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

SET B

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. (B) 3

Place $x = 1$ in $4x + 5y = 19$

$4(1) + 5y = 19$

$4 + 5y = 19$

$5y = 19 - 4$

$5y = 15$

$y = \frac{15}{5}$

$y = 3$

(2) Ans. Total No's = 100

$n(s) = 100$

Assume Event A= getting a Prime number

$A = \{2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97\}$

$n(A) = 25$

$P(A) = \frac{n(A)}{n(S)} = \frac{25}{100} = \frac{1}{4}$

(C) is correct option

(3) Ans. (b)

3 Boys can be denoted as B_1, B_2, B_3.

3 Girls can be denoted as G_1, G_2, G_3.

Event A = Sample space to form committee of at most 1 boy.

$A = \{G_1G_2, G_1G_3, G_2G_3, B_1G_1, B_1G_2, B_1G_3, B_2G_1, B_2G_2, B_2G_3, B_3G_1, B_3G_2, B_3G_3\}$ $n(A) = 12$

(4) Ans. (a)

$\frac{D_x}{D} = D$

$\frac{66}{11} = 6$

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

(1) Ans. 0.6, 0.9, 1.2, 1.5, ...

First terms $t_1 = 0.6$

Common difference 'd' $= t_n - t_{n-1}$

$= t_2 - t_1$ (for n = 2)

$= 0.9 - 0.6$

$= 0.3$

$\therefore$ a = 0.6 and d=0.3 for A.P 0.6, 0.9, 1.2, 1.5, ...

(2) Ans. MV = FV + Premium = 100 + 65 = Rs. 165.

Market value is Rs. 165 per share.

(3) Ans. The given equations are

$17x + 15y = 11$ ... (1)

$15x + 17y = 21$ ....(2)

Now, lets subtract equation (2) from (1)

$17x + 15y = 11$

$15x + 17y = 21$

$- \quad - \quad -$

$2x - 2y = -10$

Dividing the equations by 2.

$x - y = 5$.

(4) Ans. S = {1, 2, 3, . . . 49, 50}, n(S) = 50

(i) Condition for event A : number is divisible by 6.

A = {6, 12, 18, 24, 30, 36, 42, 48} n(A) = 8

(ii) Condition for event B : the number on the card is a complete square.

B = {1, 4, 9, 16, 25, 36, 49} n(B) = 7

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

(1) Ans. The following table is prepared as per steps.

Class (Percentage of marks)	Class mark x_i	Frequency (No. of students) f_i	Class mark × frequency $x_i f_i$
0–20	10	3	30
20–40	30	7	210
40–60	50	15	750
60–80	70	20	1400
80–100	90	5	450
Total		$N = \sum f_i = 50$	$\sum x_i f_i = \boxed{2840}$

$$\overline{X} = \frac{\sum x_i f_i}{\sum f_i}$$

$$= \frac{\boxed{2840}}{50}$$

$$= \boxed{56.8}$$

$\therefore$ The mean of the percentage = 56.8

(2) Ans. First divide the equation by 2 so that coefficient of y^2 becomes 1.

$$\rightarrow \frac{2}{2}y^2 + \frac{9}{2}y + \boxed{\frac{10}{2}} = \frac{0}{2}$$

$$\rightarrow y^2 + \frac{9}{2}y + 5 = 0$$

To solve the quadratic equation $y^2 + \frac{9}{2}y + 5 = 0$ by method of completing square, add and subtract square of the half of coefficient of 'y'

Added/ Subtracted value $= \left(\frac{1}{2} \times \frac{9}{2}\right)^2$

$$= \boxed{\left(\frac{9}{2}\right)^2}$$

$$\therefore y^2 + \frac{9}{2}y + \left(\frac{9}{4}\right)^2 - \left(\frac{9}{4}\right)^2 + 5 = 0$$

$$\rightarrow y^2 + \boxed{2(y)}\left(\frac{9}{4}\right) + \left(\frac{9}{4}\right)^2 = -\left(\frac{9}{4}\right)^2 - 5$$

$$\rightarrow \left(y + \frac{9}{4}\right)^2 = \boxed{\frac{81}{16}} - 5$$

$$\rightarrow \left(y + \frac{9}{4}\right)^2 = \left(\frac{1}{4}\right)^2$$

Taking square roots

$$\rightarrow y + \frac{9}{4} = \frac{1}{4} \quad \text{or } y + \frac{9}{4} = -\frac{1}{4}$$

$$\rightarrow y = \frac{1}{4} - \frac{9}{4} \quad \text{or } y = -\frac{1}{4} - \frac{9}{4}$$

$$\rightarrow y = \frac{-8}{4} \quad \text{or } y = \frac{-10}{4}$$

$$\rightarrow y = -2 \quad \text{or } y = \frac{-5}{2}$$

$\therefore$ -2 and $\frac{-5}{2}$ are roots of the quadratic equation

(3) Ans. Let us assume mean method to find mean. Let a = 55

Income (Rs.)	x_i	No. of farmers (fi)	$u_i = x_i - a$	f_iu_i
20 – 30	25	10	-30	-300
30 – 40	35	11	-20	-200
40 – 50	45	15	-10	-100
50 – 60	55	16	0	0
60 – 70	65	18	10	180
70 - 80	75	14	20	280
		$\sum fi = 84$		$\sum_i u_i = \boxed{210}$

$$\therefore \text{Mean} = a + \frac{\Sigma fiui}{\Sigma fi}$$

$$= 55 + \left(\frac{-210}{84}\right)$$

$$= 55 - 2.5$$

$\bar{x} = 52.5$

∴ Mean income of farmers is Rs. 52.5 thousand or Rs. 52500

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

(1) Ans. Given digits : 2,3,4,7,9

Let S be the sample space

∴S={23,25,27,29,32,35,37,39,52,53,57,59,72,73,75,79,92,93,95,97}

∴n(S) = 20

Let Event A: The number formed is an odd number

∴A={23,25,27,29,35,37,39,53,57,59,73,75,79,93,95,97}

∴n(A)=16

P(A)=n(A)/n(S)

$$= \frac{16}{20}$$

$$P(A) = \frac{4}{5}$$

(2) Ans.

Year	First Year (2015)	Second Year (2016)	Third Year (2017)	...
Salary (₹)	[1,80,000]	[1,80,000 + 10,000]		...

$a = 1,80,000 \quad d = 10,000 \quad n = ? \quad t_n = 2,50,000$ ₹

$t_n = a+(n-1)d$

$2,50,000 = 1,80,000 + (n-1) \times 10,000$

$(n-1) \times 10000 = 70,000$

$(n-1) = 7$

$n = 8$

In the 8th year her annual salary will be ₹ 2,50,000.

(3) Ans. $2y^2+27y+13=0$

$\rightarrow 2y^2+26y+y+13=0$

$\rightarrow 2y(y+13)+1(y+13)=0$

$\rightarrow (y+13)(2y+1)=0$

$\rightarrow y+13=0$ or $2y+1=0$

$\rightarrow y=-13$ or $y=-\frac{1}{2}$

$\therefore$ -13 and $\frac{-1}{2}$ are the roots of the equation $2y^2+27y+13=0$

(4) Ans. GST paid at the time of purchase (Input tax)
= Rs. 1,00,500
GST paid at the time of sale (Output tax)
= Rs. 1,22,500
GST payable = Output tax – Input tax
= Rs. 1,22,500 – Rs. 1,00,500
= Rs. 22,000

(5) Ans. **Take the assumed mean A = 15.**

x	f	d = x - A	fd
5	4	-10	-40
10	5	-5	-25
15	7	0	0
20	4	5	20
25	3	10	30
30	2	15	30
Total	N = 25		Σfd = 15

Mean is given as,

$$\bar{X}=A+\frac{\sum fd}{N}$$

$$=15+\frac{15}{25}$$

$$=15.6$$

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

(1) Ans. Given equations are

$6x-4y=-12$

$8x-3y=-2$

$$D=\begin{vmatrix}6 & -4\\ 8 & -3\end{vmatrix}$$

$=6(-3)-8(-4)$

$=-18+32$

$=14$

$$D_x=\begin{vmatrix}-12 & -4\\ -2 & -3\end{vmatrix}$$

$=-12(-3)-(-2)(-4)$

$=\boxed{36}-8$

$=\boxed{28}$

$$D_y=\begin{vmatrix}6 & -12\\ 8 & -2\end{vmatrix}$$

$=6(-2)-8(-12)$

$=-12+96$

$=\boxed{84}$

$$x=\frac{D_x}{D}$$

$$=\frac{28}{14}$$

$=\boxed{2}$

and

$$y=\frac{D_y}{D}$$

$$=\boxed{\frac{84}{14}}$$

$=\boxed{6}$

(2) Ans. The given classes are not continuous. So, let us make them continuous and rewrite the table.

Class	Continuous classes	Frequency
1–3	0.5–3.5	$33 \rightarrow f_0$
4–6	3.5–6.5	$40 \rightarrow f_1$
7–9	6.5–9.5	$27 \rightarrow f_2$
10–12	9.5–12.5	18
13–15	12.5–15.5	12

From the above table, the modal class is $\boxed{3.5-6.5}$

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

$$\text{Mode} = 3.5 + \left[\frac{40-33}{2(40)-33-27}\right] \times h$$

$$= 3.5 + \left[\frac{7}{\boxed{80-60}}\right] \times \boxed{3}$$

$$= 3.5 + \boxed{\frac{21}{20}}$$

$$= 3.5 + \boxed{1.05}$$

$$= \boxed{4.55}$$

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

(1) Ans. Total number of students = 200 n(s) = 200
No. of student who like kabaddi = 135
No. of students who do not like kabaddi = 200 – 135
= 65
Probability that the student selected doesn't like

$$\text{Kabaddi} = \frac{65}{200}$$

$$= \frac{13}{40}$$

(2) Ans. Rate of GST = 5% ∴ Rate of CGST 2.5%, and Rate of SGST = 2.5%.

$$\text{CGST} = \frac{2.5}{100} \times 545 = 13.625 = ₹\ 13.63$$

∴ SGST = CGST = ₹ 13.63

Amount paid by the consumer = Taxable value + CGST + SGST
= 545 + 13.63 + 13.63
= 572.26

Arati Gas Agency has to pay CGST = ₹ 13.63. and SGST = ₹ 13.63

∴ Total GST to be paid = 13.63 × 2 = ₹ 27.26.

(3) Ans. $\rightarrow m^2 - 5m + 3 = 0$

$a = 1, b = -5, c = 3$

To solve quadratic equation $m^2 - 5m + 3 = 0$ by method of computing square add and subtract the square of half of coefficient of 'm'.

$\therefore$ Added/Subtracted value $= (\frac{5}{2})^2$

$\rightarrow m^2 - 5m + (\frac{5}{2})^2 - (\frac{5}{2})^2 + 3 = 0$

$\rightarrow m^2 - 2(m)\left(\frac{5}{2}\right) + (\frac{5}{2})^2 = (\frac{5}{2})^2 - 3$

$\rightarrow (m - \frac{5}{2})^2 = \frac{25}{4} - 3$

$\rightarrow (m - \frac{5}{2})^2 = \frac{13}{4}$

$\rightarrow (m - \frac{5}{2})^2 = (\frac{\sqrt{13}}{2})^2$

Taking square roots

$\rightarrow m - \frac{5}{2} = \frac{\sqrt{13}}{2}$ or $m - \frac{5}{2} = \frac{\sqrt{13}}{2}$

$\rightarrow m = \frac{\sqrt{13}}{2} + \frac{5}{2}$ or $m = \frac{5}{2} - \frac{\sqrt{13}}{2}$

$\rightarrow m = \frac{5+\sqrt{13}}{2}$ or $m = \frac{5-\sqrt{13}}{2}$

$\therefore \frac{5+\sqrt{13}}{2}$ and $\frac{5-\sqrt{13}}{2}$ are the roots of the quadratic equation $m^2 - 5m + 3 = 0$

(4) 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

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

$n(c) = 4$

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

(1) Ans. **Solution:** Let us assume Shefali's marks in Mathematics = x
Then her marks in English = 30-x
As per question, $(x+2)(27-x)=210$

$\Rightarrow 27x-x^2+54-2x=210$

$\Rightarrow 25x-x^2+54-210=0$

$\Rightarrow x^2-25x+156=0$

$\Rightarrow x^2-12x-13x+156=0$

$\Rightarrow x(x-12)-13(x-12)=0$

$\Rightarrow (x-13)(x-12)=0$

If Shefali's marks in Matematics = 13, then her marks in English = 17

$(13+2)(17-3)=15\times 14=210$

If Shefali's marks in Mathematics = 12, then her marks in English = 18

$(12+2)(18-3)=14\times 15=210$

(2) Ans. Number of seats in Auditorium forms an A.P as 20, 22, 24, ...
Total number of rows = 27
$\therefore$ a = 20, d = 2, n = 27
To find: Number of seats in 15th row i.e. t_{15}
$t_n = a + (n-1)d$
$t_{15} = 20 + (15-1)2$
$= 20 + 14 \times 2$
$= 20 + 28$
$= 48$
Total number of seats in auditorium is S_{27}

$S_{27} = \frac{27}{2}[2a + (27-1)d]$

$= \frac{27}{2}[2(20) + 26 \times 2]$

$= \frac{27}{2}[40 + 52]$

$= \frac{27}{2} \times 92$

$= 1242$

Thus, number of seats in 15th row is 48 and total number of seats in auditorium are 1248.

(3) Ans. Let larger tap fill the tank in x hours
∴ Smaller tap will take (x+3) hours

1 hour work of larger tap= $\frac{1}{x}$

1 hour work of larger tap= $\frac{1}{x+3}$

Together they fill tank in 2 hours

$\therefore \frac{1}{x} + \frac{1}{x+3} \frac{1}{x+3} = \frac{1}{2}$

$\rightarrow \frac{x+3+x}{x(x+3)} = \frac{1}{2}$

$\rightarrow \frac{2x+3}{x^2+3x} = \frac{1}{2}$

$\rightarrow 2(2x+3)=x^2+3x$
$\rightarrow 4x+6=x^2+3x$
$\rightarrow x^2+3x-4x-6=0$
$\rightarrow x^2-x-6=0$
$\rightarrow x^2-3x+2x-6=0$
$\rightarrow x(x-3)+2(x-3)=0$
$\rightarrow (x-3)(x+2)=0$
$\rightarrow x-3=0$ or $x+2=0$
$\rightarrow x=3$ or $x=-2$(not possible)
∴ Larger tap fills the tank in 3 hours and smaller tap will take 6 hours

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

(1) Ans. Let the Present age of Father be x yrs & that of son by y years.
After (n - y) years son's age will be x yrs
After (n - y) yrs Fathers age will be x+ (x - y) years
Acc to 1st Condition
X+ (x - y)+ x = 126
3x-y = 126.....(I)
(x - y) yrs ago, Fathers age was y years and (x - y) years ago son's age was y - (n - y) = 2y - x yrs
Acc to 2nd Condition
Y+ 2y - x = 38
-x + 3y = 38.....(II)
Mutillying eq II by 3
-3x + 9y = 114.....(III)
Adding eq II & III
-3x + 9y = 114
3x - y = 126

8y = 240
∴ y = 30
Sub Value of y in eqn I
3x - 30 = 126
3x = 156
X = 52
The Present age of fathers is 52 yrs & That of son is 30 yrs

(2) Ans.

Time (in min)	No. of persons (f)
30 - 40	4
40 - 50	$6 \leftarrow f_1$
50 - 60	$19 \leftarrow f_m$
60 - 70	$14 \leftarrow f_2$
70 - 80	8
80 - 90	7
90 - 100	2

Class 50-60 has the maximum frequency 19.

$\therefore$ 50-60 is the modal class.

Here, L=50, f_m=19, f_1=6, f_2 = 14, h = 10.

$$Mode = L + \left[\frac{f_m - f_1}{2f_m - f_1 - f_2}\right]h = 50 + \frac{19-6}{2(19)-6-14} \times 10$$

$$= 50 + \frac{13}{38-20} \times 10$$

$$= 50 + \frac{13 \times 10}{18}$$

= 50 + 7.22

= 57. 22

Ans. Modal time for watching a TV by a person is 57.22 minutes.

....All The Best....