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Subject: - Mathematics

Solution of a Pair of Linear Equations in Two Variables Graphically method

Graph of Eqn. having unique soln.

Q. $x + 2y = 3$, $4x + 3y = 2$ — (i)

Taking eqn (i)

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

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

Putting $y = 0$

$$x = 3 - 2 \times 0 = 3$$

Putting $y = 1$

$$x = 3 - 2 \times 1 = 1$$

Putting $y = 2$

$$x = 3 - 2 \times 2 = -1$$

Taking eqn (ii)

$$\Rightarrow 4x + 3y = 2$$

$$\Rightarrow 4x = 2 - 3y$$

$$\therefore x = \frac{2 - 3y}{4}$$

Putting $y = -2$

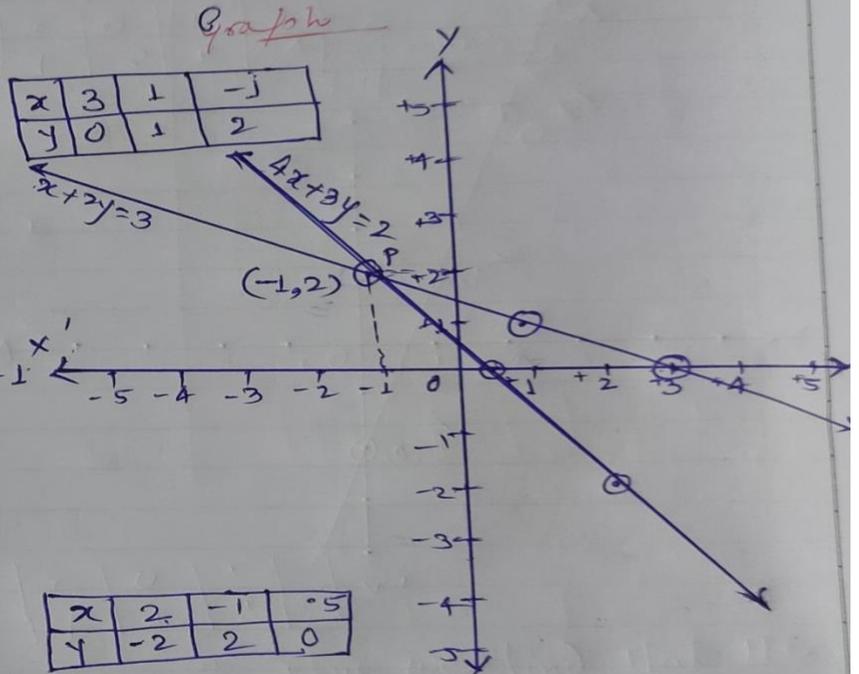
$$x = \frac{2 - 3 \times -2}{4} = \frac{8}{4} = 2$$

Putting $y = 2$

$$x = \frac{2 - 3 \times 2}{4} = \frac{-4}{4} = -1$$

Putting $y = 0$

$$x = \frac{2 - 3 \times 0}{4} = \frac{2}{4} = \frac{1}{2} = 0.5$$



The two graphlines intersect at the point P (-1, 2)
Hence,
 $\therefore x = -1$ and $y = -2$

Ans

Graph of Eqn. having infinite many solutions

8. $3x - y = 2$ — (i), $6x - 2y = 4$ — (ii)

Taking eqn (i)

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

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

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

x	0	1	2
y	-2	1	4

Putting $x = 0$

$$\therefore y = 3 \times 0 - 2 = -2$$

Putting $x = 1$

$$\therefore y = 3 \times 1 - 2 = 1$$

Putting $x = 2$

$$\therefore y = 3 \times 2 - 2 = +4$$

Taking eqn (ii)

$$\Rightarrow 6x - 2y = 4$$

$$\Rightarrow -2y = 4 - 6x$$

$$\therefore y = \frac{6x - 4}{2}$$

x	0	1	2
y	-2	1	4

Putting $x = 0$

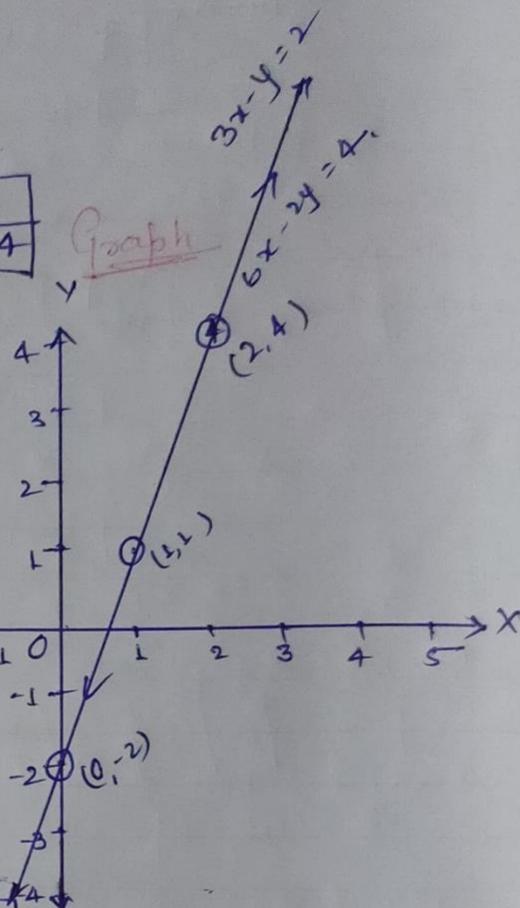
$$\therefore y = \frac{6 \times 0 - 4}{2} = \frac{-4}{2} = -2$$

Putting $x = 1$

$$\therefore y = \frac{6 \times 1 - 4}{2} = \frac{2}{2} = 1$$

Putting $x = 2$

$$\therefore y = \frac{6 \times 2 - 4}{2} = \frac{8}{2} = 4$$



Thus, we find that the two graph lines coincide.

Hence, the given system of equations has an infinite many solutions.

Graph of eqn. having no solution.

8 $2x - 3y = 5$ — (i), $6y - 4x = 3$ — (ii)

Taking eqn (i)

$$\Rightarrow 2x - 3y = 5$$

$$\Rightarrow 2x = 3y + 5$$

$$\therefore x = \frac{3y + 5}{2}$$

x	2.5	4
y	0	1

Putting $y = 0$

$$x = \frac{3 \times 0 + 5}{2} = \frac{5}{2} = 2.5$$

Putting $y = 1$

$$x = \frac{3 \times 1 + 5}{2} = \frac{8}{2} = 4$$

Taking eqn (ii)

$$\Rightarrow 6y - 4x = 3$$

$$\Rightarrow -4x = 3 - 6y$$

$$\therefore x = \frac{6y - 3}{4}$$

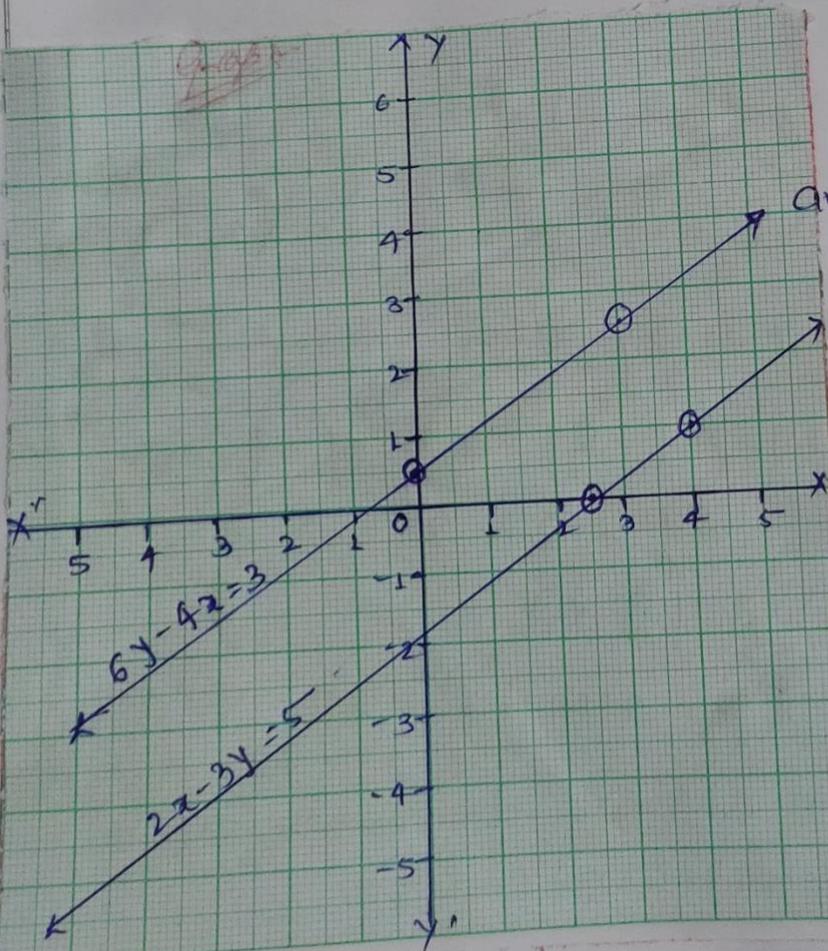
Putting $y = \frac{1}{2}$

$$\therefore x = \frac{6 \times \frac{1}{2} - 3}{4} = \frac{0}{4} = 0$$

Putting $y = \frac{5}{2}$

$$\therefore x = \frac{6 \times \frac{5}{2} - 3}{4} = \frac{12}{4} = 3$$

x	0	3
y	1/2	5/2



The graph that the two lines are parallel and do not intersect when produced.

Hence the given system of eqn. has no solutions &.

Do yourself

(i) $x + 2y + 2 = 0$
 $3x + 2y - 2 = 0$

(ii) $2x + y = 6$
 $6x + 3y = 18$

(iii) $2x - y = 6$
 $4x - 2y = 4$