



SHIKSHA CLASSES

Subject : Algebra

ANSWERS PAPER

Total Marks : 20

Class : X

1. Linear Equations in Two variables

Q. 1 a) Choose the correct alternative of the following question. (2)

1) The index of variables in linear equations is always -----.

Ans. : c) One

2) If $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ then value of determinant is

Ans. : b) ad-bc

B) Write any 2 linear equations in two variables. (1)

Ans. : i) $5x + 3y + 9 = 0$

ii) $2x + 3y - 12 = 0$

Q. 2 A) Attempt any ONE of the following. (2)

1) Find the value of determinant

$$A = \begin{vmatrix} 2\sqrt{3} & 3 \\ 2 & 3\sqrt{3} \end{vmatrix}$$

$$\text{Ans. : } [2\sqrt{3} \times 3\sqrt{3}] - [2 \times 3]$$

$$= [6 \times \sqrt{3} \times 3] - [6]$$

$$= [6 \times \sqrt{9}] - [6]$$

$$= [6 \times 3] - [6]$$

$$= 18 - 6 = 12$$

2) For simultaneous equations in variables x and y, $Dx = 49$ $Dy = -63$ and $D=7$ then find x and y.

$$\text{Ans. : } Dx = \boxed{49}, Dy = \boxed{-63} \text{ and } D = \boxed{7}$$

\therefore By cramer's rule

$$x = \frac{Dx}{D} = \frac{\boxed{49}}{\boxed{7}} = 7 \quad y = \frac{Dy}{D} = \frac{\boxed{-63}}{\boxed{7}} = -9$$

$$\therefore x = 7$$

$$\therefore y = -9$$

Q. 2 : B) Attempt any ONE of the following. (2)

1) Solve the simultaneous equations

$$3a + 5b = 26;$$

$$a + 5b = 22.$$

Ans. : Given equation are

$$\underline{3a + 5b = 26} \quad \text{---(i)}$$

$$a + 5b = 22 \quad \text{---(ii)}$$

Subtract eqⁿ (ii) from (i)

$$3a + \cancel{5b} = 26$$

$$a + \cancel{5b} = 22$$

$$- \quad - \quad -$$

$$2a = 4$$

$$\therefore a = \frac{4}{2} = 2$$

Put $a = 2$ in eqⁿ (i)

$$3 \times 2 + 5b = 26$$

$$6 + 5b = 26$$

$$\therefore 5b = 20$$

$$\therefore b = \frac{20}{5} = 4$$

$$\therefore a = 2 \text{ and } b = 4.$$

2) Solve simultaneous equation by cramer's rule.

$$3x - 4y = 10; \quad 4x + 3y = 5.$$

Ans. : $3x - 4y = 10$

$$4x + 3y = 5$$

$$D = \begin{vmatrix} 3 & -4 \\ 4 & 3 \end{vmatrix} = 3 \times 3 - (-4) \times 4 \\ = 9 + 16 \\ = 25$$

$$D_x = \begin{vmatrix} 10 & -4 \\ 5 & 3 \end{vmatrix} = 10 \times 3 - (-4) \times 5 \\ = 30 + 20 \\ = 50$$

$$D_y = \begin{vmatrix} 3 & 10 \\ 4 & 5 \end{vmatrix} = 3 \times 5 - 10 \times 4 \\ = 15 - 40 \\ = -25$$

\therefore By cramer's rule

$$x = \frac{D_x}{D} = \frac{50}{25} = 2$$

$$y = \frac{D_y}{D} = \frac{-25}{25} = -1$$

$$\therefore x = 2, y = -1$$

Q. 3 A) Solve Any ONE of the following. (3)

1) Complete the following tables.

Ans. : I) $x + y = 3$

When,	i) $x = 3$	ii) $y = 5$	iii) $y = 3$
	$3 + y = 3$	$x + 5 = 3$	$x + 3 = 3$
	$y = 3 - 3$	$x = 3 - 5$	$x = 3 - 3$
	$y = 0$	$x = -2$	$x = 0$

x	3	-2	0
y	0	5	3
(x, y)	(3, 0)	(-2, 5)	(0, 3)

II) $x - y = 4$

When, i) $x - y = 4$ ii) $x - y = 4$ iii) $x - y = 4$

$$x - 0 = 4 \quad -1 - y = 4 \quad 0 - y = 4$$

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

x	4	-1	0
y	0	-5	-4
(x, y)	(4, 0)	(-1, -5)	(0, -4)

2) Solve the following by Cramer's rule.

$$4x + 3y - 4 = 0; \quad 6x = 8 - 5y$$

Ans. : $4x + 3y = 4$

$$6x + 5y = 8$$

$$D = \begin{vmatrix} 4 & 3 \\ 6 & 5 \end{vmatrix} = (4 \times 5) - (6 \times 3) = 20 - 18 = 2$$

$$D_x = \begin{vmatrix} 4 & 3 \\ 8 & 5 \end{vmatrix} = (4 \times 5) - (8 \times 3) = 20 - 24 = -4$$

$$D_y = \begin{vmatrix} 4 & 4 \\ 6 & 8 \end{vmatrix} = (4 \times 8) - (4 \times 6) = 32 - 24 = 8$$

\therefore By Cramer's rule.

$$x = \frac{D_x}{D} = \frac{-4}{2} = -2$$

$$y = \frac{D_y}{D} = \frac{8}{2} = 4$$

$$\therefore x = -2, y = 4$$

Q.3 : B) Solve Any ONE of the following. (3)

1) The sum of two numbers is 60. The greater number is 8 more than thrice the smaller number. Then Find the numbers.

Ans. : Let the two numbers be x and y ($x > y$)

\therefore By first condition

$$x + y = 60 \quad \text{-----} \quad (1)$$

∴ By Second condition

$$x = 3y + 8$$

$$\therefore x - 3y = 8 \quad \text{-----} \quad (2)$$

Subtracting eqⁿ (2) from eqⁿ (1)

$$\cancel{x} + y = 60 \quad \text{-----} \quad (1)$$

$$\cancel{x} - 3y = 8 \quad \text{-----} \quad (2)$$

$$\begin{array}{r} - \quad + \quad - \\ \hline 4y = 52 \end{array}$$

$$y = \frac{52}{4}$$

$$\therefore y = 13$$

∴ Put $y = 13$ in eqⁿ (1)

$$x + y = 60$$

$$x + 13 = 60$$

$$x = 60 - 13$$

$$x = 47$$

∴ The no.s are 47 and 13

2) Complete the following activity to solve simultaneous equations.

Ans. : $5x + 3y = 9$ ----- I

$$2x - 3y = 12 \quad \text{-----} \quad \text{II}$$

Let's add equation (I) and (II)

$$\begin{array}{r} 5x + 3y = 9 \\ + 2x - 3y = 12 \\ \hline 7x = 21 \end{array}$$

$$x = \frac{21}{7} = 3 \quad x = \boxed{3}$$

put $x = 3$ in eqⁿ (I)

$$5 \times \boxed{3} + 3y = 9$$

$$3y = 9 - \boxed{15}$$

$$3y = \boxed{-6}$$

$$y = \frac{\boxed{-6}}{3}$$

$$y = \boxed{-2}$$

∴ solution is $(x, y) = (\boxed{3}, \boxed{-2})$

Q. 4 : Solve Any ONE of the following. (4)

$$1) \frac{27}{x-2} + \frac{31}{y+3} = 85; \frac{31}{x-2} + \frac{27}{y+3} = 89$$

Ans. : $\frac{27}{x-2} + \frac{31}{y+3} = 85$ ----- (1)

$$\frac{31}{x-2} + \frac{27}{y+3} = 89$$
 ----- (2)

Substituting $\frac{1}{x-2} = a$ and $\frac{1}{y+3} = b$

$$\therefore 27a + 31b = 85$$
 ----- (3)

$$31a + 27b = 89$$
 ----- (4)

Adding eqⁿs (3) and (4)

$$27a + 31b = 85$$

$$+ 31a + 27b = 89$$

$$58a + 58b = 174$$

Divide by 58

$$a + b = 3$$
 ----- (5)

Subtracting eqⁿ (3) from (4)

$$\begin{array}{r} 31a + 27b = 89 \\ -27a + 31b = 85 \\ \hline 4a - 4b = 4 \end{array}$$

$$\therefore a - b = 1 \quad \text{_____ (6)}$$

Adding eqⁿ(5) and (6)

$$\begin{array}{r} a + b = 3 \\ a - b = 1 \\ \hline 2a = 4 \end{array}$$

$$a = 2$$

\therefore Put $a = 2$ in eqⁿ (5)

$$a + b = 3$$

$$2 + b = 3$$

$$b = 3 - 2 = 1$$

Now Re-substituting the values

$$a = \frac{1}{x-2} \quad b = \frac{1}{y+3}$$

$$\frac{2}{1} = \frac{1}{x-2}; \quad \frac{1}{1} = \frac{1}{y+3}$$

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

$$2x - 4 = 1 \quad y = 1 - 3$$

$$2x = 1 + 4 \quad y = -2$$

$$x = 5/2$$

$$\therefore x = 5/2, \quad y = -2$$

2) The perimeter of a rectangle is 40cm The length of rectangle is more than double it's breadth by 2. Find length and breadth.

Ans. : Let the length of rectangle be x cm and breadth be y cm.

\therefore By first condition

$$2(x+y) = 40$$

$$x+y = \frac{40}{2}$$

$$\therefore x+y = 20 \quad \text{_____ (1)}$$

By second condition

$$x = 2y + 2$$

$$x - 2y = 2 \quad \text{_____ (2)}$$

Multiply eqⁿ (1) by 2

$$2(x+y) = 2 \times 20$$

$$2x + 2y = 40 \quad \text{_____ (3)}$$

Adding eqⁿs (2) and (3)

$$x - 2y = 2$$

$$\begin{array}{r} 2x + 2y = 40 \\ \hline 3x = 42 \end{array}$$

$$x = \frac{42}{3}$$

$$x = 14$$

Put $x = 14$ in eqⁿ(1)

$$\therefore x+y = 20$$

$$14 + y = 20$$

$$y = 20 - 14$$

$$y = 6$$

$$\therefore x = 14, \quad y = 6$$

\therefore Length of rectangle is 14cm. and breadth is 6cm.

Q. 5 : Attempt any one of the following. (3)

1) Solve the following simultaneous equation $99x + 101y = 499$, $101x + 99y = 501$.

$$\text{Ans. : } 99x + 101y = 499 \quad \text{_____ (1)}$$

$$101x + 99y = 501 \quad \text{_____ (2)}$$

Adding eqⁿs (1) and (2)

$$99x + 101y = 499$$

$$+ \quad 101x + 99y = 501$$

$$200x + 200y = 1000$$

Divide by 200

$$\therefore x+y = 5 \quad \text{_____ (3)}$$

Subtracting eqⁿs (2) from (1)

$$\begin{array}{r} 99x + 101y = 499 \\ - 101x + 99y = 501 \\ \hline -2x + 2y = -2 \end{array}$$

Divide By -2

$$\therefore -x + y = -1 \quad (4)$$

\therefore Again adding eqⁿ (3) and (4)

$$\therefore \cancel{x} + y = 5$$

$$\begin{array}{r} - \cancel{x} + y = -1 \\ \hline 2y = 4 \end{array}$$

$$\therefore y = 4/2 \quad y = 2$$

put $y = 2$ in eqⁿ (3)

$$x + y = 5$$

$$x + 2 = 5$$

$$x = 5 - 2$$

$$x = 3$$

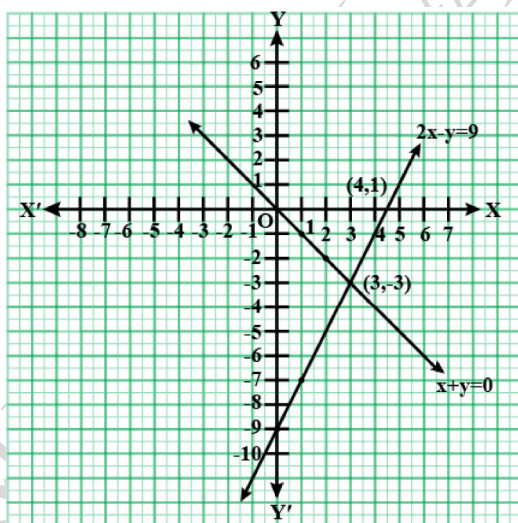
$$\therefore x = 3, y = 2$$

2) solve the simultaneous equation graphically.

$$x + y = 0 \quad 2x - y = 9.$$

Ans. :

	x + y = 0			2x - y = 9			
x	3	1	2	x	3	0	1
y	-3	-1	-2	y	-3	-9	-7



BECOME AN ACE IN JEE & NEET



SHIKSHA CLASSES

Believe & Achieve

JEE | NEET | Previsa (8-10)

📞 8625055707 | 8623085707 🌐 shikshaclasses.co.in

M-19, MHADA Colony, Khat Road, Bhandara



Learn with Jaiswal sir