



NCERT Solutions for Class 10th Maths Chapter 3 Pair of Linear Equations in Two Variables Ex 3.2

Question-4

Form the pair of linear equations in the following problem, and find their solutions graphically. 10 students of Class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz.

Solution:

Let the number of boys be x and the number of girls be y

$$x + y = 10 \dots\dots\dots (1) \text{ (given)}$$

$$y = x + 4 \dots\dots\dots (2) \text{ (given)}$$

$$x + y = 10 \dots\dots(1)$$

$$\Rightarrow y = 10 - x$$

$$\text{When } x = -1, y = 10 - (-1) = 11$$

$$\text{When } x = 0, y = 10 - 0 = 10$$

$$\text{When } x = 1, y = 10 - 1 = 9$$

$$\text{when } x = 2, y = 10 - 2 = 8$$

$$\text{when } x = 3, y = 10 - 3 = 7$$

x	-1	0	1	2	3
$y = 10 - x$	11	10	9	8	7

$$y = x + 4 \dots\dots\dots(2)$$

$$\text{Let } x = -1, \Rightarrow y = -1 + 4 = 3$$

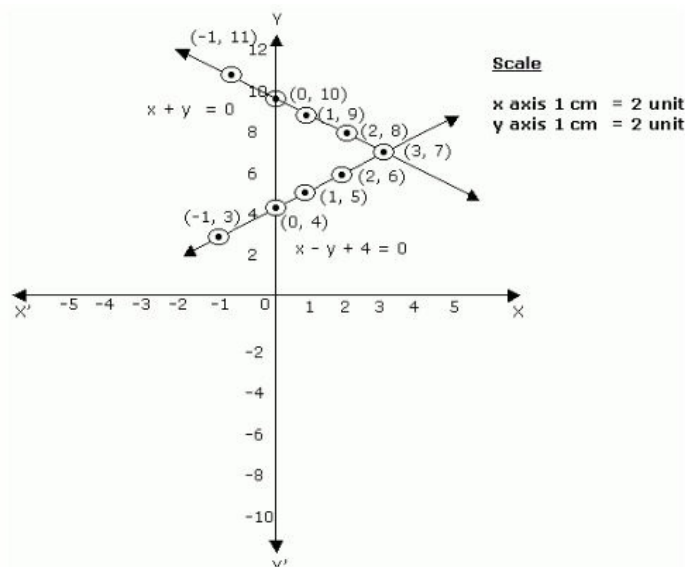
$$\text{Let } x = 0, y = 0 + 4 = 4$$

$$\text{Let } x = 1, y = 1 + 4 = 5$$

$$\text{Let } x = 2, y = 2 + 4 = 6$$

$$\text{Let } x = 3, y = 3 + 4 = 7$$

x	-1	0	1	2	3
$y = x + 4$	3	4	5	6	7



The solution thus obtained graphically is $(3, 7)$. Number of girls = 7 and number of boys = 3.

Question-5

Form the pair of linear equations in the following problem, and find their solutions graphically. 5 pencils and 7 pens together cost ₹50, whereas 7 pencils and 5 pens together cost ₹46. Find the cost of one pencil and that of one pen.

Solution:

Let the cost of one pencil be ₹x

Let the cost of one pen be ₹y

$$5x + 7y = 50$$

$$y = \frac{50 - 5x}{7} \dots\dots\dots (1)$$

When x = 3

$$y = \frac{50 - 5(3)}{7} = \frac{35}{7} = 5$$

When x = 10

$$y = \frac{50 - 5(10)}{7} = \frac{0}{7} = 0$$

When x = -4

$$y = \frac{50 - 5(-4)}{7} = \frac{70}{7} = 10$$

x	-4	3	10
y	10	5	0

Also, $7x + 5y = 46 \dots\dots\dots (2)$

$$y = \frac{46 - 7x}{5}$$

When x = 0,

$$y = \frac{46 - 7(0)}{5} = \frac{46}{5} = 9.2$$

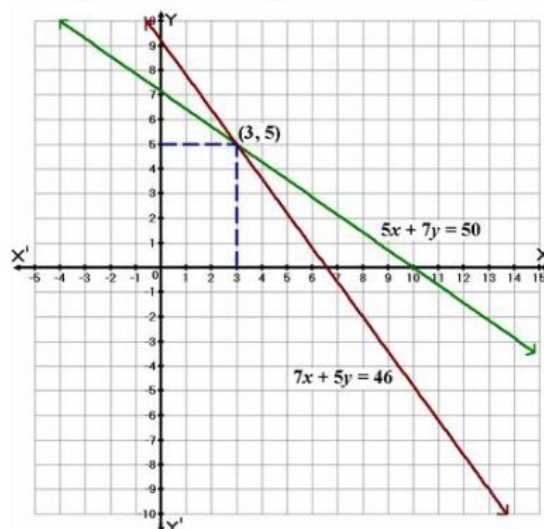
When x = 3,

$$y = \frac{46 - 7(3)}{5} = \frac{46 - 21}{5} = \frac{25}{5} = 5$$

When x = 8

$$y = \frac{46 - 7(8)}{5} = \frac{46 - 56}{5} = \frac{-10}{5} = -2$$

x	0	3	8
y	9.2	5	-2



By solving graphically, cost of one pencil = ₹3, cost of one pen = ₹5.

Question-6

On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident:

(i) $5x - 4y + 8 = 0$

$$7x + 6y - 9 = 0$$

(ii) $9x + 3y + 12 = 0$

$$18x + 6y + 24 = 0$$

(iii) $6x - 3y + 10 = 0$

$$2x - y + 9 = 0$$

Solution:

(i) $5x - 4y + 8 = 0$

$$7x + 6y - 9 = 0$$

$$\frac{a_1}{a_2} = \frac{5}{7}$$

$$\frac{b_1}{b_2} = \frac{-4}{6}$$

$$\therefore \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

\therefore Lines are intersecting.

(ii) $9x + 3y + 12 = 0$

$$18x + 6y + 24 = 0$$

$$\frac{a_1}{a_2} = \frac{9}{18} = \frac{1}{2}$$

$$\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{12}{24} = \frac{1}{2}$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, the lines are coincident.

(iii) $6x - 3y + 10 = 0$

$$2x - y + 9 = 0$$

$$\frac{a_1}{a_2} = \frac{6}{2} = 3$$

$$\frac{b_1}{b_2} = \frac{-3}{-1} = 3$$

But $\frac{c_1}{c_2} = \frac{10}{9}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, the lines are parallel.

Question-7

On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations are consistent, or inconsistent.

(i) $3x + 2y = 5$

$$2x - 3y = 17$$

(ii) $2x - 3y = 8$

$$4x - 6y = 9$$

(iii) $\frac{3}{2}x + \frac{5}{3}y = 7$

$$9x - 10y = 14$$

(iv) $5x - 3y = 11$

$$-10x + 6y = -22$$

(v) $\frac{4}{3}x + 2y = 8$

$$2x + 3y = 12$$

Solution:

(i) $3x + 2y = 5$; $2x - 3y = 17$

$$\frac{a_1}{a_2} = \frac{3}{2}$$

$$\frac{b_1}{b_2} = \frac{2}{-3}$$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, equations are consistent.

(ii) $2x - 3y = 8$; $4x - 6y = 9$

$$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{b_1}{b_2} = \frac{-3}{-6} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{-8}{-9}$$

Here $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

\therefore The equations are inconsistent.

$$(iii) \frac{3}{2}x + \frac{5}{3}y = 7$$

$$9x - 10y = 14$$

$$\frac{a_1}{a_2} = \frac{\frac{3}{2}}{9} = \frac{3}{2 \times 9} = \frac{3}{18} = \frac{1}{6}$$

$$\frac{b_1}{b_2} = \frac{\frac{5}{3}}{-10} = \frac{5}{3 \times -10} = \frac{-1}{6}$$

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

∴ The equations are consistent.

$$(iv) 5x - 3y = 11$$

$$-10x + 6y = -22$$

$$\frac{a_1}{a_2} = \frac{5}{-10} = \frac{-1}{2}$$

$$\frac{b_1}{b_2} = \frac{-3}{6} = \frac{-1}{2}$$

$$\frac{c_1}{c_2} = \frac{11}{-22} = \frac{-1}{2}$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, the equations are consistent.

$$(v) \frac{4}{3}x + 2y = 8$$

$$2x + 3y = 12$$

$$a_1 = \frac{4}{3}, a_2 = 2, c_1 = -8$$

$$a_1 = 2, b_2 = 3, c_2 = -12$$

$$\frac{a_1}{a_2} = \frac{\frac{4}{3}}{2} = \frac{4}{6} = \frac{2}{3}$$

$$\frac{b_1}{b_2} = \frac{2}{3}$$

$$\frac{c_1}{c_2} = \frac{8}{-12} = \frac{2}{3}$$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

The equations are consistent.

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