factor of (*a* + *b*).

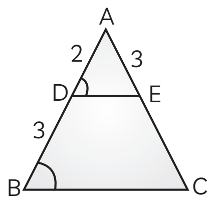
(a) 0 (b) 1

(c) 2 (d) 3

SECTION - B **16 marks**

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

21. In ΔABC, if $\angle ADE = \angle ABC$, then what is the value of CE? (See Figure).



(a) 6 cm (b) 3 cm

(c) 4.5 cm (d) 5 cm

22. How many zeroes can a polynomial of degree *n* can have?

(a) 0 (b) n

(c) $(n - 1)$ (d) n^2

23. If three consecutive integers are multiplied, then their product is divisible by

(a) 6 (b) 4

(c) 3 (d) 5

24. *Any two-digit number have a digit at one's place and at ten's place. If we consider digit at ten's place as 'x' and digit at one's place as 'y'. then, a two-digit number is written in the form of an algebraic expression is shown as:*

$$10x + y$$

The linear equation representing the situation. "The tens digit is three times the unit digit is".

(a) $x - 3y = 0$ (b) $x + 3y = 2$

(c) $x + 3y = 0$ (d) $x - 3y = 3$

25. *Ramesh want to distribute pencils and pen on his birthday in school. So he went to a stationary shop for buying pens and pencils. He purchased 55 pencils and 110 pens. He ask the shopkeeper to put the pens and pencils in different packets in such a way that each have equal number of pens and pencils in it.*

In each packet, how many pens and pencil will be placed ?

(a) 65 (b) 55

(c) 11 (d) 5

26. For what value of *k*, the system of equations $8x + 5y = 9$ and $kx + 10y = 18$ has infinitely many solutions.

(a) $k = 10$ (b) $k = 16$

(c) $k = 8$ (d) $k = 15$

27. Evaluate the value of $2\tan^2\theta + \cos^2\theta - 2$, where θ is an acute angle and $\sin\theta = \cos\theta$.

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

(c) $-\frac{3}{2}$ (d) 0

28. Samiksha had a pack of 52 cards. She took out all the face cards and shuffled the remaining cards well.
Now she took out a card from it.

What is the probability of getting neither a black card nor an ace?

(a) $\frac{11}{20}$ (b) $\frac{3}{5}$

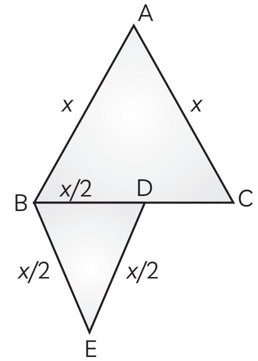
(c) $\frac{9}{20}$ (d) $\frac{11}{20}$

29. If the probability of winning a game is 0.6, than what is the probability of lossing it?.

(a) 0.3 (b) 0.4

(c) 1.0 (d) 0.2

30. **What is the ratio of the areas of $\triangle ABC$ and $\triangle BDE$, if $\triangle ABC$ and $\triangle BDE$ are two equilateral triangles such that D is the mid-point of BC.**



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

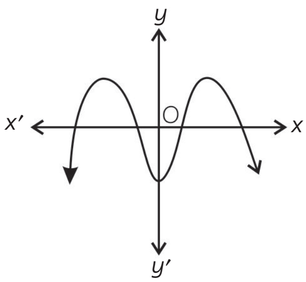
(c) 1 : 4 (d) 4 : 1

31. **The LCM of the smallest multiple of 4 and smallest multiple of 6 is:**

(a) 6 (b) 12

(c) 24 (d) 48

32. **What are the number of zeroes of $p(x)$ for the given graph?**



(a) 0 (b) 1

(c) 3 (d) 4

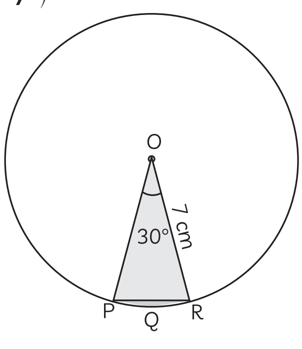
33. **How many number of solutions are there for the following pair of linear equations :**

$$x + 2y - 8 = 0,\ 2x + 4y = 16$$

(a) Unique (b) Infinite

(c) No solution (d) Two solution

34. **What is the area of the segment PQR, in the given figure, if the radius of the circle is 7 cm ? $\left(\text{use } \pi = \dfrac{22}{7}\right)$**



(a) $\dfrac{12}{7}\text{cm}^2$ (b) $\dfrac{11}{5}\text{cm}^2$

(c) $\dfrac{22}{7}\text{cm}^2$ (d) $\dfrac{7}{12}\text{cm}^2$

35. **The power of 2 in the prime factorization of 792 is:**

(a) 1 (b) 2

(c) 3 (d) 4

36. **Find the value of the $\alpha\beta^2 + \beta\alpha^2$, if α and β are the zeroes of polynomial $3x^2 + 4x + 2$.**

(a) $\dfrac{3}{7}$ (b) $\dfrac{1}{9}$

(c) $-\dfrac{8}{9}$ (d) $\dfrac{7}{8}$

37. **What is the value of 'a', if 2 is a zero of polynomial $p(x) = 4x^2 + 2x - 5a$?**

(a) 4 (b) 6

(c) – 1 (d) 0

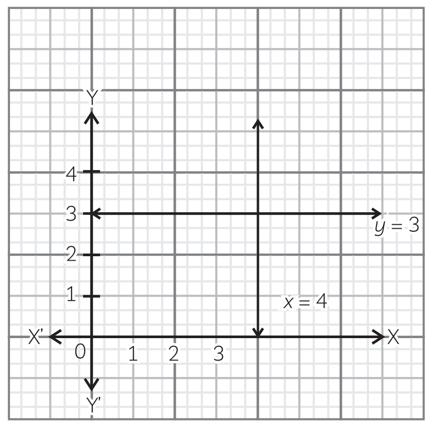
38. **Evaluate the radius of the circle, if the circumference of a circle exceeds its diameter by 30.**

(a) 11 cm (b) 21 cm

(c) 14 cm (d) 7 cm

39. *A city has two main roads which cross each other at the centre of the city. These two roads are along North-South direction and East-West direction. These two roads represent the pair of linear equations.*

Let the pair of linear equations represented by the roads is given by x = 4 and y = 3.



Point of intersection of the pair of linear equations $x = 4$ and $y = 3$ is

(a) (4, 0) (b) (3, 4)

(c) (4, 3) (d) (3, 3)

40. **An uniform path runs around a circular park. The difference between the outer and inner circumference of the circular path is 132 m. Its width is:**

(a) 7 m (b) 21 m

(c) 42 m (d) 32 m

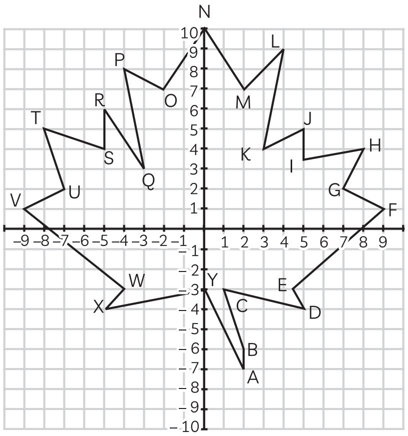
SECTION - C **8 marks**

(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:

Shyla is a very talented lady. She is always interested in doing something creative in her free time after the household work. She embroidered a leaf by knitting on her tabble cloth. Her son trace the design on a coordinate plane as shown below.



41. **Find the ratio in which C divides the line joining W and E.**

(a) 5 : 4 (b) 5 : 3
(c) 2 : 5 (d) 1 : 1

42. **What is the ratio in which x-axis divides the line joining the points P and D?**

(a) 1 : 1 (b) 4 : 5
(c) 2 : 1 (d) 8 : 3

43. **What is the ratio in which y-axis divides the line joining the points L and U?**

(a) 1 : 4 (b) 7 : 9
(c) 4 : 7 (d) 9 : 2

44. **What is the distance of point K from the origin?**

(a) 3 units (b) 5 units
(c) 7 units (d) 10 units

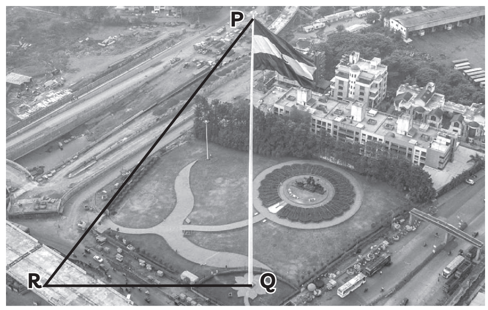
45. **From the given points the mid-point of which doesn't lie on y-axis?**

(a) P and L (b) U and G
(c) Q and K (d) None of these

Q 46 to Q 50 Based on Case Study–2:

Case Study–2:

Located in Nigdi, the Bhakti Shakti flag was set up by the Pimpri Chinchwad Municipal Corporation (PCMC) in 2018. The approximately 105 metre high flagpole weighs 42 tonnes and the flag is made up of knitted polyester and the flag itself weighs 90 kg and can sustain winds up to 25 km per hour. The height of the flag is shown in the picture as PQ and the distance between the foot of the flagpole Q and a point R on the ground is 208 m.



46. **The value of cos R is:**

(a) $\frac{105}{233}$ (b) $\frac{105}{208}$
(c) $\frac{208}{105}$ (d) $\frac{208}{233}$

47. **The value of sin P is:**

(a) $\frac{208}{233}$ (b) $\frac{105}{208}$
(c) $\frac{208}{105}$ (d) $\frac{105}{233}$

48. **The value of cosec R is:**

(a) $\frac{208}{233}$ (b) $\frac{233}{105}$
(c) $\frac{208}{105}$ (d) $\frac{105}{233}$

49. **The value of $\tan^2 P - \sec^2 P$ is:**

(a) 0 (b) 1
(c) –1 (d) 2

50. **tan P – cot R is:**

(a) 1 (b) 0
(c) –1 (d) 2

SOLUTION

SAMPLE PAPER - 10

SECTION - A

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

Explanation: Given, $2x^2 - 8x - m$

Its one zero is $\frac{5}{2}$

Let the other zero be β.

$$\therefore \quad \frac{5}{2} + \beta = \frac{-(-8)}{2} = 4$$

$$\Rightarrow \quad \beta = 4 - \frac{5}{2} = \frac{3}{2}$$

2. (a) 14, 7

Here, AB = CD

$\therefore \quad 3x - y = 2x + y$ ...(i)

$\Rightarrow 3x - y + 2x - 3 + 2x + y + 2x - 3 = 120$

$\Rightarrow \quad 9x = 120 + 6$

$\Rightarrow \quad x = \frac{126}{9} = 14$

Put the value of x in (i), we get

$14 - 2y = 0$

$\Rightarrow \quad y = 7$

3. (c) $\frac{1}{6}$

Here, total outcomes at A = 6

Favourable outcomes = 4 *i.e.* 1

$\therefore$ P (getting number 4 in column A) = $\frac{1}{6}$

4. (c) 4.5 cm

Explanation : In ΔABC,

$\angle ADE = \angle ABC$

$\therefore$ By converse of corresponding angle axiom

DE || BC

$\therefore$ Using basic proportionality theorem in ΔABC

$$\frac{AD}{DB} = \frac{AE}{CE}$$

$$\Rightarrow \quad \frac{2}{3} = \frac{3}{CE} \Rightarrow CE = \frac{9}{2} = 4.5 \text{ cm}$$

5. (c) 5 units

Explanation: Radius of circle = Distance between origin O and the point P.

$$= \sqrt{(5-0)^2 + (0-0)^2} = 5 \text{ units}$$

6. (c) terminate after 2 decimal places

Explanation: We know that a rational number $x = \frac{p}{q}$ has a decimal expansion which terminates if the prime factorization of q is of the form $2^n 5^m$, where n, m are non-negative integers.

$$\text{Here} \quad \frac{129}{60} = \frac{3 \times 43}{2^2 \times 3 \times 5} = \frac{43}{2^2 \times 5}$$

$$= \frac{43 \times 5}{2^2 \times 5^2} = \frac{43 \times 5}{10^2}$$

$$= \frac{215}{100} = 2.15$$

Therefore, the decimal representation of the number $\frac{129}{60}$ will terminate after 2 decimal places.

7. (c) $\frac{3}{5}$

Explanation: Here, total outcomes i.e. no. of letters in word = 5

Favourable cases i.e. getting 'R' = 3

$\therefore$ P (drawing letter R) = $\frac{3}{5}$

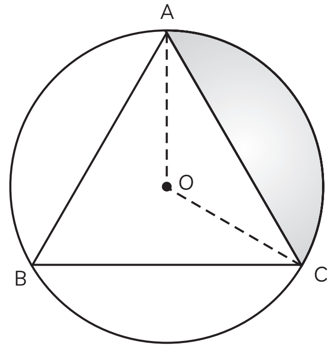
8. (a) $\frac{4}{3}(4\pi - 3\sqrt{3})\,cm^2$

Explanation: We have, R = 4 cm

$\therefore$ AB = BC = CA = $R\sqrt{3} = 4\sqrt{3}$ cm

$$\left[\because R = \frac{2}{3}b \text{ and } b = \frac{\sqrt{3}}{2}a; \therefore R = \frac{a}{\sqrt{3}}\right]$$

$\therefore$ Required area = $\frac{1}{3}$ (Area of the circle – Area of ΔABC)



$\therefore$ Required area $= \frac{1}{3}\left\{\pi R^2 - \frac{\sqrt{3}}{4} \times (\text{Side})^2\right\}$

$= \frac{1}{3}\left\{16\pi - \frac{\sqrt{3}}{4} \times (4\sqrt{3})^2\right\}$

$= \frac{1}{3}(16\pi - 12\sqrt{3})$

$= \frac{4}{3}(4\pi - 3\sqrt{3})\text{cm}^2$

9. *(a) –2, –5*

Explanation : Let

$p(x) = 2x^2 + 14x + 20$

$= 2(x^2 + 7x + 10)$

$= 2(x^2 + 5x + 2x + 10)$

[by splitting the middle term]

$= 2[x(x + 5) + 2(x + 5)]$

$= 2(x + 2)(x + 5)$

To determine the zeroes, put $p(x) = 0$

$\Rightarrow \quad 2(x + 2)(x + 5) = 0$

$\therefore \quad x = -2$ and $x = -5$

Hence, the pair of zeroes of given polynomial is –2 and –5.

10. *(c) congruent*

Explanation : If the areas of two similar triangles are equal, than their corresponding sides are equal.

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

But $ar(\Delta ABC) = ar(\Delta PQR)$

$AB = PQ, BC = QR, AC = PR$

11. *(c) $-x^2 + 2x + 35$*

Explanation: Clearly, other zero $= -\frac{35}{7} = -5$

Thus, the zeroes are 7 and –5.

Hence, the required polynomial is given by

$k(x - 7)(x + 5)$

i.e., $k(x^2 + 5x - 7x - 35)$

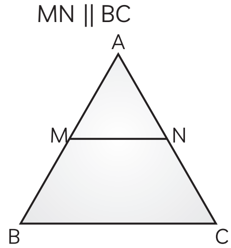
i.e., $k(x^2 - 2x - 35)$

Since, the shape of gate is always in the shape of downward parabola, therefore coefficient of x^2 should be negative.

So, putting $k = -1$, we get the required polynomial as $-x^2 + 2x + 35$.

12. *(b) 1 : 9*

Here, $MN \parallel BC$



$\therefore \quad \Delta AMN \sim \Delta ABC$

$\therefore \quad \frac{ar(\Delta AMN)}{ar(\Delta ABC)} = \frac{AM^2}{AB^2}$

$\therefore \quad \frac{AM}{MB + AM} = \frac{1}{1+2} = \frac{1}{3}$

But, $\frac{AM}{MB} = \frac{1}{2}$

$\therefore \quad \frac{ar(\Delta AMN)}{ar(\Delta ABC)} = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$

13. *(c) P*

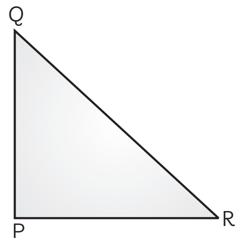
Explanation:

$\because \quad (25)^2 = (24)^2 + (7)^2$

$\Rightarrow \quad (QR)^2 = (RP)^2 + (PQ)^2$

$\Rightarrow \quad \angle P$ is a right angle

[by converse of pythagoras theorem]



[Angle opposite to hypotenuse is a right angle]

14. *(c) 0.69*

Explanation: Total number of envelopes in the box = 1000

Number of envelopes containing cash prize

$= 10 + 100 + 200 = 310$

Number of envelopes containing no cash prize

$= 1000 - 310 = 690$

$\therefore$ Required probability $= \frac{690}{1000} = 0.69$

15. *(b) Infinite solution*

16. *(d) $\Delta PQR \sim \Delta XZY$*

Explanation: $\frac{PQ}{XZ} = \frac{PR}{XY} = \frac{QR}{YZ}$

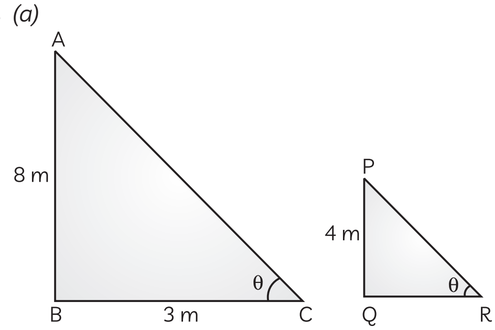
$\Rightarrow \quad \Delta PQR \sim \Delta XZY$

17. *(a) $\sqrt{2}$*

Explanation: The smallest number will be $\sqrt{2}$.

Because, $\sqrt{8} \times \sqrt{2} = \sqrt{16} = 4$, which is rational.

18. *(a)*



Let, AB be a longer tree and it's shadow is BC.
PQ be a smaller tree and it's shadow is QR.

Now, $\Delta ABC \sim \Delta PQR$

$\therefore \quad \frac{AB}{PQ} = \frac{BC}{QR}$

$\Rightarrow \quad \frac{8}{4} = \frac{3}{QR}$

$\Rightarrow \quad QR = \frac{8}{4} \times 3 = 6\text{m}$

19. *(d) 26 units*

Explanation: The given points are A(–6, 7) and B(–1, –5).

$\therefore$ AB = $\sqrt{(-6-(-1))^2 + (7-(-5))^2}$

$= \sqrt{(-5)^2 + (12)^2} = \sqrt{169} = 13$

$\therefore$ 2AB = 2 × 13 = 26 units

20. *(c) 2*

Explanation: Since, 3 is the least prime factor of *a*.

$\therefore$ *a* is an odd number.

Again, 7 is the least prime factor of *b*.

$\therefore$ *b* is also an odd number.

$\therefore$ (*a* + *b*) is an even number, because sum of two odds is even.

Hence, least factor of (*a* + *b*) is 2.

SECTION - B

21. *(c) 4.5 cm*

Explanation : In ΔABC,

$\angle ADE = \angle ABC$

$\therefore$ By converse of corresponding angle axiom

DE || BC

$\therefore$ Using basic proportionality theorem in ΔABC

$\frac{AD}{DB} = \frac{AE}{CE}$

$\Rightarrow \quad \frac{2}{3} = \frac{3}{CE} \Rightarrow CE = \frac{9}{2} = 4.5 \text{ cm}$

22. *(b) n*

Explanation: A polynomial of degree *n* can have at most *n* zeroes.

23. *(a) 6*

Explanation: The product of three consecutive numbers *n*, *n* + 1 and *n* + 2 is divisible by 2 and 3. Therefore, it be divisible by 6.

24. *(a) x – 3y = 0*

Explanation: Digit at ten's place be *x* and digit at one's place be *y*.

$\therefore$ As per condition,

$x = 3y$

$\Rightarrow \quad x - 3y = 0$

25. *(b) 55*

Explanation: For finding the number of pens and pencils to be packed, find the HCF of 55 and 110.

$\because \quad 55 = 11 \times 5$

and $\quad 110 = 11 \times 5 \times 2$

$\therefore \quad \text{HCF} = 11 \times 5 = 55$

Hence, 55 pens or pencils will be packed in each packet.

26. *(b) k = 16*

Explanation: We have

$8x + 5y - 9 = 0$

and, $\quad kx + 10y - 18 = 0$

For infinitely many solutions, we have

$\frac{8}{k} = \frac{5}{10} = \frac{-9}{-18}$

$\Rightarrow \quad \frac{8}{k} = \frac{1}{2} \Rightarrow k = 16$

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

Explanation: Given, $\sin\theta = \cos\theta$

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

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

$\Rightarrow \quad \theta = 45°$

$\therefore 2\tan^2\theta + \cos^2\theta - 2 = 2\tan^2 45° + \cos^2 45° - 2$

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

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

$= \frac{1}{2}$

28. *(c)* $\frac{9}{20}$

Explanation: Total number of cards is a deck = 52

Number of face cards = 12

$\therefore$ Number of cards left in the deck = 52 – 12
= 40

$\therefore$ Total number of possible outcomes = 40

Number of black cards and ace in the remaining deck

= 20 + 2 = 22

$\therefore$ Number of favourable outcomes

= 40 – 22 = 18

$\therefore$ P(neither a black card nor an ace)

$= \frac{18}{40} = \frac{9}{20}$

29. *(b) 0.4*

$P(E) + P(\bar{E}) = 1$

$\Rightarrow \quad 0.6 + P(E) = 1$

$\Rightarrow \quad P(E) = 1 - 0.6 = 0.4$

30. *(d) 4 : 1*

Explanation : Since, ΔABC and ΔBDE are two equilateral triangles.

$\therefore \quad \Delta ABC \sim \Delta EBD$ [By AA similarity criterion]

$$\Rightarrow \quad \frac{ar(\Delta ABC)}{ar(\Delta EBD)} = \frac{BC^2}{BD^2} = \frac{x^2}{\frac{x^2}{4}} = \frac{4}{1}$$

31. *(b) 12*

Explanation: The smallest multiple of 4 is 4 and the smallest multiple of 6 is 6.

To find LCM (4, 6), we will first find their prime factors.

$\because \quad 4 = 2^2; 6 = 2^1 \times 3^1$

Therefore, $\quad LCM = 2^2 \times 3 = 12$

32. *(d) 4*

Explanation: Graph of $y = p(x)$ intersects the x-axis at four points. So, the number of zeroes for the given graph is 4.

33. *(b) Infinite*

Explanation: Here, equations are

$x + 2y - 8 = 0,\ 2x + 4y - 16 = 0$

$$\frac{a_1}{a_2} = \frac{1}{2},$$

$$\frac{b_1}{b_2} = \frac{2}{4} = \frac{1}{2}; \text{ and}$$

$$\frac{c_1}{c_2} = \frac{-8}{-16} = \frac{1}{2}$$

Since, $\quad \dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

$\therefore$ The given pair of linear equations has infinitely many solutions.

34. *(d)* $\dfrac{7}{12}cm^2$

Explanation: Area of the segment PQR

Area to sector OPQRO – Area of ΔOPR

$$= \frac{\theta}{360°} \times \pi r^2 - \frac{1}{2} r^2 \sin\theta$$

$$= \frac{30°}{360°} \times \frac{22}{7} \times (7)^2 - \frac{1}{2} \times (7)^2 \times \sin 30°$$

$$= \frac{1}{12} \times 22 \times 7 - \frac{49}{4} = \frac{77}{6} - \frac{49}{4}$$

$$= \frac{154 - 147}{12} = \frac{7}{12} cm^2$$

35. *(c) 3*

Explanation: The prime factors of $792 = 2 \times 2 \times 2 \times 3 \times 3 \times 11 = 2^3 \times 3^2 \times 11$

Therefore, the power of 2 in the prime factorization of 792 is 3.

36. *(c)* $\dfrac{-8}{9}$

Explanation : Let $\quad p(x) = 3x^2 + 4x + 2$

So, sum of zeroes, $\alpha + \beta = -\dfrac{4}{3}$

and product of zeroes, $\alpha\beta = \dfrac{2}{3}$

$$\text{Now, } \alpha\beta^2 + \beta\alpha^2 = \alpha\beta(\beta + \alpha) = \frac{2}{3} \times \left(-\frac{4}{3}\right) = \frac{-8}{9}$$

37. *(a) 4*

Explanation: Given, polynomial is

$$p(x) = 4x^2 + 2x - 5a$$

Since, 2 is a zero of the polynomial

$\therefore \quad p(2) = 0$

$\Rightarrow \quad 4(2)^2 + 2(2) - 5a = 0 \qquad$ [putting $x = 2$]

$\Rightarrow \quad 16 + 4 - 5a = 0$

$\Rightarrow \quad 5a - 20 = 0$

$\Rightarrow \quad a = \dfrac{20}{5} = 4$

38. *(d) 7 cm*

Explanation: Let C be the circumference and r be the radius of the circle.

Then, $\quad C = 2r + 30$

$\Rightarrow \quad 2\pi r = 2r + 30$

$\Rightarrow \quad 2r(\pi - 1) = 30$

$\Rightarrow \quad 2r\left(\dfrac{22}{7} - 1\right) = 30$

$\Rightarrow \quad 2r\left(\dfrac{15}{7}\right) = 30$

$\Rightarrow \quad r = 7$ cm

39. *(c) (4, 3)*

Explanation: We have,

$$x = 4 \text{ and } y = 3$$

$\therefore$ Point of intersection is (4, 3).

40. *(b) 21 m*

Explanation: Let the inner radius of the circular path be r and its outer radius be R.

$2\pi R - 2\pi r = 132 \qquad$ (Given)

$\Rightarrow \quad 2\pi(R - r) = 132$

$\Rightarrow \quad R - r = \dfrac{132}{2\pi} = 21$

$\therefore$ Width of the path = 21 m

SECTION - C

41. *(b) 5 : 3*

Explanation: Clearly, the coordinates of W, C and E are (–4, –3), (1, –3) and (4, –3), respectively.

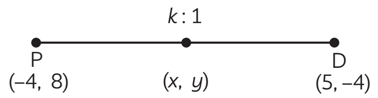
Since, WC = 5 units and CE = 3 units

$\therefore$ C divides the line joining W and E in the ratio 5 : 3.

42. *(c) 2 : 1*

Explanation: Clearly, the coordinates of P and D are (–4, 8) and (5, –4) respectively.

Let the x-axis divides the join of P and D at point (x, y) in the ratio of $k : 1$.



Then, $$y = \frac{-4k+8}{k+1}$$

But (x, y) lies on x-axis, therefore $y = 0$

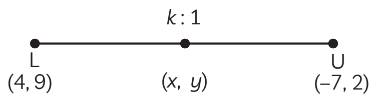
$\Rightarrow -4k + 8 = 0 \Rightarrow 4k = 8 \Rightarrow k = 2$

Thus, the required ratio is 2 : 1.

43. *(c) 4 : 7*

Explanation: Clearly, the coordinates of L and U are (4, 9) and (–7, 2) respectively.

Let the y-axis divides the join of L and U at the point (x, y) in the ratio $k : 1$.



Then, $$x = \frac{-7k+4}{k+1}$$

But (x, y) lies on y-axis, therefore $x = 0$

$$\Rightarrow \quad \frac{-7k+4}{k+1} = 0$$

$$\Rightarrow \quad 7k = 4$$

$$\Rightarrow \quad k = \frac{4}{7}$$

Thus, the required ratio is 4 : 7.

44. *(b) 5 units*

Explanation: Coordinates of K are (3, 4), therefore its distance from origin

$$= \sqrt{3^2 + 4^2} = \sqrt{9+16} = \sqrt{25} = 5 \text{ units}$$

45. *(d) None of these*

Explanation: Clearly the coordinates of U and G are (–7, 2) and (7, 2) respectively, therefore its mid-point is (0, 2), which lies on y-axis.

Also, the coordinates of P and L are (–4, 8) and (4, 9) respectively, therefore its mid-point is $\left(0, \frac{17}{2}\right)$, which also lies on y-axis.

And, the coordinates of Q and K are (–3, 3) and (3, 4) respectively, therefore, its mid-point is $\left(0, \frac{7}{2}\right)$ which also lies on y-axis.

46. *(d)* $\frac{208}{233}$

Explanation: Applying Pythagoras theorem,

we get $PR^2 = PQ^2 + QR^2 = 105^2 + 208^2$

Simplifying we get,

$$PR^2 = 11025 + 43264 = 54289 \Rightarrow PR = 233 \text{ m.}$$

$$\therefore \cos R = \frac{\text{Base}}{\text{Hypotenuse}} = \frac{QR}{PR} = \frac{208}{233}$$

47. *(b)* $\frac{208}{233}$

Explanation: $$\sin P = \frac{\text{Perpendicular}}{\text{Hypotenuse}} = \frac{QR}{PR} = \frac{208}{233}$$

48. *(b)* $\frac{233}{105}$

Explanation: $$\text{cosec } R = \frac{\text{Hypotenuse}}{\text{Perpendicular}} = \frac{PR}{PQ} = \frac{233}{105}$$

49. *(c) –1*

Explanation: We know, $\sec^2\theta - \tan^2\theta = 1$

$\Rightarrow \quad \sec^2 P - \tan^2 P = 1$

or, $\quad -(\tan^2 P - \sec^2 P) = 1$

$\Rightarrow \quad \tan^2 P - \sec^2 P = -1$

50. *(b) 0*

Explanation: $$\tan P = \frac{\text{Perpendicular}}{\text{Base}} = \frac{QR}{PQ} = \frac{208}{105}$$

and $$\cot R = \frac{\text{Base}}{\text{Perpendicular}} = \frac{QR}{PQ} = \frac{208}{105}$$

Therefore,

$$\tan P - \cot R = \frac{208}{105} - \frac{208}{105} = 0$$