



### Question-8

Which of the following pairs of linear equations are consistent/inconsistent ?

If consistent, obtain the solution graphically:

(i)  $x + y = 5$ ,  $2x + 2y = 10$

(ii)  $x - y = 8$ ,  $3x - 3y = 16$

(iii)  $2x + y - 6 = 0$ ,  $4x - 2y - 4 = 0$

(iv)  $2x - 2y - 2 = 0$ ,  $4x - 4y - 5 = 0$

**Solution:**

$x + y = 5$ ,  $2x + 2y = 10$

$\frac{a_1}{a_2} = \frac{1}{2}$ ,  $\frac{b_1}{b_2} = \frac{1}{2}$ ,  $\frac{c_1}{c_2} = \frac{1}{2}$

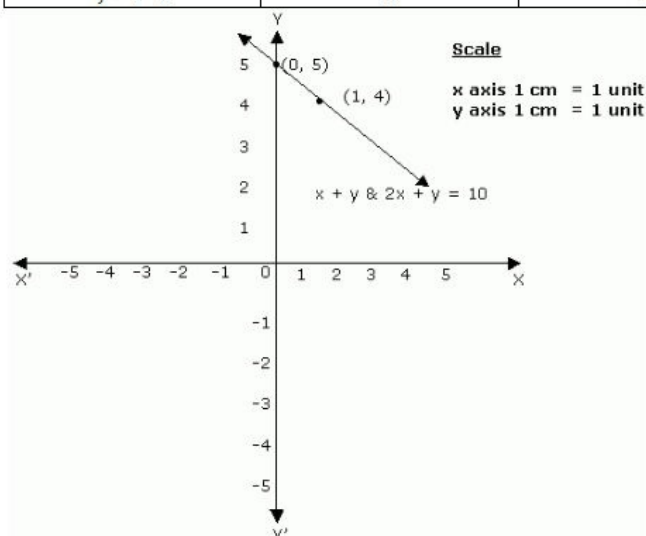
$\therefore$  Equations are consistent .

We have to draw the graphs of both the given equations  $x + y = 5$

x	0	1
y = 5 - x	5	4

$2x + 2y = 10 \Rightarrow y = 5 - x$

x	0	1
y = 5 - x	5	4



Hence the lines represented by both the equations are coincident. Thus both the equations have infinitely many solutions.

(ii)  $x - y = 8, 3x - 3y = 16$

$$\frac{a_1}{a_2} = \frac{1}{3}, \frac{b_1}{b_2} = \frac{-1}{-3} = \frac{1}{3}, \frac{c_1}{c_2} = \frac{8}{16} = \frac{1}{2}$$

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

∴ The equations are inconsistent.

$$2x + y - 6 = 0$$

$$4x - 2y - 4 = 0$$

$$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}, \frac{b_1}{b_2} = -\frac{1}{2}$$

Thus as  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ , the equations are consistent.

(iii)  $2x + y - 6 = 0$

when  $x = 1, y = 6 - 2x = 4$

$x = 0, y = 6$

$x = -1, y = 8$

x	2	0	-1
$y = 6 - 2x$	2	6	8

$$4x - 2y - 4 = 0$$

$$4x - 2y = 4$$

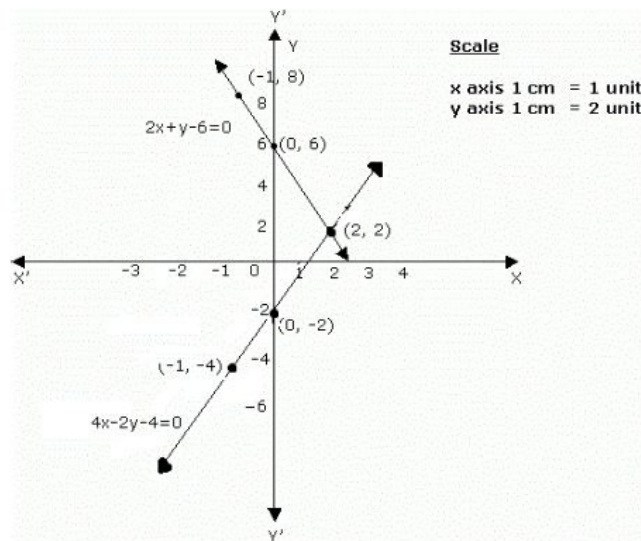
$$y = \frac{4x - 4}{2} = 2x - 2$$

When  $x = 1, y = 2 - 2 = 0$

$x = 0, y = -2$

$x = -1, y = -2 - 2 = -4$

x	2	0	-1
$y = 2x - 2$	2	-2	-4



(iv)  $2x - 2y - 2 = 0$

$$4x - 4y - 5 = 0$$

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

$$\frac{b_1}{b_2} = \frac{-2}{-4} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{2}{5}$$

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

Equations are inconsistent

### Question-9

Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden.

#### Solution:

Let  $l$  be the length and  $b$  be the breadth

$$l = b + 4$$

$$\Rightarrow l - b = 4 \dots\dots\dots(1)$$

$$\text{Perimeter} = 2(l + b)$$

$$\frac{1}{2} \times 2(l + b) = 36(\text{given}) \dots\dots\dots(2)$$

$$l - b = 4 \dots\dots\dots(1)$$

$$l + b = 36 \dots\dots\dots(2)$$

$$(1) + (2) \Rightarrow 2l = 40$$

$$l = \frac{40}{2} = 20 \text{ m}$$

Substitute  $l = 20$  in (1)

$$l - b = 4$$

$$20 - b = 4$$

$$b = 20 - 4 = 16 \text{ m.}$$

### Question-10

Given the linear equation  $2x + 3y - 8 = 0$ , write another linear equation in two variables such that the geometrical representation of the pair so formed is:

(i) intersecting lines (ii) parallel lines (iii) coincident lines

#### Solution:

$$2x + 3y - 8 = 0$$

$$3x + 2y - 7 = 0 \text{ (intersecting lines)}$$

$$2x + 3y + 12 = 0 \text{ (parallel lines)}$$

$$4x + 6y - 16 = 0 \text{ (coincident lines)}$$

### Question-11

Draw the graphs of the equations  $x - y + 1 = 0$  and  $3x + 2y - 12 = 0$ . Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and the triangular region.

#### Solution:

$$x - y + 1 = 0$$

$$y = x + 1$$

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

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

$$2y = 12 - 3x$$

$$y = \frac{12 - 3x}{2}$$

when  $x = 0$ ,

$$y = \frac{12 - 3(0)}{2} = \frac{12}{2} = 6$$

when  $x = 2$ ,

$$y = \frac{12 - 3(2)}{2} = \frac{12 - 6}{2} = \frac{6}{2} = 3$$

when  $x = 4$ ,

$$y = \frac{12 - 3(4)}{2} = \frac{12 - 12}{2} = \frac{0}{2} = 0$$

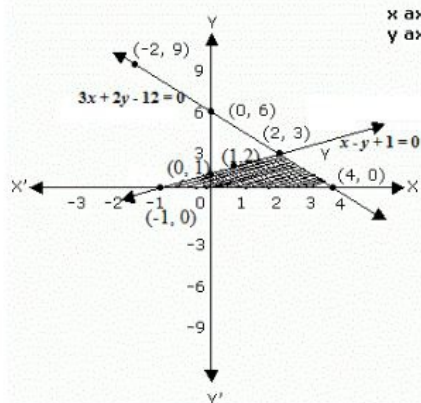
when  $x = -2$ ,

$$y = \frac{12 - 3(-2)}{2} = \frac{12 + 6}{2} = \frac{18}{2} = 9$$

x	-2	0	2	4
$y = \frac{12 - 3x}{2}$	9	6	3	0

**Scale**

x axis 1 cm = 1 unit  
y axis 1 cm = 3 unit



\*\*\*\*\* END \*\*\*\*\*