EDUTECH ACADEMY ®
NURTURING THE FUTURE...
— Classes 5 to 10 —

SET A

N 926

Seat No. | | | | | | | |

2025 XII 26 1100 – N 926 – MATHEMATICS (71) GEOMETRY – PART I (E)

(NEW COURSE)

Time : 2 Hours **(Pages 10)** **Max. Marks : 40**

--- MODEL ANSWER ---

Q.1 (A) Choose the correct alternative: **4**

(1) Ans. (d) $x - 4y - 14 = 0$; $5x - y - 13 = 0$

Substitute $x = 2$ and $y = -3$ in each of the equations to verify if L.H.S = R.H.S
If L.H.S. = R.H.S for both the equations then the pair of linear equations have $x = 2$ and $y = -3$ as solution.
Proceeding like

a)

$x + y = -1$ $2 + (-3) = -1$ $-1 = -1$ L.H.S = R.H.S	$2x - 3y = -5$ $2(2) - 3(-3) = -5$ $4 + 9 = -5$ $13 \neq -5$ L.H.S ≠ R.H.S

b)

$2x + 5y = -11$ $2(2) + 5(-3) = -1$ $4 - 15 = -11$ $-11 = -11$ L.H.S = R.H.S	$4x + 10y = 22$ $4(2) + 10(-3) = 22$ $8 - 30 = 22$ $-22 \neq 22$ L.H.S ≠ R.H.S

c)

$2x - y = -1$ $2(2) - (-3) = -1$ $4 + 3 = -1$ $7 \neq -1$ L.H.S ≠ R.H.S	$3x + 2y = 0$ $3(2) + 2(-3) = 0$ $6 - 6 = 0$ $0 = 0$ L.H.S = R.H.S

$x - 4y - 14 = 0$ $(2) - 4(-3) - 14 = 0$ $2 + 12 - 14 = 0$ $0 = 0$ L.H.S = R.H.S	$5x - y - 13 = 0$ $5(2) - (-3) - 13 = 0$ $10 + 3 - 13 = 0$ $0 = 0$ L.H.S = R.H.S

Thus, $x = 2$ and $y = -3$ is solution of equations $x - 4y - 14 = 0$; $5x - y - 13 = 0$

(2) Ans. (D) 1st July 2017

(3) Ans. (a)

The two roots of a quadratic equation $ax^2 + bx + c = 0$ are determined by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(4) Ans. (c)

On the X-axis, a mark '  ' is called krink mark. It is shown between the origin and the first class.

(B) Solve the following: **4**

(1) Ans. **Given: L = 30, N = 50, cf = 20, f = 10 and h = 50-30 = 20**

Median is given as,

$$\text{Median} = L + \left(\frac{\frac{N}{2} - cf}{f} \right) \times h$$

$$= 30 + \left(\frac{\frac{50}{2} - 20}{10} \right) (20)$$

$$= 30 + 0.5(20)$$

$$= 30 + 10 = 40$$

(2) Ans. Here $a = 1$, $t_1 = 1$ $t_2 = 8$, $t_3 = 15$

$t_2 - t_1 = 8 - 1 = 7$

$t_3 - t_2 = 15 - 8 = 7$

$\therefore d = 7$

(3) Ans. $m^2 - 11 = 0$

$m^2 - (\sqrt{11})2 = 0$

$(m - \sqrt{11})(m + \sqrt{11}) = 0$

$m - \sqrt{11} = 0$ or $m + \sqrt{11} = 0$

$m = \sqrt{11}$ or $m = -\sqrt{11}$

$\therefore \sqrt{11}$ and $-\sqrt{11}$ are roots of the equation $m^2 - 11$

(4) Ans. Sum invested = Number of shares x MV = 50 x 50 = Rs. 2500

Q.2 (A) Complete the following activities:(Any TWO) **4**

(1) Ans. Comparing $2x^2 + 6x - 5 = 0$ with $ax^2 + bx + c = 0$.

$\therefore a = 2$, $b = \boxed{6}$, $c = -5$

$\therefore \alpha + \beta = -\frac{b}{a} = -\frac{\boxed{6}}{2} = \boxed{-3}$

and $\alpha \times \beta = \frac{c}{a} = \frac{\boxed{-5}}{2}$

(2) Ans. $\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix} = 3 \times \boxed{5} - \boxed{2} \times 4 = \boxed{15} - 8 = \boxed{7}$

(3) Ans. Experiment is to throw a dice and a coin simultaneously

$S = \{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

$n(s) = 12$

Condition for event A → to get head or tail and an odd number

$A = \{H1, H3, H5\}$

$n(A) = 3$

Condition for event B → To get head or tail and an even number

$B = \{H2, H4, H6, T2, T4, T6\}$

$n(B) = 6$

Condition for event C → Number on upper face is greater than 7 and tail on the coin

$C = \{\ \}$

$n(c) = 0$

(B) Solve the following: (Any FOUR) **8**

(1) Ans.

Class	Class Mark (xi)	Frequency fi	xi fi
0-20	10	6	60
20-40	30	4	120
40-60	50	5	250
60-80	70	7	490
80-100	90	3	270
		25	1190

$$\text{Mean} = \frac{\sum x_i f_i}{\sum f_i}$$

$$= \frac{1190}{25}$$

$$= 47.6$$

(2) Ans. $= \frac{7}{3} \times \frac{1}{2} - \frac{5}{3} \times \frac{3}{2}$

$= \frac{7}{6} - \frac{15}{6}$

$= \frac{-8}{6}$

$= -\frac{4}{3}$

(3) Ans. 'S' is the sample space.

$S = \{1, 2, 3, 4, 5, 6\}$ $\therefore n(S) = 6$

(i) Event A : Prime number on the upper face.

$A = \{2, 3, 5\}$ $\therefore n(A) = 3$

$$P(A) = \frac{n(A)}{n(S)}$$

$$\therefore P(A) = \frac{3}{6} = \frac{1}{2}$$

(ii) Event B : Even number on the upper face.

$B = \{2, 4, 6\}$ $\therefore n(B) = 3$

$$P(B) = \frac{n(B)}{n(S)}$$

$$\therefore P(B) = \frac{3}{6} = \frac{1}{2}$$

(4) Ans.

Method I : Completing the square.	Method II : Factorisation
$x^2 + 8x - 48 = 0$	$x^2 + 8x - 48 = 0$
$\therefore x^2 + 8x + 16 - 16 - 48 = 0$	$\therefore x^2 + 12x - 4x - 48 = 0$
$\therefore (x + 4)^2 - 64 = 0$	$\therefore x(x + 12) - 4(x + 12) = 0$
$\therefore (x + 4)^2 = 64$	$\therefore (x + 12)(x - 4) = 0$
$\therefore x + 4 = 8$ or $x + 4 = -8$	$\therefore x + 12 = 0$ or $x - 4 = 0$
$\therefore x = 4$ or $x = -12$	$\therefore x = -12$ or $x = 4$

(5) Ans. **8 is the maximum frequency.**

So, modal class is 10 – 18.

$L = 10, f_1 = 8, f_0 = 3, f_2 = 5, h = 8$

Mode is given as,

$$\text{Mode} = L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$= 10 + \left(\frac{8 - 3}{2(8) - 3 - 5}\right)(8)$$

$$= 10 + 5 = 15$$

Q.3 (A) Complete the following activity:(Any ONE) **3**

(1) Ans.

Class (Temp. °C)	Class mark x_i	Frequency (No. of towns) f_i	Class mark × frequency $x_i f_i$
24–28	26	4	104
28–32	30	5	150
32–36	34	7	238
36–40	38	8	304
40–44	42	6	252
Total		$N = \sum f_i = 30$	$\sum x_i f_i = 1048$

$$\text{Mean} = \overline{X} = \frac{\sum x_i f_i}{\sum f_i} = \frac{1048}{30} = 34.9\ °C$$

(2) Ans. Company A : 200 shares, FV = Rs. 2 Premium = Rs. 18.
Company B : 45 shares, MV = Rs. 500
Company C : 1 share, MV = Rs. 10,540.
Company A: 200 shares FV = Rs. 2
Premium = Rs. 18
MV = FV + Premium
= Rs. 2 + 18
= Rs. 20
Sum invested = No. of shares x MV
= Rs. 200 x 20
= Rs. 4000 ……. (I)
Company B: 45 shares MV = Rs. 500
Sum invested = No. of shares MV = Rs. 500
Sum invested = No. of shares x MV
= Rs. 45 x 500
= Rs. 22500 ……(II)
Company C: 1 share, MV = Rs. 10540
Sum invested = No. of shares x MV
= 1 x Rs. 10540
= Rs. 10540 ……(III)
Adding (I), (II) and (III) to obtain total investment
Total investment = Rs. (4000 + 22500 + 10540)
= Rs. 37040

(B) Solve the following: (Any TWO) **6**

(1) Ans. 11 term, $t_{11} = 16$ and 21 term, $t_{21} = 29$

$\Rightarrow t_1 + (11 - 1)\,d = 16$

$a + 10d = 16 \quad (I)$

$\Rightarrow t_1 + (21 - 1)\,d = 29$

$a + 20d = 29 \quad (II)$

Subtracting (I) & (II)

$a + 10d = 16$

$a + 20d = 29$

$- \quad - \quad -$

$-10d = -13$

$$d = \frac{13}{10}$$

Place $d = \frac{13}{10}$ in equation (I) to obtain 'a'

$a + 10d = 16$

$$a + 10\left(\frac{13}{10}\right) = 16$$

$a + 13 = 16$

$a = 16 - 13$

$a = 3$

Therefore $a = 3$ and $d = \frac{13}{10}$

41th term $= t_{41} = t_1 + (41 - 1)d$

$= a + 40d$

$$= 3 + 40 \times \left(\frac{13}{10}\right)$$

$= 3 + 4(13)$

$= 3 + 52$

$= 55$

Thus, 41th term of A.P. is 55.

(2) Ans. $2x^2 - 2x + \frac{1}{2} = 0$

$\rightarrow 4x^2 - 4x + 1 = 0$

$\rightarrow 4x^2 - 2x - 2x + 1 = 0$

$\rightarrow 2x(2x - 1) - 1(2x - 1) = 0$

$\rightarrow (2x - 1)(2x - 1) = 0$

$\rightarrow (2x - 1) = 0$ or $2x - 1 = 0$

$$x = \frac{1}{2} \text{ or } x = \frac{1}{2}$$

$\therefore \frac{1}{2}$ and $\frac{1}{2}$ are the roots of the quadratic equation $2x^2 - 2x + \frac{1}{2} = 0$

(3) Ans. Experiment is 2-digits numbers are formed using 0, 1, 2, 3, 4, 5 without repetition of digit.

$S = \{10,12,13,14,15,20,21,23,24,25,30,31,33,35,40,41$
$42,43,45,50,51,52,53,54\}$

$n(S) = 25$

Condition for event A→ The number formed is even

$A = \{10,12,14,20,24,30,32,34,40,42,50,52,54\}$

$n(A) = 13$

Condition for event B → The number formed is divisible by 3

$B = \{12,15,21,30,24,42,45,51,54\}$

$n = (b) = 9$

Condition for event C → The number formed is greater than 50

$c = \{5,52,53,54\}$

$n(c) = 4$

(4) Ans. MV. of shares = Rs. 1000
Rate of brokerage = 0.1%
Amount received after sale = MV – brokerage
= Rs. 1000 – 0.1%
Amount received after sale = MV – brokerage
= Rs. 1000 – 0.1% of 1000
= Rs. 1000 – 1
= Rs. 999

Q.4 Solve the following: (Any TWO) **8**

(1) Ans. Saving in first month ₹ 200; Saving in second month ₹ 250; .....

200, 250, 300, . . . this is an A.P.

Here $a = 200$, $d = 50$, Let's find n using t_n formula and then find S_n.

$$t_n = a+(n-1)d$$
$$= 200 +(n-1)50$$
$$= 200 + 50n - 50$$
$$1000 = 150 + 50n$$
$$150 + 50n = 1000$$
$$50n = 1000 - 150$$
$$50n = 850$$
$$\therefore n = 17$$

In the 17th month he will save ₹ 1000.

Let's find that in 17 months how much total amount is saved.

$$S_n = \frac{n}{2}[2a+(n-1)d]$$
$$= \frac{17}{2}[2 \times 200+(17-1) \times 50]$$
$$= \frac{17}{2}[400 + 800]$$
$$= \frac{17}{2}[1200]$$
$$= 17 \times 600$$
$$= 10200$$

In 17 months total saving is ₹ 10200.

(2) Ans. Suppose the speed of the car starting from A = x km/hr and the speed of the car starting from B = y km/hr.
According to the first condition, x > y
Both cars move in the same direction and suppose they meet at C.
In 8 hrs, first car starting from A travels 8x km and another car starting from B travels 8y km.
By first condition,
$8x = 80 + 8y$
$\therefore 8x - 8y = 80$
$\therefore x - y = 10$ ----(i)
Now, if the cars move in opposite direction from A and B, then they meet after 1 hr and 20 minutes.

$1\text{ hr }20\text{ min} = 1 + \frac{20}{60} = \frac{4}{3}\text{ hrs}$

In $\frac{4}{3}$hrs, car starting from A travels $\frac{4}{3}x$ km and car starting from B travels $\frac{4}{3}y$ km.

$\therefore \quad \frac{4}{3}x + \frac{4}{3}y = 80$

$\therefore \quad x + y = 60 \qquad$ ----(ii)

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

$$\begin{array}{r} x - y = 10 \\ x + y = 60 \\ \hline 2x \quad = 70 \end{array}$$

$\therefore \quad x = 35$

Substituting the value of x in equation (ii), we get

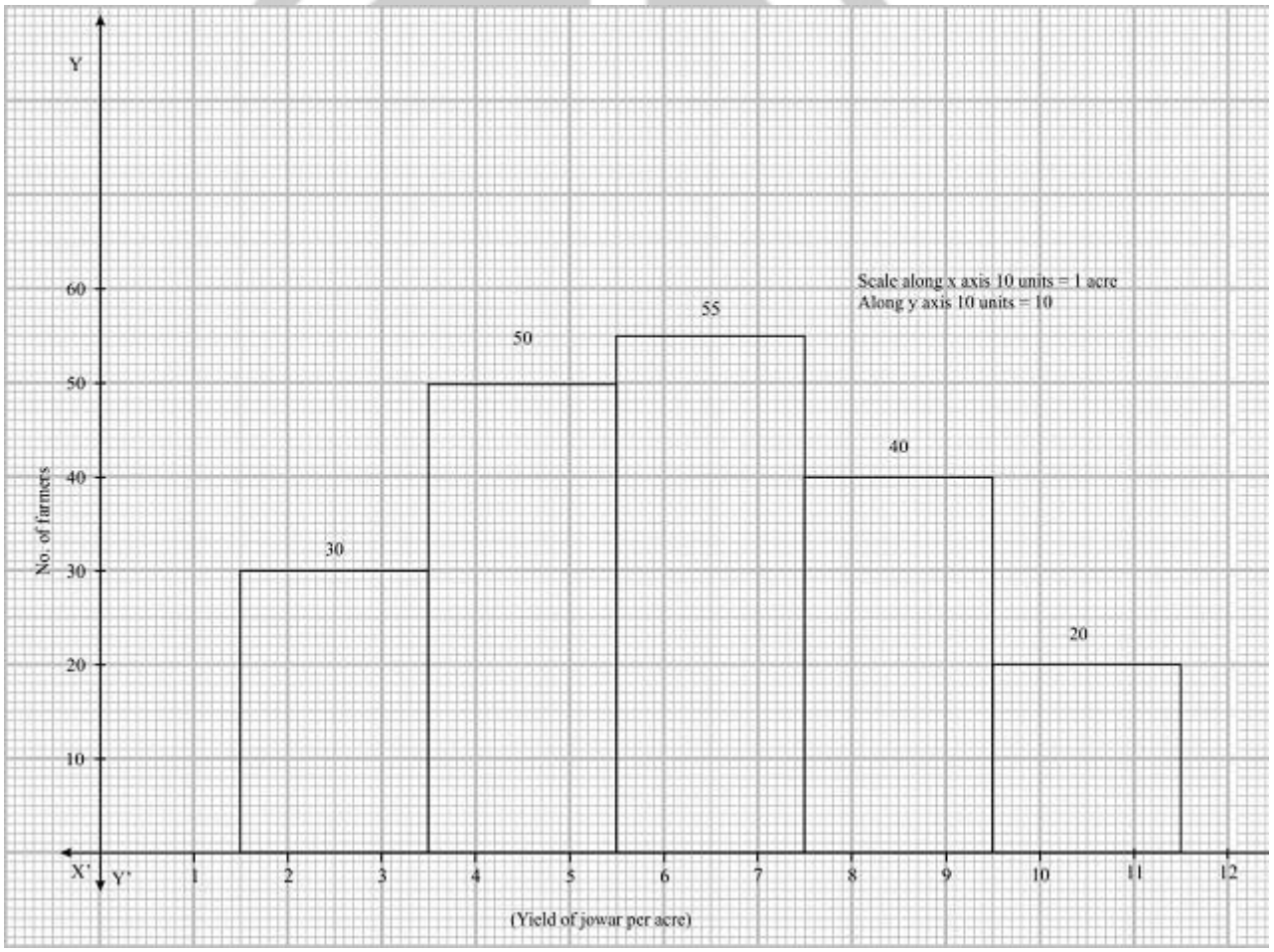
$35 + y = 60$

$y = 25$

$\therefore$ Speed of the car starting from A = 35 km/hr

Speed of the car starting from B = 25 km/hr

(3 Ans) .



Q.5 Solve the following: (Any ONE) **3**

(1) Ans. Let the length of the rectangular park = x m

Breadth = (x-3) m

Area of rectangular park = $x(x-3)\ m^2$

Area of isosceles triangular park = $\frac{1}{2}\times(x-3)\times 12m^2 = 6\ (x-3)\ m^2$

As per given, $x(x-3) - 6(x-3) = 4$

$x^2-3x-6x+18=4$

$x^2-9x+14=0$

$x^2-7x-2x+14=0$

$x(x-7)-2(x-7)=0$

$(x-7)(x-2)=0$

$x = 2$ or $7m$

Length = 7m

Breadth = x-3 = 7-3 = 4m

So, the breadth of the park = 4m and its length will be 7m.

(2) Ans. $\left(\sqrt{\frac{x}{y}}\right)=4$

Squaring both sides,

$\left(\sqrt{\frac{x}{y}}\right)^2=4^2$

$\frac{x}{y}=16$

$x=16y$

$x-16y=0$ ..(i)

$\frac{1}{x}+\frac{1}{y}=\frac{1}{xy}$

Multiplying both sides by x.y

$xy.\frac{1}{x}+x.y.\frac{1}{y}=x.y.\frac{1}{y}$

$y+x=1$

$\therefore x+y=1$ ...(ii)

Subracting equation (ii) from (i)

$x - 16y = 0$

$x + y = 1$

(-) (-) (-)

$/17y = /1$

put $y=\frac{1}{17}$ in equation (i)

$x-\frac{16}{17}=0$

$x=\frac{16}{17}$

$\therefore x=\frac{16}{17}$, $y=\frac{1}{17}$

....All The Best....