10

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. **The ratio of HCF and LCM of numbers 28 and 32 is:**
(a) 4 : 27 (b) 1 : 56
(c) 56 : 1 (d) 27 : 4

2. **In a group of three friends, the probability of two friends not having the same birthday is 0.992. Then, what is the probability that the two friends have the same birthday?**
(a) 0.001 (b) 0.008
(c) 0.007 (d) 0.006

3. **What is the length of side AC in ΔABC, which is right angled at B if BC = 5 cm and $\angle BAC = 30°$?**
(a) 5 cm (b) 15 cm
(c) 10 cm (d) 7 cm

4. **Consider an isosceles right angled triangle ΔABC at C, then AB^2 = ... times AC^2.**
(a) 1 (b) 2
(c) 3 (d) 4

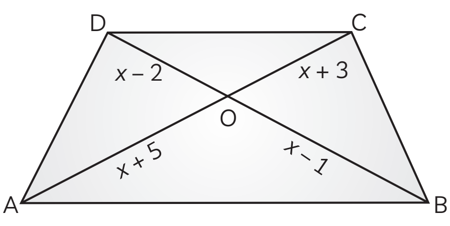
5. **If the zeroes of the polynomial $x^2 - 2kx + 2$ are equal in magnitude but opposite in sign, then the value of k is:**
(a) 0 (b) 1
(c) 2 (d) 3

6. **What is the distance of the point P(3, –4) from the origin?**
(a) 3 units (b) 4 units
(c) 5 units (d) 6 units

7. **Evaluate the approximate area covered by hour hand in 1 hour, where the length of hour hand of a clock is 7 cm.**
(a) 9 cm^2 (b) 11 cm^2
(c) 13 cm^2 (d) 15 cm^2

8. **Find the value of y, from the equations $x - y = 0.9$ and $\frac{11}{x+y} = 2$.**
(a) 1.2 (b) 2.1
(c) 3.2 (d) 2.3

9. **Evaluate for x, if, AB || DC in the given figure.**



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

10. **What is the area of a square inscribed in a circle having diameter p cm?**
(a) $\frac{p^2}{2}$ cm^2 (b) p^2 cm^2
(c) $\frac{\pi p^2}{2}$ cm^2 (d) πp^2 cm^2

11. The HCF of co-prime numbers 17 and 43 is:
(a) 7 (b) 6
(c) 1 (d) 3

12. In $\triangle ABC$, D and E are points on sides AB and AC respectively such that DE || BC. If AE = 1.8 cm, BD = 7.2 cm and CE = 5.4 cm, then the length of AD is:
(a) 3.6 cm (b) 2.8 cm
(c) 2.4 cm (d) 1.8 cm

13. If α and β are the zeroes of a polynomial $x^2 - 3x - 4$, then the polynomial whose zeroes are $(\alpha + \beta)$ and $\alpha\beta$ is :
(a) $x^2 - x + 12$ (b) $x^2 + x - 12$
(c) $x^2 - x - 12$ (d) $x^2 + x + 12$

14. What is the probability of getting a consonant, when a letter of English alphabet is chosen at random?
(a) $\frac{5}{26}$ (b) $\frac{21}{26}$
(c) $\frac{19}{26}$ (d) $\frac{17}{26}$

15. If AD is a median of $\triangle ABC$ with vertices A (5, –7), B (4, 7) and C (6, –5), then what are the coordinates of D?
(a) (5, 1) (b) (–1, 1)
(c) (–5, 1) (d) (1, 1)

16. Evaluate for what value of *k*, the system of equations $2x - y = 5$ and $6x + ky = 15$ has infinitely many solutions.
(a) 8 (b) –3
(c) 3 (d) 6

17. 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 insufficient

18. Given two triangles ABC and DEF such that $\triangle ABC \sim \triangle DEF$. Also, ar($\triangle$ABC) = 25 cm^2, ar ($\triangle$DEF) = 64 cm^2 and AB = 5 cm. Then length of side DE is:
(a) 8 cm (b) 10 cm
(c) 4 cm (d) 12 cm

19. The product of $(3+\sqrt{3})$ and $(3-\sqrt{5})$ is:
(a) a rational number
(b) an irrational number
(c) a prime number
(d) a co-prime number

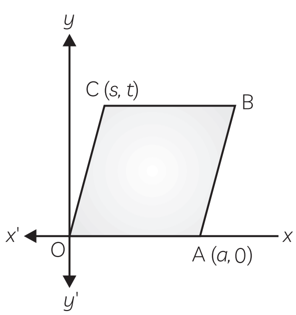
20. $0x^2 + 2x - 5$ is an example of a:
(a) cubic polynomial
(b) quadratic polynomial
(c) linear polynomial
(d) quadratic equation

SECTION - B **16 Marks**

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

21. A girl of height 90 cm is standing near a lamp-post. Now, she starts walking away from the base of a lamp post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, then what is the length of her shadow after 4 seconds?
(a) 1.6 m (b) 1.5 m
(c) 3 m (d) 2 m

22. In the figure, OABC is rhombus and O is the origin. If the coordinates of A and C are (a, 0) and (s, t), respectively, then the coordinates of B are:



(a) (*s*, *a* + *t*) (b) (*a*, *s* + *t*)
(c) (*a* + *s*, *t*) (d) (*s* + *t*, *a*)

23. If α and β are the zeroes of the polynomial $p(x) = x^2 - 5x + k$ and $\alpha - \beta = 1$, then the value of k is:
(a) 7 (b) 6
(c) 5 (d) 4

24. 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 solutions
(c) No solution
(d) Data insufficient

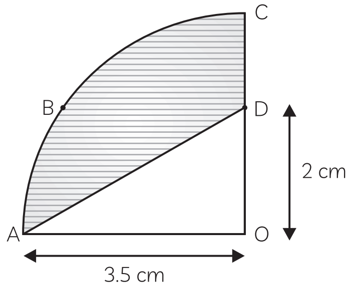
25. What is the probability of getting the sum of perfect square, in a single throw of a pair of dice?
(a) $\frac{1}{36}$ (b) $\frac{5}{36}$
(c) $\frac{7}{36}$ (d) $\frac{11}{36}$

26. Evaluate sin θ. cos θ, if sin θ + cos θ = $\sqrt{2}$.

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

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

27. The area of shaded region in the given figure is:



(a) 6.125 cm^2 (b) 5.5 cm^2

(c) 2.625 cm^2 (d) 12.25 cm^2

28. Evaluate the least number which when divided by the numbers 18, 24, 30 and 42 leaves a remainder of 1.

(a) 4221 (b) 2521

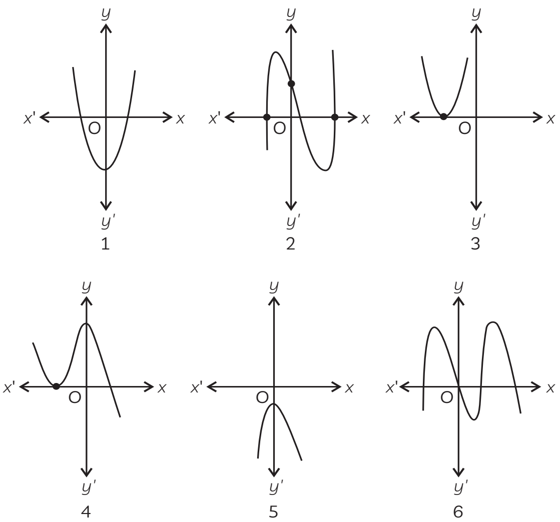
(c) 3862 (d) 1221

29. The decimal expansion of $\frac{17}{125}$ is:

(a) 0.017 (b) 0.136

(c) 0.68 (d) 4.25

30. *The graph of a polynomial function is a smooth continuous curve. By looking at graph, we can find the number of zeros of the polynomial. Graphs are the geometrical meaning of the polynomials. They help us to understand their type, nature of its zeroes and coefficients of its various terms.*



Which of the above graph represent quadratic polynomials?

(a) 1 and 3 (b) 1, 3 and 5

(c) Only 5 (d) Only 6

31. If $a + b + c = 0$ and A(a, b), B(b, c) and C(c, a) are vertices of ΔABC, then the coordinates of its centroid are:

(a) $\left(\frac{a+b+c}{2}, \frac{a+b+c}{2}\right)$

(b) $\left(\frac{a+b+c}{3}, \frac{a+b+c}{3}\right)$

(c) (1, 1)

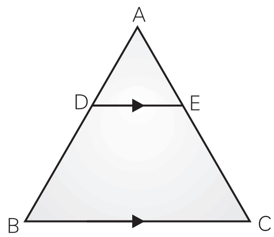
(d) (0, 0)

32. If a number is selected at random from the numbers 1 to 30, then the probability that it is a prime number, is:

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

(c) $\frac{1}{3}$ (d) $\frac{3}{4}$

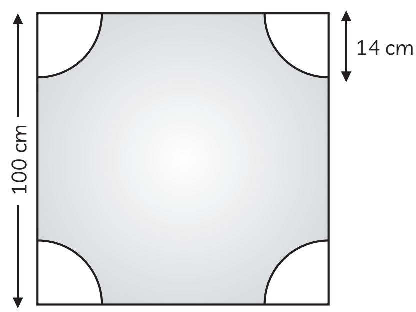
33. In the figure, DE || BC. If AD = 1 cm and BD = 2 cm, then the ratio of areas of ΔADE and ΔABC is:



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

(c) 2 : 3 (d) 1 : 9

34. Find the area of shaded region in the given figure in which the square is of side 100 cm and quadrant of radius 14 cm is formed at four corners.



(a) 9384 cm^2 (b) 8998 cm^2

(c) 9212 cm^2 (d) 9656 cm^2

35. Evaluate one of the common solution of $ax + by = c$ and y-axis?

(a) (0, b) (b) $\left(0, \frac{c}{b}\right)$

(c) $\left(0, \frac{a}{c}\right)$ (d) (0, 0)

36. The graphical representation of $x - 2y + 4 = 0$ and $x + 4y + 2 = 0$ will be:

(a) coincident lines
(b) parallel lines
(c) intersecting lines
(d) Data insufficient

37. Which of the following is an example of non-terminating decimal?

(a) $\frac{5}{8}$ (b) $\frac{9}{640}$
(c) $\frac{4}{45}$ (d) $\frac{1}{25}$

38. If $x = 2$ is a zero of polynomial $ax^2 - bx + 2$, then what is the relation between a and b?

(a) $2a - b + 1 = 0$ (b) $a + b + 1 = 0$
(c) $a - b + 1 = 0$ (d) $7a - 5b + 1 = 0$

39. $\Delta ABC \sim \Delta PQR$. If AB = 4 cm, BC = 3 cm, CA = 7 cm and PR = 2 cm, then the perimeter of ΔPQR is:

(a) 2 cm (b) 4 cm
(c) 14 cm (d) 7 cm

40. If the HCF of 408 and 1032 is expressible in the form $1032 \times 2 + 408 \times p$, then the value of p is:

(a) −10 (b) −15
(c) −5 (d) 10

SECTION - C

8 marks

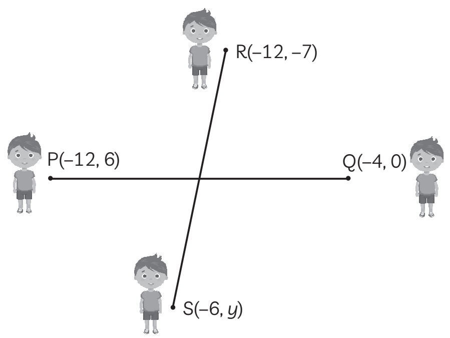
(Case Study Based Questions.)

(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:

Four friends visited a nearby park to play. They decided to play with the ball. So they get stood the four corners P, Q, R, S of the rectangulor park PQRS and started playing pass the ball.



41. If A is the mid-point of P and Q, then find the coordinates of A.

(a) (3, −8) (b) (2, −8)
(c) (−8, 2) (d) (−8, 3)

42. If $k : 1$ is the ratio in which point A divides the line RS, then the value of k is:

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

43. What are the coordinates of the point S?

(a) (−6, 9) (b) (−6, 8)
(c) (−6, 7) (d) (−6, 6)

44. Calculate the total distance between the points P and Q.

(a) 9 units (b) 10 units
(c) 8 units (d) 7 units

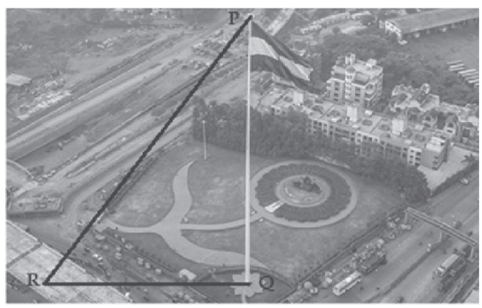
45. What is the distance between the points S and R?

(a) $2\sqrt{29}$ units (b) $3\sqrt{29}$ units
(c) $\sqrt{26}$ units (d) $2\sqrt{26}$ units

Q. 46-50 are 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

SECTION - A

1. *(b) 1 : 56*

Explanation: Since, $28 = 2^2 \times 7$ and $32 = 2^5$.

$\therefore$ HCF (28, 32) $= 2^2 = 4$

and LCM (28, 32) $= 2^5 \times 7 = 32 \times 7 = 224$

$\therefore$ HCF : LCM = 4 : 224 = 1 : 56

2. *(b) 0.008*

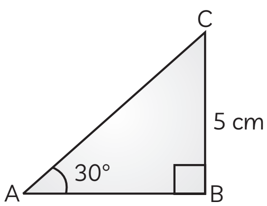
Explanation: We know, P(having same birthday) + P(not having the same birthday) = 1

$\Rightarrow$ P(having same birthday) + 0.992 = 1

$\Rightarrow$ P(having same birthday) = 1 – 0.992 = 0.008

3. *(c) 10 cm*

Explanation: We have, $\angle BAC = 30°$, *i.e.*, $\angle A = 30°$ and BC = 5 cm



Now,

$$\sin A = \frac{BC}{AC}$$

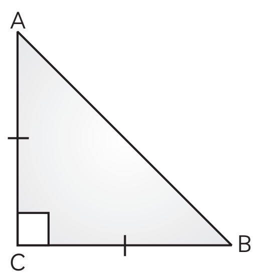
$$\Rightarrow \sin 30° = \frac{5}{AC}$$

$$\Rightarrow \frac{5}{AC} = \frac{1}{2} \qquad \left[\because \sin 30° = \frac{1}{2}\right]$$

$$\Rightarrow AC = 2 \times 5 = 10 \text{ cm}$$

4. *(b) 2*

Explanation: Here, AC = BC



$\therefore$ Using Pythagoras theorem,

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

5. *(a) 0*

Explanation: Let one zero of the given polynomial be α.

Then, other zero = $-\alpha$

We know, sum of zeroes $= \dfrac{\text{Coefficient of } x}{\text{Coefficient of } x^2}$

$$\Rightarrow \alpha + (-\alpha) = -\frac{(-2k)}{1}$$

$$\Rightarrow 0 = 2k$$

$$\Rightarrow k = 0$$

6. *(c) 5 units*

Explanation: Coordinates of origin are (0, 0).

$$\therefore \text{Distance} = \sqrt{(3-0)^2 + (-4-0)^2}$$

$$= \sqrt{9+16} = \sqrt{25} = 5 \text{ units}$$

7. *(c) 13 cm²*

Explanation: Angle described by hour hand in 1 hour $= \dfrac{360°}{12} = 30°$

$$\therefore \text{Area swept} = \frac{\theta}{360°} \times \pi r^2$$

$$= \frac{30°}{360°} \times \frac{22}{7} \times (7)^2 = 12.83 \text{ cm}^2$$

8. *(d) 2.3*

Explanation: We have

$$x - y = 0.9 \qquad \text{...(i)}$$

and $$\frac{11}{x+y} = 2$$

$$\therefore x + y = \frac{11}{2} \qquad \text{...(ii)}$$

$$\Rightarrow x + y = 5.5$$

Adding eq. (i) *and* (ii), we get

$$2x = 6.4$$

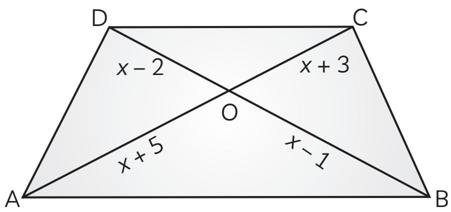
$$\Rightarrow x = 3.2$$

$$\therefore y = 55 - 3.2 = 2.3$$

9. *(b) 7*

Explanation: Here, AB || DC

$\therefore$ ABCD forms a trapezim



Also, $\Delta AOB \sim \Delta COD$ (AA similarity)

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

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

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

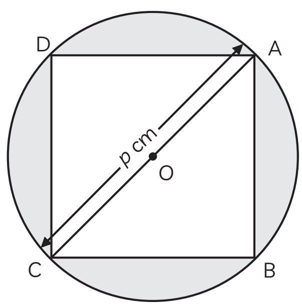
$$\Rightarrow \quad x^2 + 3x - 10 = x^2 + 2x - 3$$

$$\Rightarrow \quad x = 7$$

10. *(a)* $\frac{p^2}{2} cm^2$

Explanation: Diagonal of the square = Diameter of circle = p cm

$\therefore\ p^2 = AB^2 + BC^2 = side^2 + side^2$



$$\Rightarrow \quad p^2 = 2\ side^2$$

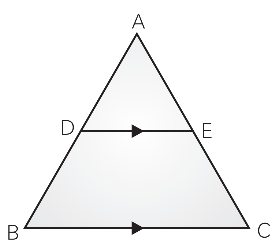
or $side^2 = \frac{p^2}{2}\ cm^2$ = Area of the square

11. *(c) 1*

Explanation: HCF of co-prime numbers is always one.

12. *(c) 2.4 cm*

Explanation:



$\because$ DE || BC

Using Thales theorem,

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

$$\Rightarrow \quad \frac{AD}{7.2} = \frac{1.8}{5.4} \Rightarrow \frac{AD}{7.2} = \frac{1}{3}$$

$$\Rightarrow \quad AD = \frac{7.2}{3} = 2.4$$

13. *(b)* $x^2 + x - 12$

Explanation: Let $p(x) = x^2 - 3x - 4$

since, α and β are the zeros at above polynomial

$$\therefore \quad \alpha + \beta = -\frac{(-3)}{1} = 3$$

and $$\alpha\beta = \frac{-4}{1} = -4$$

Let a and b be the zeroes of the required polynomial.

Then, $a = \alpha + \beta$ and $b = \alpha\beta$

$$\therefore \quad a + b = (\alpha + \beta) + (\alpha\beta)$$
$$= 3 + (-4) = -1$$

and $$ab = (\alpha + \beta) \times \alpha\beta$$
$$= 3 \times (-4) = -12$$

So, the required polynomial is

i.e. $$x^2 - (a + b)\,x + ab$$
$$x^2 + x - 12$$

14. *(b)* $\frac{21}{26}$

Explanation: We know that, in English alphabet, there are 26 letters (5 vowels + 21 consonants).

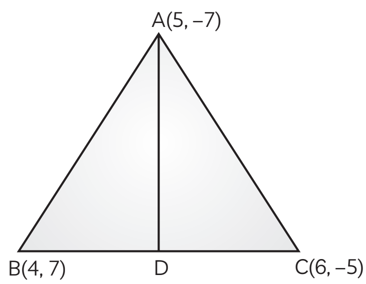
So, total number of outcomes = 26

and number of favourable outcomes = 21

Hence, required probability = $\frac{21}{26}$

15. *(a) (5, 1)*

Explanation: We know, median of a triangle bisects the base.



$\therefore$ D is the mid-point of BC.

$$\therefore \text{ Coordinates of D} = \left(\frac{4+6}{2}, \frac{7-5}{2}\right)$$
$$= (5, 1)$$

16. *(b) –3*

Explanation: Given system of equations is:

$$2x - y = 5 \text{ and } 6x + ky = 15$$

For infinitely many solutions, we have

$$\frac{2}{6} = -\frac{1}{k} = \frac{-5}{-15}$$

$$\Rightarrow \quad \frac{1}{3} = -\frac{1}{k}$$

$$\Rightarrow \quad k = -3$$

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

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

∴ According to question, we have

$$5x + 7y = 79$$

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

18. *(a) 8 cm*

Explanation: Since, ΔABC ~ ΔDEF

$$\therefore \quad \frac{ar(\Delta ABC)}{ar(\Delta DEF)} = \left(\frac{AB}{DE}\right)^2$$

$$\Rightarrow \quad \frac{25}{64} = \left(\frac{5}{DE}\right)^2$$

$$\Rightarrow \quad \frac{5}{8} = \frac{5}{DE}$$

[Taking square root both sides]

$$\Rightarrow \quad DE = 8$$

19. *(b) an irrational number*

Explanation: We have, $(3+\sqrt{3})(3-\sqrt{5})$

$= 9 - 3\sqrt{5}+3\sqrt{3}-\sqrt{15}$ which is an irrational number.

20. *(c) Linear polynomial*

Explanation: ∵ $0x^2 = 0$

∴ The polynomial is $2x = 5$, which highest power of variable x is 1.

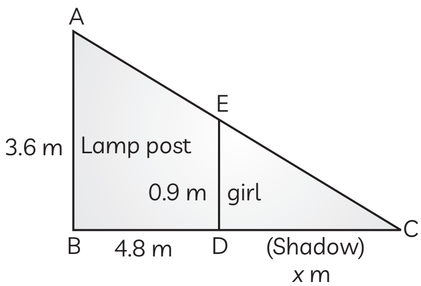
∴ It is a linear polynomial.

SECTION - B

21. *(a) 1.6 m*

Explanation: Speed of girl = 1.2 m/s

∴ In 4 seconds,



Distance travelled by her = 1.2 × 4 = 4.8 m

∵ After 4 seconds, she reaches at D.

$$\therefore \quad BD = 4.8 \text{ m}$$

Let CD = x m be the length of her shadow.

Now, $\angle ABD = \angle EDC = 90°$

$$\therefore \quad AB \parallel ED$$

$$\therefore \quad \angle ABC \sim \Delta EDC$$

$$\frac{AB}{ED} = \frac{BC}{DC}$$

$$\frac{3.6}{0.9} = \frac{4.8+x}{x}$$

$$\Rightarrow \quad 4x = 4.8 + x$$

$$\Rightarrow \quad x = 1.6 \text{ m}$$

22. *(c) (a + s, t)*

Explanation: Let the coordinates of B be (x, y).

Clearly, Perpendicular distance of C from x-axis = Perpendicular distance of B from x-axis

$$\Rightarrow \quad t = y$$

Also, Length of side OA = a

$$\therefore \quad BC = a \text{ units}$$

[∵ Sides of rhombus are equal in length]

$$\Rightarrow \quad \sqrt{(x-s)^2+(t-t)^2} = a$$

$$\Rightarrow \quad \sqrt{(x-s)^2} = a$$

$$\Rightarrow \quad x - s = a \Rightarrow x = s + a$$

$$\therefore \quad B = (x, y) = (s + a, t)$$

23. *(b) 6*

Explanation: We have,

$$\alpha + \beta = -\frac{(-5)}{1} = 5 \quad \text{...(i)}$$

and $$\alpha\beta = \frac{k}{1} = k \quad \text{...(ii)}$$

also, $$\alpha - \beta = 1 \quad \text{...(iii)}$$

[Given]

Solving equations (i) and (iii), we get

$$\alpha = 3, \beta = 2$$

From (ii), $$\alpha\beta = k$$

$$\Rightarrow \quad 3 \times 2 = k$$

$$\Rightarrow \quad k = 6$$

24. *(b) Infinite solutions*

25. *(c)* $\frac{7}{36}$

Explanation: Total number of outcomes = 36

Favourable outcomes are {(1, 3), (2, 2), (3, 1), (3, 6), (6, 3), (4, 5), (5, 4)}

$\therefore$ Required probability = $\frac{7}{36}$

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

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

Squaring both sides, we get :

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

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

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

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

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

27. *(a) 6.125 cm²*

Explanation: Area of shaded region = Area of quadrant OABC – Area of triangle OAD

$$= \frac{1}{4}\pi r^2 - \frac{1}{2} \times OA \times OD$$

$$= \frac{1}{4}\times\frac{22}{7}\times 3.5^2 - \frac{1}{2}\times 3.5\times 2$$

$$= 9.625 - 3.5$$

$$= 6.125 \text{ cm}^2$$

28. *(b) 2521*

Explanation:

We have, $18 = 2 \times 3^2$;

$24 = 2^3 \times 3$;

$30 = 2 \times 3 \times 5$

and $42 = 2 \times 3 \times 7$

LCM(18, 24, 30, 42) = $2^3 \times 3^2 \times 5 \times 7 = 2520$

So, required least number is 2520 + 1 = 2521

29. *(b) 0.136*

Explanation: We have,

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

30. *(b) 1, 3 and 5*

Explanation: Graph of quadratic polynomials are parabolic in shape.

31. *(d) (0, 0)*

Explanation:

$$\text{Centroid} = \left(\frac{a+b+c}{3}, \frac{b+c+a}{3}\right)$$

$$= (0, 0) \qquad [\because a + b + c = 0]$$

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

Explanation: Total number of outcomes = 30

Prime numbers from 1 to 30

= {2, 3, 5, 7, 11, 13, 17, 19, 23, 29}

$\Rightarrow$ Number of favourable outcomes = 10

$\therefore$ P(prime number) = $\frac{10}{30} = \frac{1}{3}$

33. *(d) 1 : 9*

Explanation: $\because$ DE || BC

$\therefore$ By AA similarity criterion,

$$\Delta ADE \sim \Delta ABC$$

$$\therefore \frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \left(\frac{AD}{AB}\right)^2 = \left(\frac{AE}{AC}\right)^2 = \left(\frac{DE}{BC}\right)^2$$

$$\Rightarrow \frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \left(\frac{AD}{AB}\right)^2$$

$$= \left(\frac{AD}{AD+BD}\right)^2 = \left(\frac{1}{1+2}\right)^2 = \frac{1}{9}$$

34. *(a) 9384 cm²*

Explanation: Radius of quadrant = 14 cm

$$\therefore \text{Area of quadrant} = \frac{90°}{360°} \times \pi \times (14)^2$$

$$= \frac{1}{4}\times\frac{22}{7}\times 14\times 14$$

$$= 154 \text{ cm}^2$$

$\therefore$ Area of four quadrants = 4(154) = 616 cm²

Area of square = $(100)^2$ = 10000 cm²

$\therefore$ Area of shaded region = Area of square – Area of four quadrants

= 10000 – 616

= 9384 cm²

35. *(b)* $\left(0, \frac{c}{b}\right)$

Explanation: On y-axis,

$$x = 0$$

$$\therefore \quad a \times 0 + by = c$$

$$\Rightarrow \quad y = \frac{c}{b}$$

36. *(c) intersecting lines*

Explanation:

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

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

$\therefore$ Given pair of lines represent intersecting lines.

37. *(c)* $\frac{4}{45}$

Explanation: The denominators of $\frac{5}{8}, \frac{9}{640}$ and $\frac{1}{25}$ are of the form 2^m5^n where m, n non-negative integers. So they are terminating decimals.

But in case of $\frac{4}{45}$,

$$\frac{4}{45} = \frac{4}{3^2 \times 5}$$

i.e., denominator is not of the form $2^m\,5^n$, so it is a non-terminating decimal.

38. *(a)* $2a - b + 1 = 0$

Explanation: Since, $x = 2$ is a zero of $ax^2 - bx + 2$

$\therefore \quad a(2)^2 - b(2) + 2 = 0$

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

$\Rightarrow \quad 2a - b + 1 = 0$

which is the required relation between a and b.

39. *(b)* 4 cm

Explanation: $\because \; \Delta ABC \sim \Delta PQR$

$$\therefore \quad \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$$

$$\Rightarrow \quad \frac{AB+BC+CA}{\text{Perimeter of } \Delta PQR} = \frac{AC}{PR}$$

$$\Rightarrow \quad \frac{4+3+7}{\text{Perimeter of } \Delta PQR} = \frac{7}{2}$$

$$\Rightarrow \quad \frac{14}{\text{Perimeter of } \Delta PQR} = \frac{7}{2}$$

$\Rightarrow \quad$ Perimeter of ΔPQR = 4 cm

40. *(c)* –5

Explanation: We have,

2	408	2	1032
2	204	2	516
2	102	2	258
3	51	3	129
17	17	43	43
	1		1

$$408 = 2^3 \times 3 \times 17$$
$$1032 = 2^3 \times 3 \times 43$$

$\therefore \quad \text{HCF}(408, 1032) = 2^3 \times 3 = 24$

$\therefore \quad 1032 \times 2 + 408 \times p = 24$

$\Rightarrow \quad 408 \times p = 24 - (1032 \times 2)$

$\quad = -2040$

$$\Rightarrow \quad p = \frac{-2040}{408} = -5$$

SECTION - C

41. *(d)* (–8, 3)

Explanation: Coordinates of points P and Q are (–12, 6) and (–4, 0), respectively.

$\because$ A is the mid-point of P and Q.

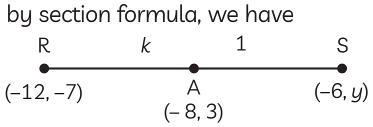
$$\therefore \text{ Coordinates of A} = \left(\frac{-12-4}{2}, \frac{6+0}{2}\right)$$

$$= \left(\frac{-16}{2}, \frac{6}{2}\right) = (-8, 3)$$

42. *(d)* 2

Explanation: From Q. 41, we have A = (–8, 3).

Now, by section formula, we have



$$(-8, 3) = \left(\frac{k(-6)+1(-12)}{k+1}, \frac{ky+1(-7)}{k+1}\right)$$

$$\Rightarrow \quad \frac{-6k-12}{k+1} = -8$$

$\Rightarrow \quad -6k - 12 = -8k - 8$

$\Rightarrow \quad 8k - 6k = -8 + 12$

$\Rightarrow \quad 2k = 4$

$\Rightarrow \quad k = 2$

43. *(b)* (–6, 8)

Explanation: From Q. 42, we have

$k = 2$

Also, $\quad \frac{ky-7}{k+1} = 3$

$\Rightarrow \quad 2y - 7 = 9$

$\Rightarrow \quad 2y = 16$

$\Rightarrow \quad y = 8$

Thus, the coordinates of point S are (–6, 8).

44. *(b)* 10 units

Explanation: We have, P(– 12, 6) and Q(– 4, 0) is,

$$\therefore \quad PQ = \sqrt{(-4+12)^2 + (0-6)^2}$$

$$= \sqrt{8^2 + 6^2} = \sqrt{64+36}$$

$$= \sqrt{100} = 10 \text{ units}$$

45. *(b)* $3\sqrt{29}$ *units*

Explanation: We have,

R (–12, –7) and S (–6, 8),

$$\therefore \quad RS = \sqrt{(-6+12)^2+(8+7)^2}$$

$$= \sqrt{6^2+15^2} = \sqrt{36+225}$$

$$= \sqrt{261} = \sqrt{9\times 29} = 3\sqrt{29} \text{ units}$$

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

Explanation: Applying Pythagoras theorem, we get

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

Simplifying, we get,

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

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

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

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

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

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