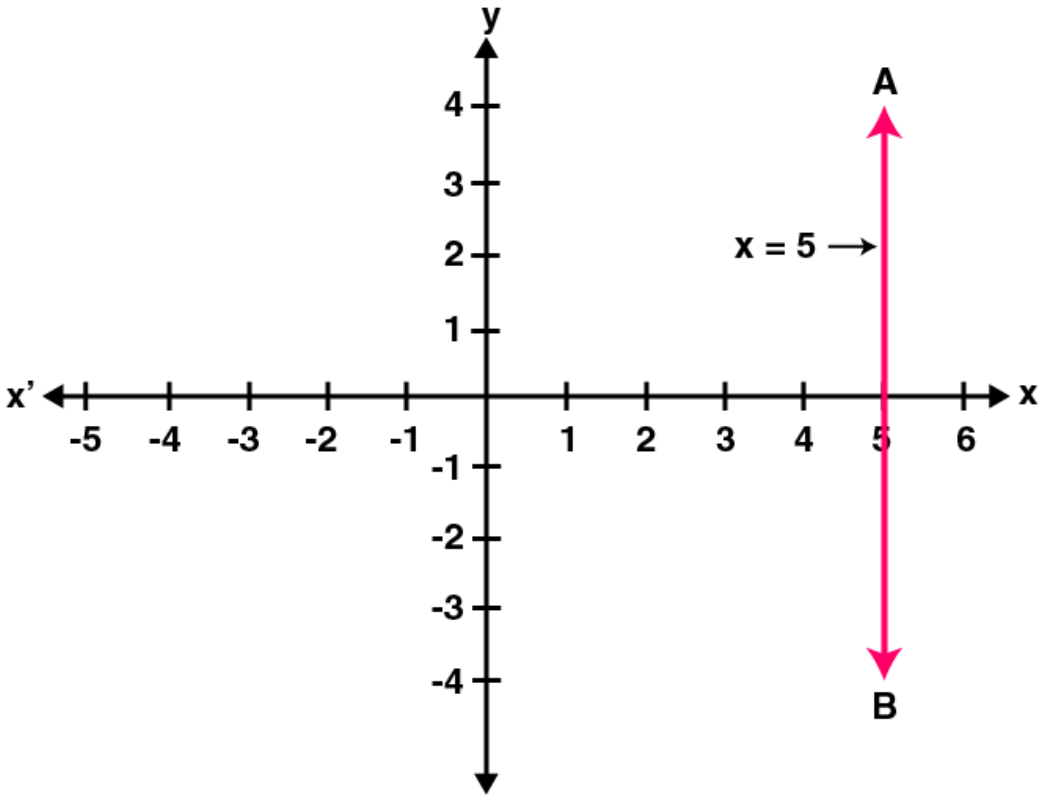
EXERCISE 27(A) PAGE:326

1. **Draw the graph for each equation, given below:**
   - **(i)** **x = 5**
   - **(ii)** **x + 5 = 0**
   - **(iii)** **y = 7**
   - **(iv)** **y + 7 = 0**
   - **(v)** **2x + 3y = 0**
   - **(vi)** **3x + 2y = 6**
   - **(vii)** **x - 5y + 4 = 0**
   - **(viii)** **5x + y + 5 = 0**

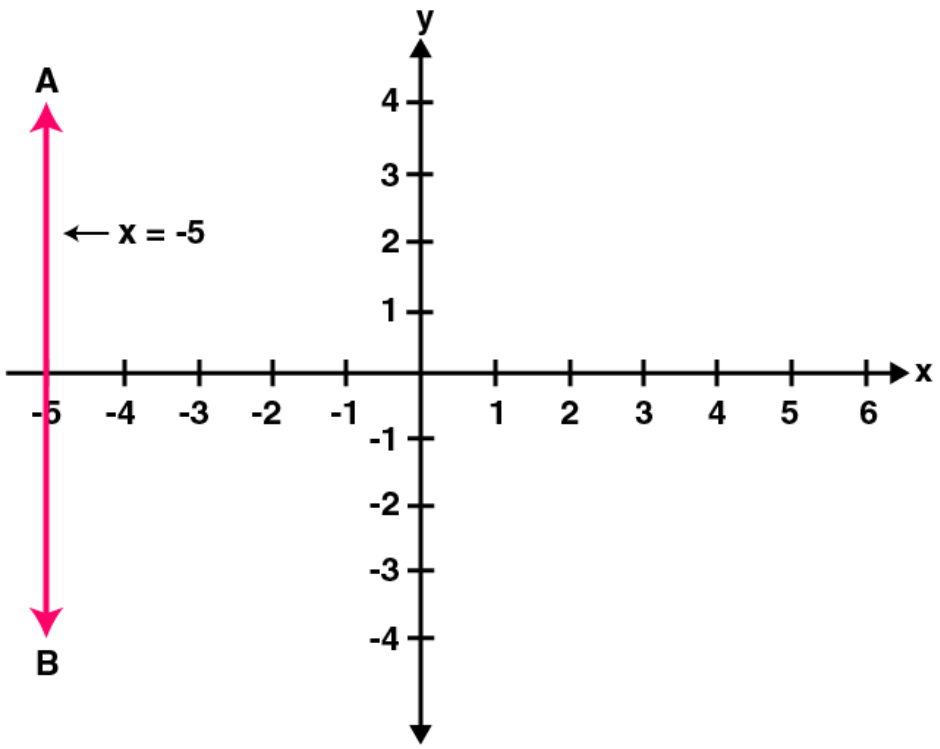
Solution:

(i) x=5

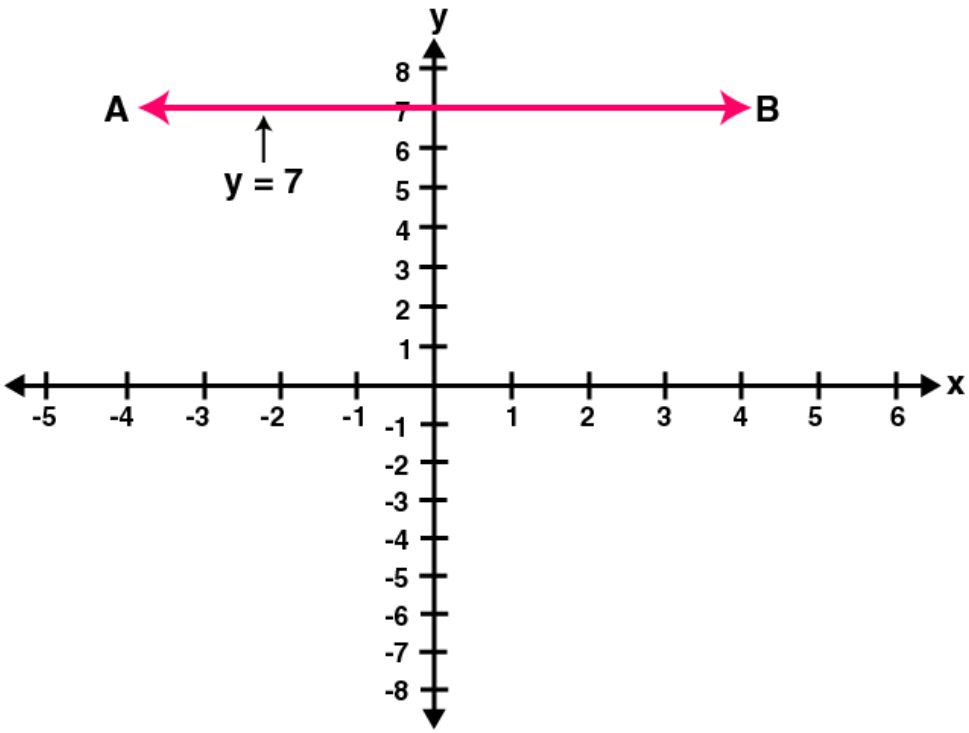


(ii) x + 5 = 0

x = -5

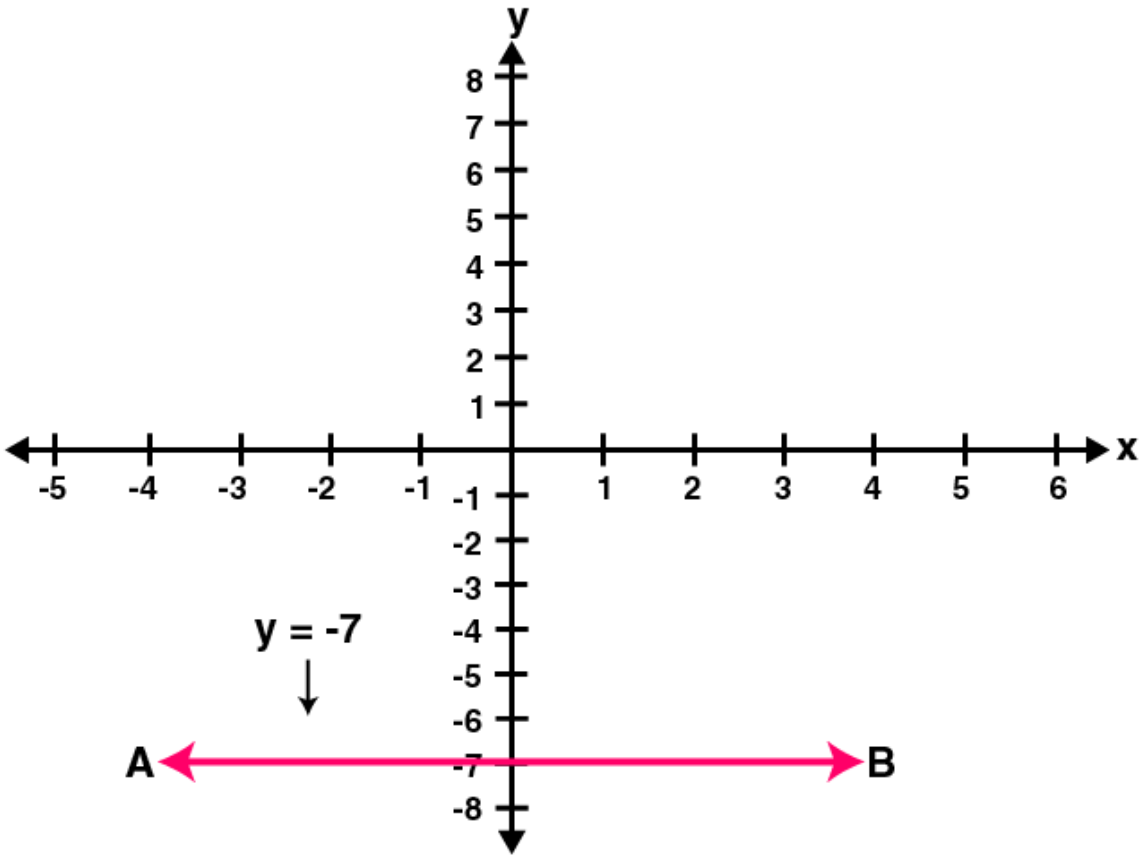

y
A
x = -5
B
x
4
3
2
1
-1
-2
-3
-4
-5
-4
-3
-2
-1
1
2
3
4
5
6

(iii) y = 7


y
A
B
y = 7
x
8
7
6
5
4
3
2
1
-1
-2
-3
-4
-5
-6
-7
-8
-5
-4
-3
-2
-1
1
2
3
4
5
6

(iv) $y + 7 = 0$

$y = -7$



(v) $2x + 3y = 0$

$3y = -2x$

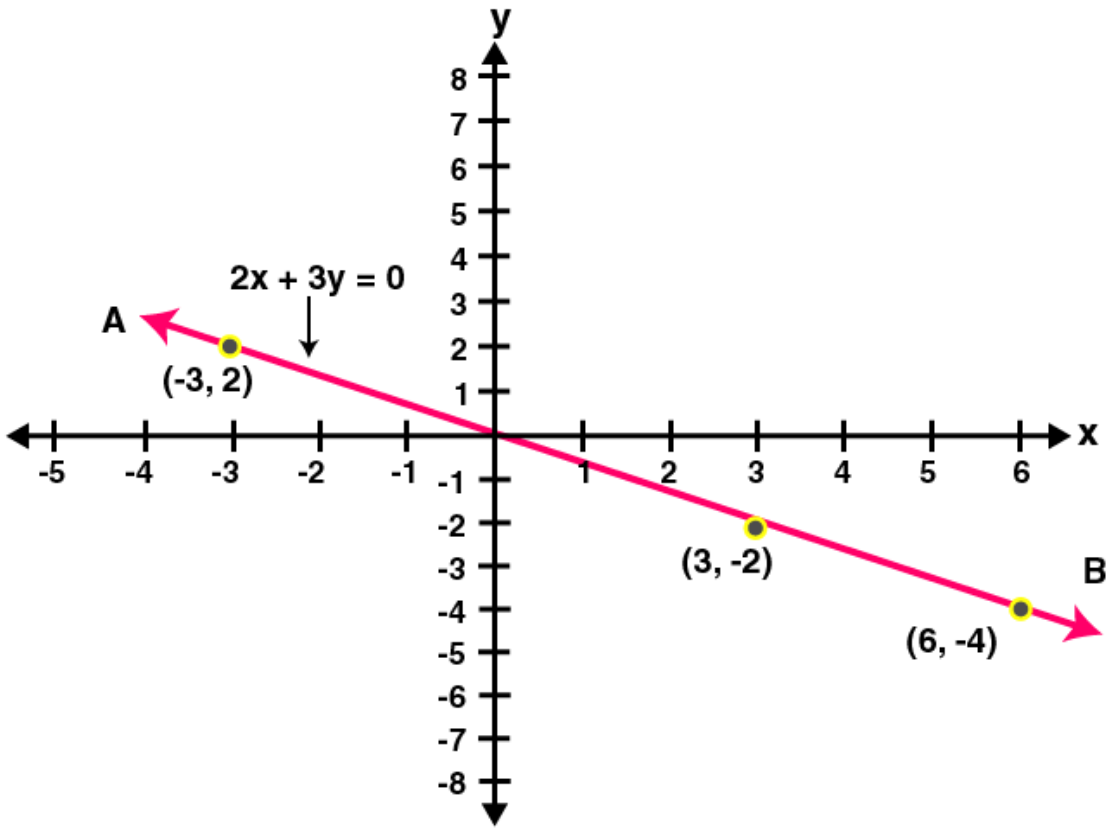
$\therefore y = \frac{-2x}{3}$

When $x = -3; y = \frac{-2(-3)}{3} = \frac{6}{3} = 2$

When $x = 3; y = \frac{-2(3)}{3} = \frac{-6}{3} = -2$

When $x = 6; y = \frac{-2(6)}{3} = \frac{-12}{3} = -4$

x	-3	3	6
y	2	-2	-4



(vi) $3x + 2y = 6$

$2y = 6 - 3x$

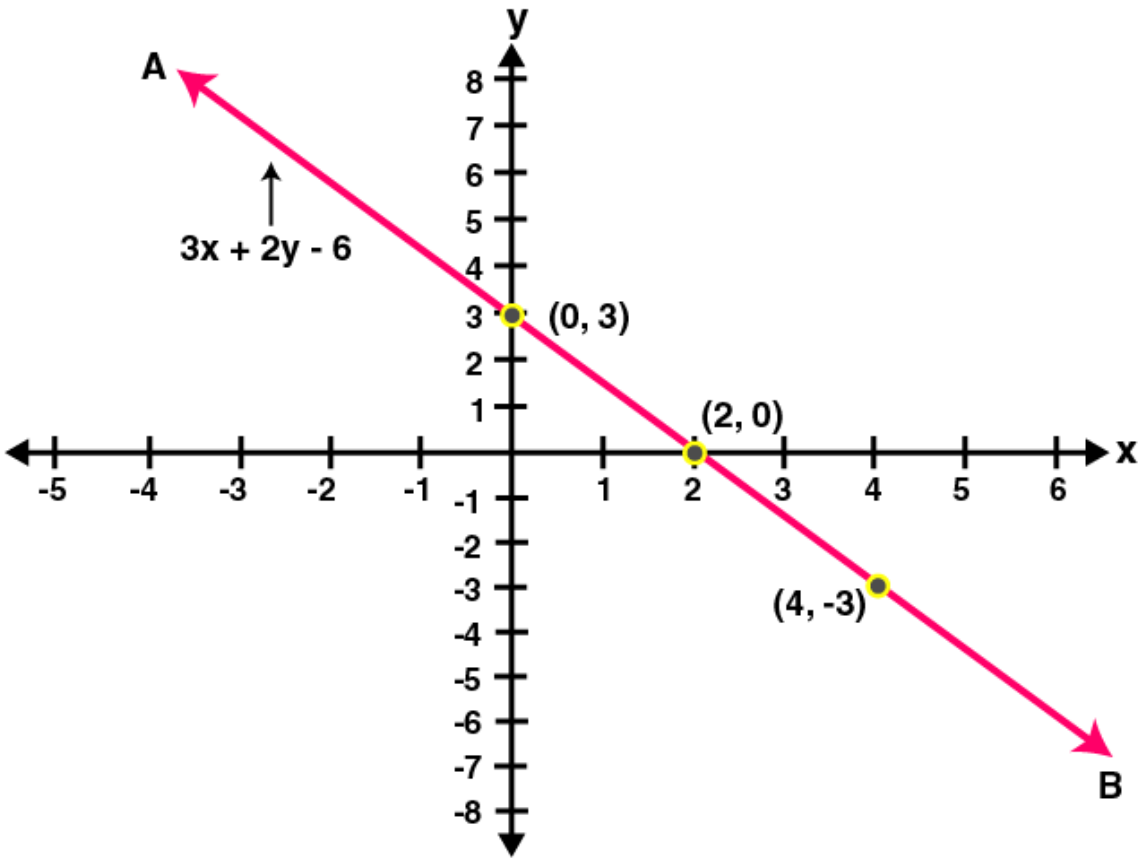
$\therefore y = \frac{6-3x}{2}$

When $x=0; y = \frac{6-3\times 0}{2} = \frac{6-0}{2} = 3$

When $x=2; y = \frac{6-3\times 2}{2} = \frac{6-6}{2} = 0$

When $x=4; y = \frac{6-3\times 4}{2} = \frac{6-12}{2} = -3$

x	0	2	4
y	3	0	-3



(vii) x-5y+4=0

5y=4+x

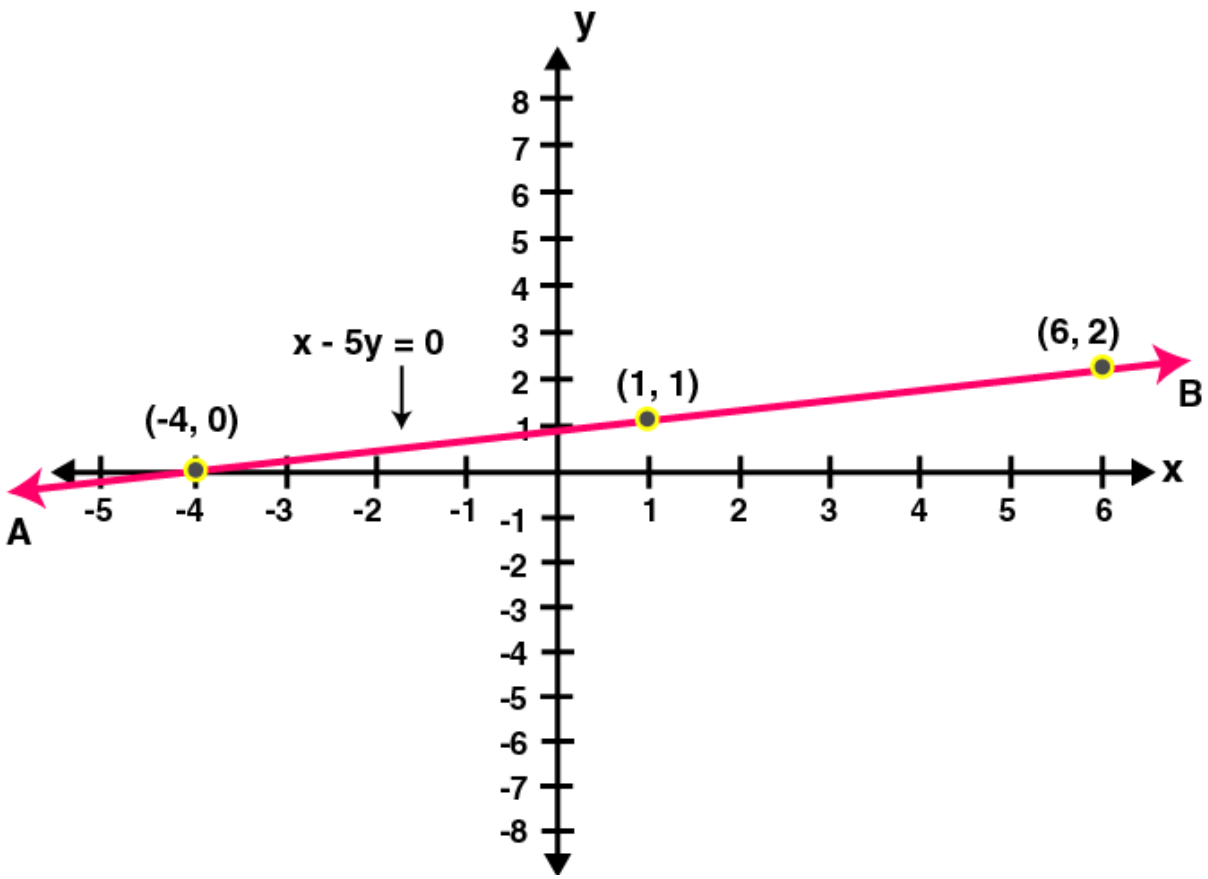
$\therefore y = \frac{x+4}{5}$

When $x=1; y = \frac{1+4}{5} = \frac{5}{5} = 1$

When $x=6; y = \frac{6+4}{5} = \frac{10}{5} = 2$

When $x=-4; y = \frac{-4+4}{5} = \frac{0}{5} = 0$

x	1	6	-4
y	1	2	0



(viii) $5x + y + 5 = 0$

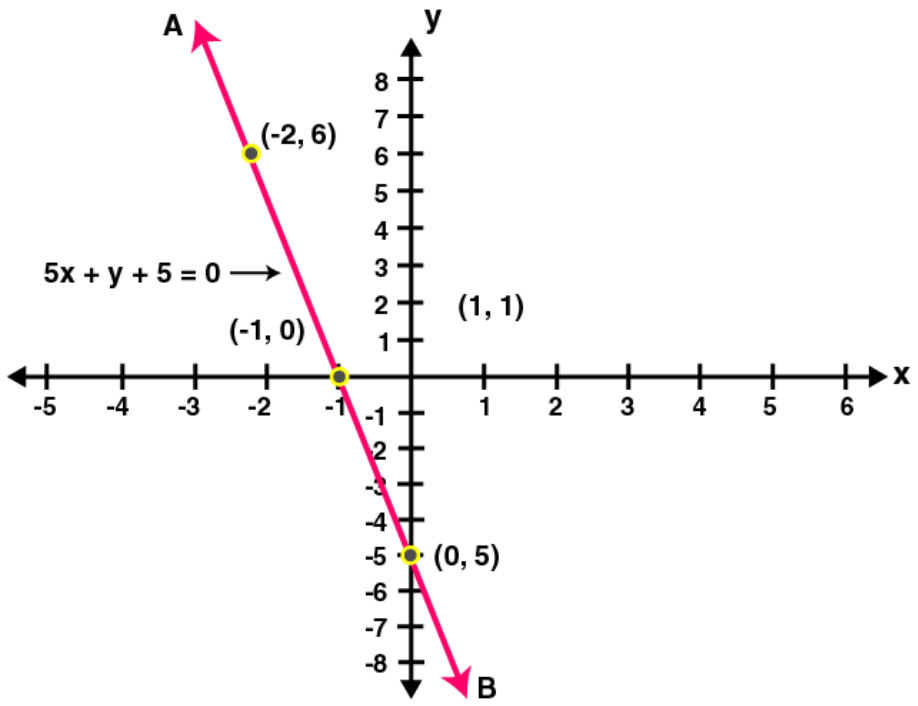
$y = -5x - 5$

When $x = 0; y = -5 \times x - 5 = -0 - 5 = -5$

When $x = -1; y = -5 \times (-1) - 5 = 5 - 5 = 0$

When $x = -2; y = -5 \times (-2) - 5 = 10 - 5 = 5$

x	0	-1	-2
y	-5	0	5



2. Draw the graph for each equation given below; hence find the co-ordinates of the points where the graph drawn meets the co- ordinate axes :

$(i)\ \frac{1}{3}x+\frac{1}{5}y=1 \qquad (ii)\ \frac{2x+15}{3}=y-1$

Solution:

$(i)\ \frac{1}{3}x+\frac{1}{5}y=1$

$\Rightarrow \frac{5x+3y}{15}=1$

$\Rightarrow 5x+3y=15$

$\Rightarrow \quad 3y=15-5x$

$\Rightarrow \quad y=\frac{15-5x}{3}$

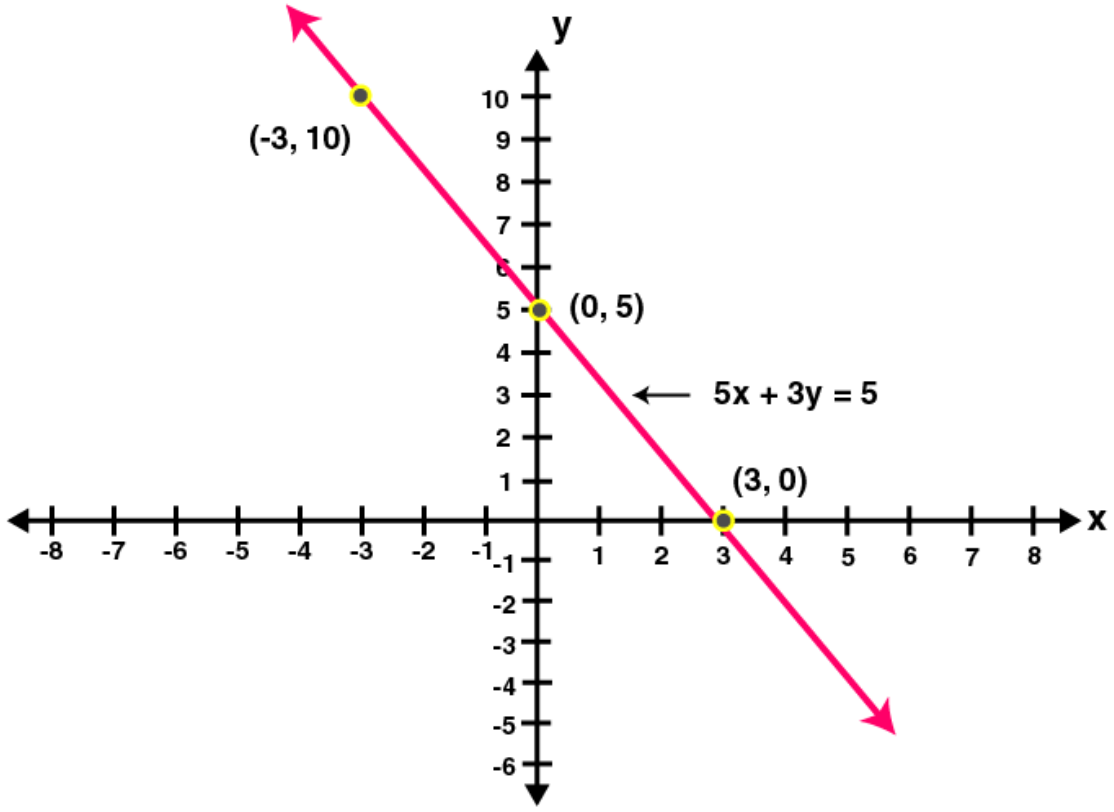
When $x=0; y=\frac{15-5\times 0}{3}=\frac{15-0}{3}=5$

When $x=3; y=\frac{15-5\times 3}{3}=\frac{15-15}{3}=0$

When $x=-3; y=\frac{15-5\times(-3)}{3}=\frac{15+15}{3}=10$

x	0	3	−3
y	5	0	10

Plotting these points we get the required graph as shown below :



Hence, the graph meets the coordinate axes at (3, 0) and (0, 5)

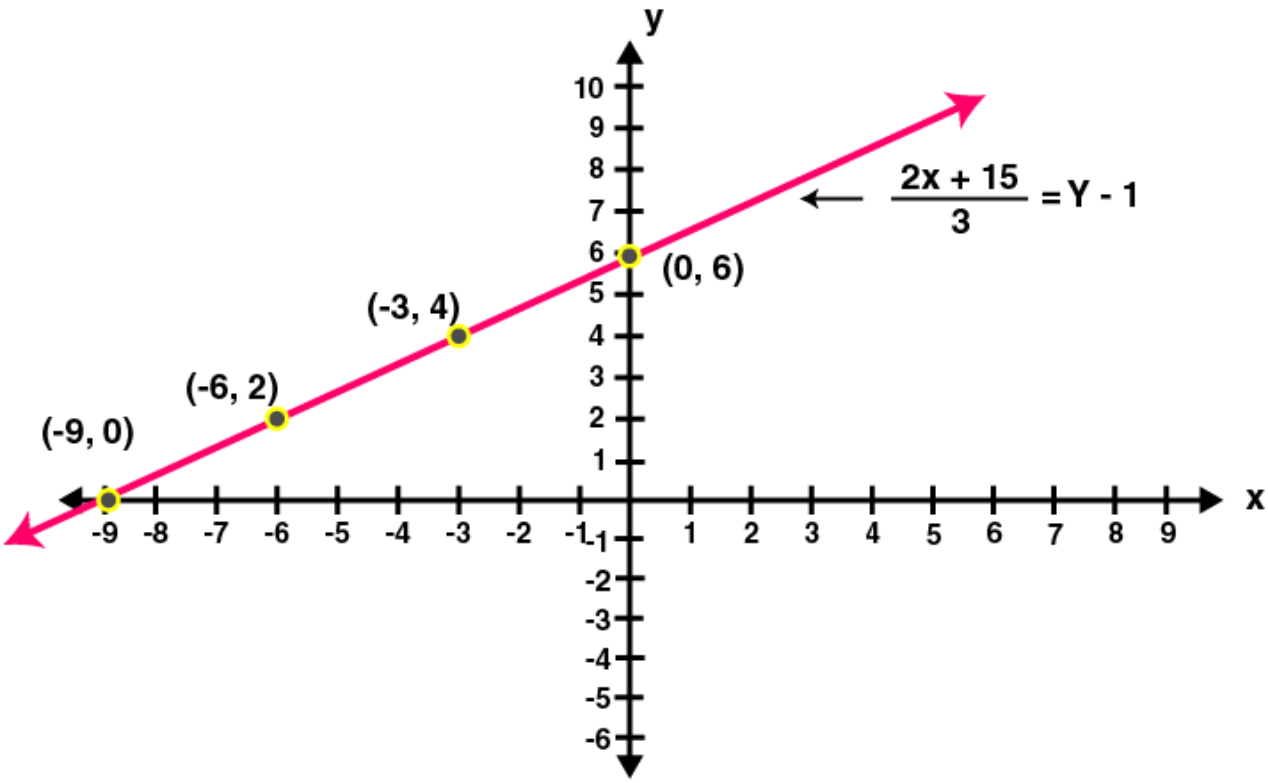
$$(ii)\frac{2x+15}{3}=y-1$$
$$\Rightarrow 2x+15=3(y-1)$$
$$\Rightarrow 2x+15=3y-3$$
$$\Rightarrow 2x-3y=-15-3$$
$$\Rightarrow 2x-3y=-18$$
$$\Rightarrow -3y=-18-2x$$
$$\Rightarrow y=\frac{-18-2x}{-3}$$

$$\text{When } x=0,\ y=\frac{-18-[2\times 0]}{-3}=\frac{-18-0}{-3}=6$$

$$\text{When } x=-3,\ y=\frac{-18-[2\times(-3)]}{-3}=\frac{-18+6}{-3}=4$$

$$\text{When } x=-6,\ y=\frac{-18-[2\times(-6)]}{-3}=\frac{-18+12}{-3}=2$$

x	0	−3	−6
y	6	4	2



Hence, the graph meets the coordinate axes at (-9, 0) and (0, 6)

3. Draw the graph of the straight line given by the equation 4x - 3y + 36 = 0. Calculate the area of the triangle formed by the line drawn and the co-ordinate axes.

Solution:

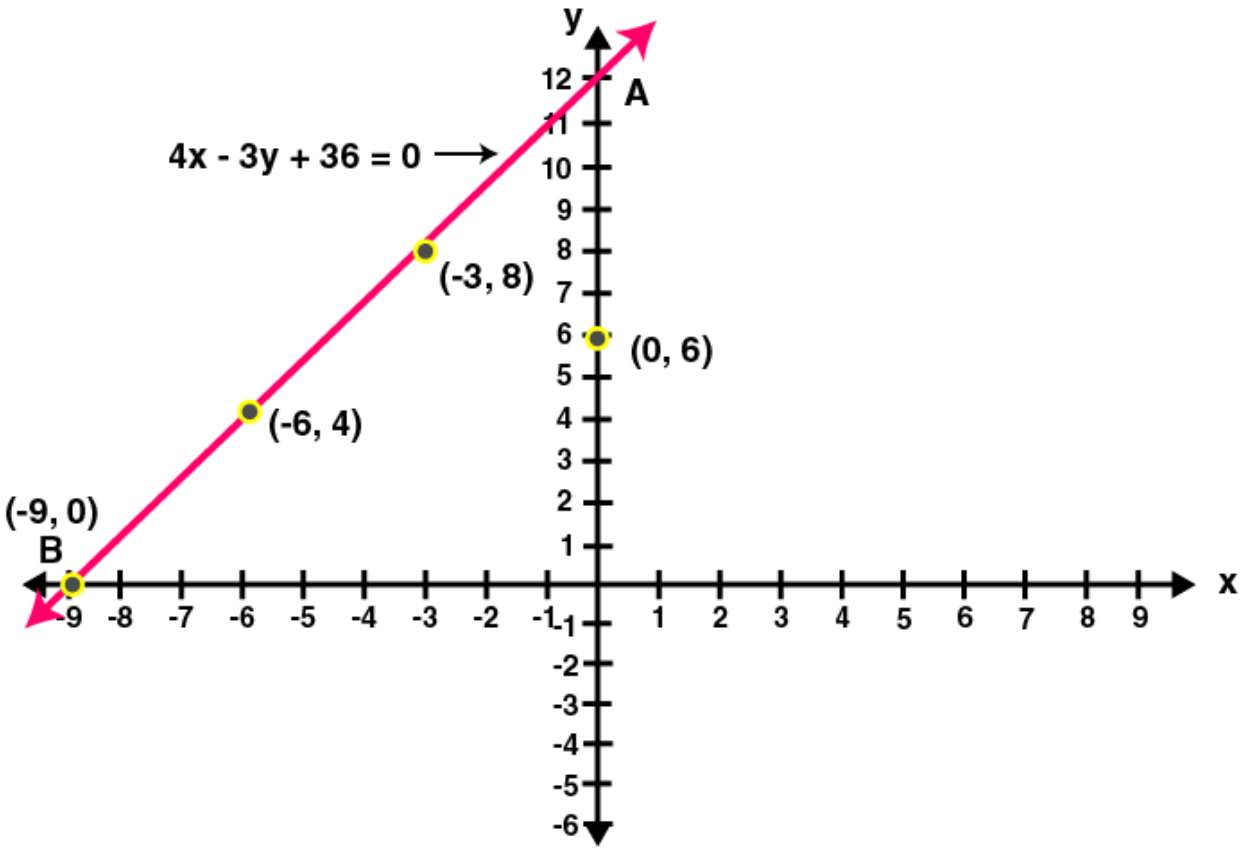
$$4x-3y+36=0$$
$$\Rightarrow 4x-3y=-36$$
$$\Rightarrow -3y=-36-4x$$
$$\Rightarrow 3y=36+4x$$
$$\Rightarrow y=\frac{36+4x}{3}$$

When $x=-6$, $y=\frac{36+4\times(-6)}{3}=\frac{36-24}{3}=4$

When $x=-3$, $y=\frac{36+4\times(-3)}{3}=\frac{36-12}{3}=8$

When $x=-9$, $y=\frac{36+4\times(-9)}{3}=\frac{36-36}{3}=0$

x	−9	−3	−6
y	0	8	4



Hence, the straight line cuts the co-ordinate axis at A(0, 12) and B(-9, 0).

∴ The triangle ΔAOB is formed.

$$\text{Area of the triangle AOB} = \frac{1}{2} \times AO \times OB$$

$$= \frac{1}{2} \times 12 \times 9$$

$$= 54 \text{ sq. units}$$

∴ Area of the triangle is 54 sq. units

4. Draw the graph of the equation 2x - 3y - 5 = 0
From the graph, find:

(i) x_1, the value of x, when y = 7

(ii) x_2, the value of x, when y = -5

Solution:

$2x-3y-5=0$

$\Rightarrow 2x=3y+5$

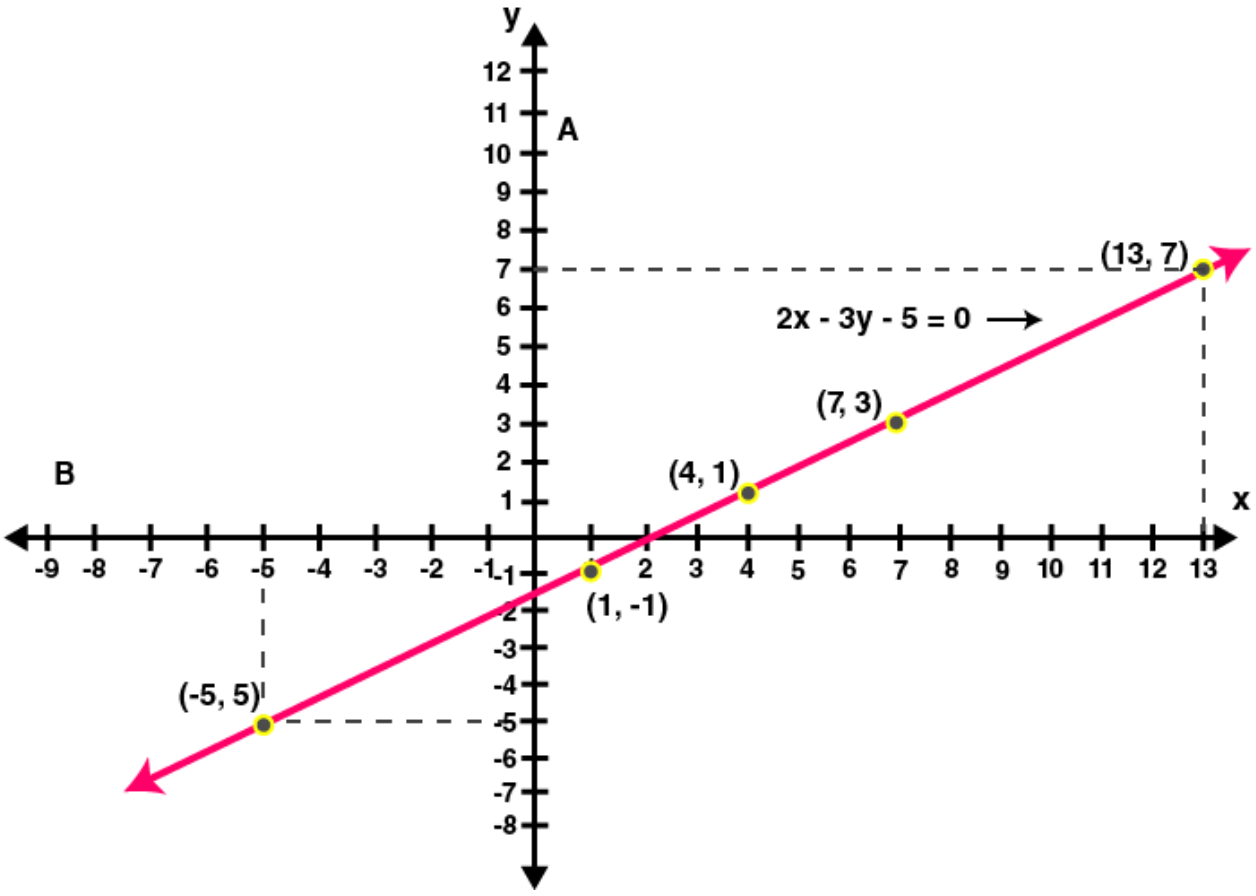
$\Rightarrow x=\frac{3y+5}{2}$

When $y=1,\ x=\frac{3(1)+5}{2}=\frac{8}{2}=4$

When $y=3,\ x=\frac{3(3)+5}{2}=\frac{9+5}{2}=7$

When $y=-1,\ x=\frac{3(-1)+5}{2}=\frac{5-3}{2}=1$

x	4	7	1
y	1	3	−1



The value of x, when y=7:

We have the equation of the line as

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

Now substitute y=7 and $x=x_1$:

$$x_1 = \frac{3(7) + 5}{2} = \frac{21 + 5}{2} = \frac{26}{2} = 13$$

The value of x, when y=−5:

Now substitute y=−5 and $x=x_2$:

$$x_2 = \frac{3(-5) + 5}{2} = \frac{-15 + 5}{2} = \frac{-10}{2} = -5$$

5. Draw the graph of the equation 4x + 3y + 6 = 0
From the graph, find:

(i) y_1, the value of y, when x = 12

(ii) y_2, the value of y, when x = -6

Solution:

$$4x + 3y + 6 = 0$$

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

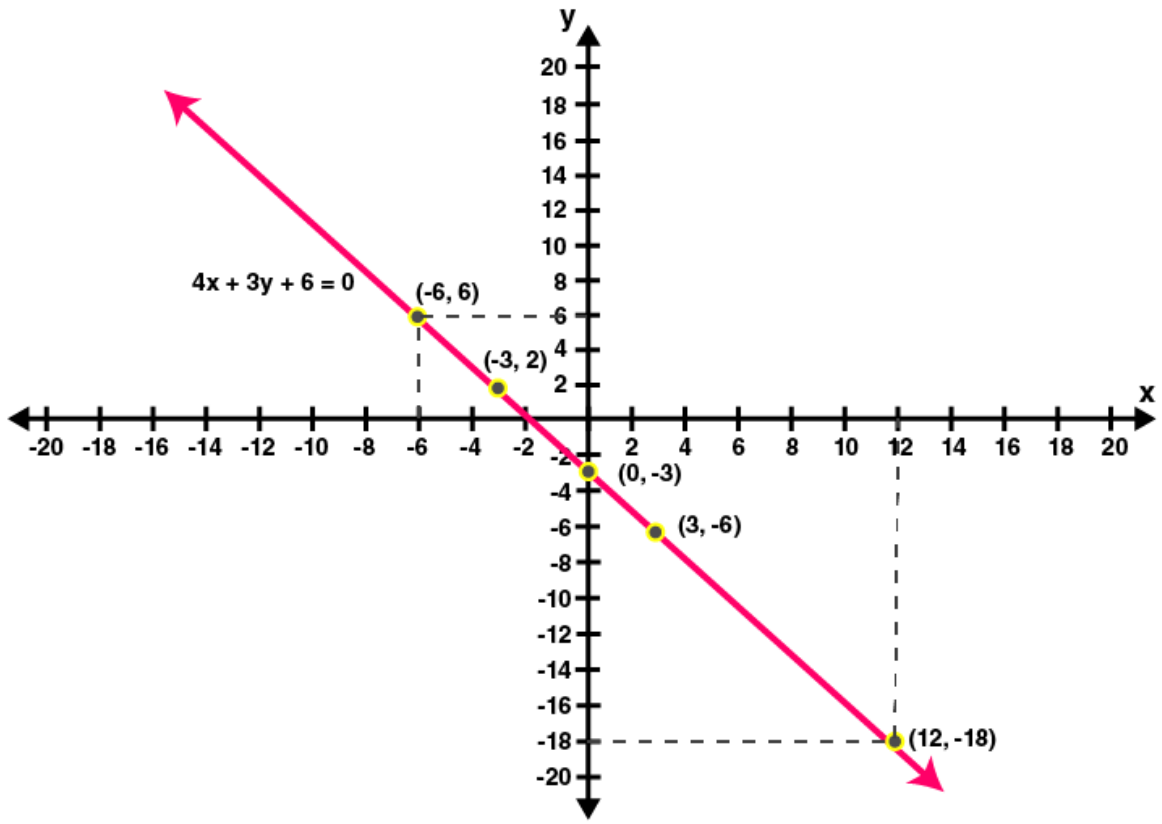
$$\Rightarrow y = \frac{-4x - 6}{3}$$

When $x = 0$, $y = \frac{-4(0) - 6}{3} = \frac{-6}{3} = -2$

When $x = 3$, $y = \frac{-4(3) - 6}{3} = \frac{-12 - 6}{3} = -6$

When $x = -3$, $y = \frac{-4(-3) - 6}{3} = \frac{12 - 6}{2} = 2$

x	0	3	−3
y	−2	−6	2



The value of y, when x=12:

We have the equation of the line as

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

Now substitute x=12 and y=y_1 :

$$y_1 = \frac{-4(12) - 6}{3} = \frac{-48 - 6}{3} = \frac{-54}{3} = -18$$

The value of y, when x=– 6:

Now substitute x=– 6 and y=y_2 :

$$y_2 = \frac{-4(-6) - 6}{3} = \frac{24 - 6}{3} = \frac{18}{3} = 6$$

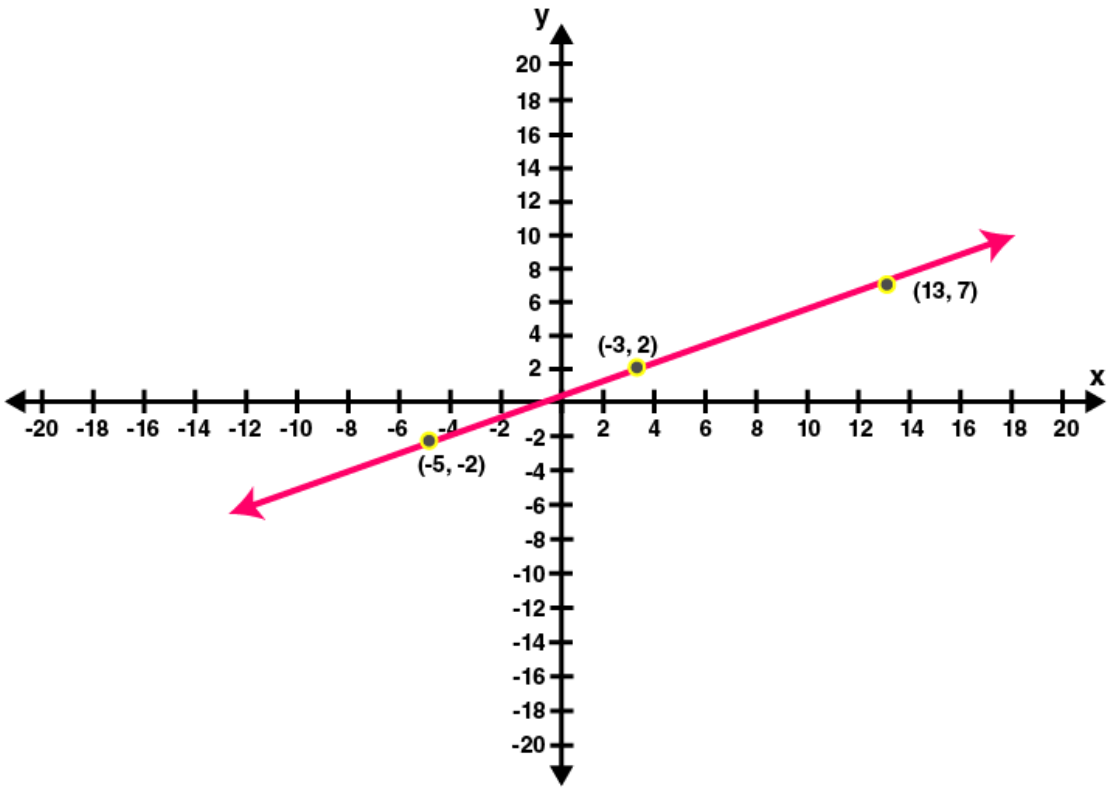
6. Use the table given below to draw the graph.

x	**-5**	**-1**	**3**	**b**	**13**
y	**-2**	**a**	**2**	**5**	**7**

From your graph, find the values of 'a' and 'b'.

State a linear relation between the variables x and y.

Solution:



When x = -1, y =0. i.e., a = 0.
When y = 5, x = 9. i.e., b = 9.
Let y=px+q ....(1)
be a linear relation between x and y
Substitute x=9 and y=5 in the equation (1), we have,
5=9p+q ....(2)
Substitute x=−1 and y=0 in the equation (1), we have,
0=−p+q ....(3)
Subtracting (3) from (2), we have,
5=10p

$\Rightarrow p=\frac{5}{10}$

$\Rightarrow p=\frac{1}{2}$

From (3), we have,
p=q

$\therefore q=\frac{1}{2}$

Thus, the linear relation is
y=px+q

$\Rightarrow y=\frac{1}{2}x+\frac{1}{2}$

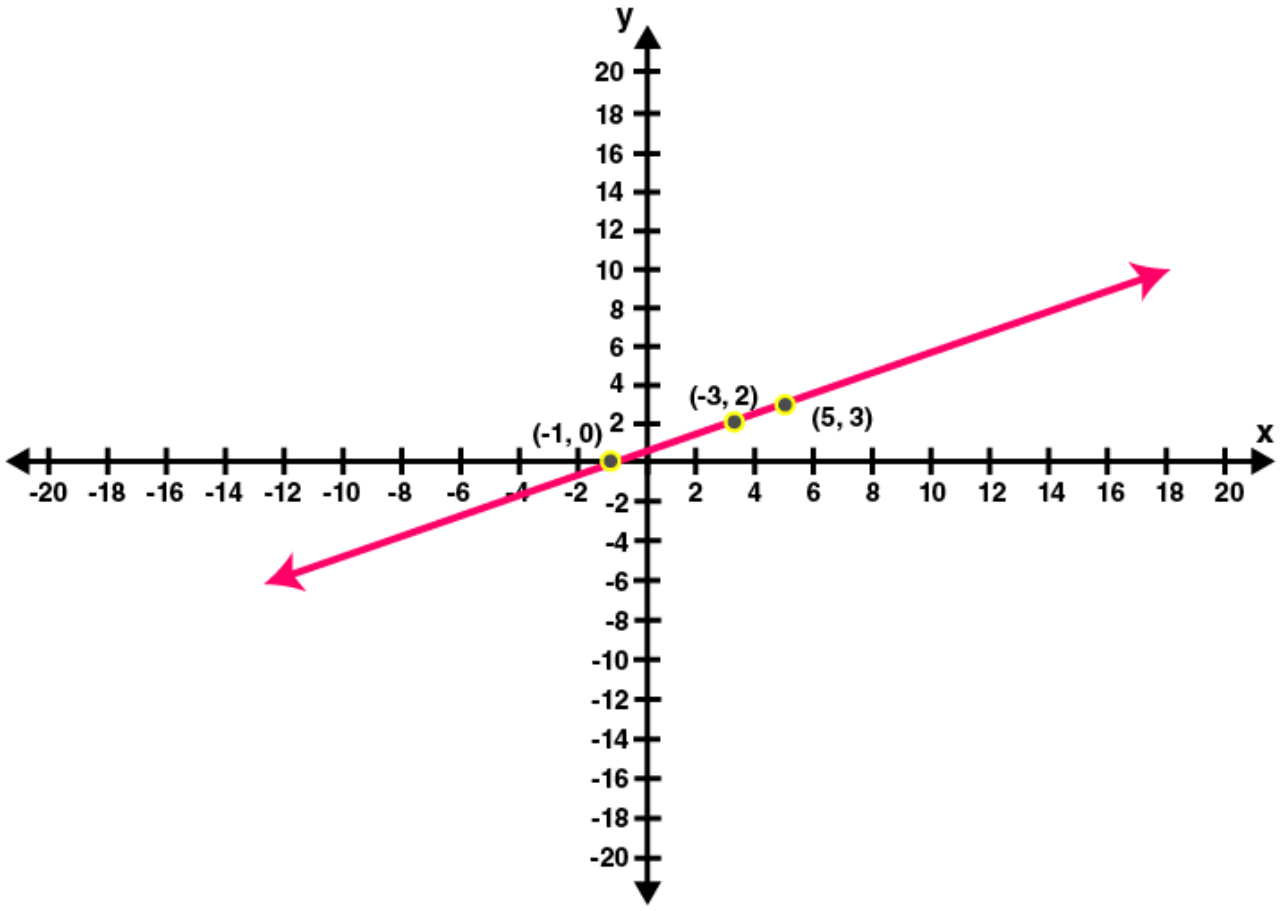
$\Rightarrow y=\frac{x+1}{2}$

7. **Draw the graph obtained from the table below:**

x	a	3	-5	5	c	-1
y	-1	2	b	3	4	0

Use the graph to find the values of a, b and c. State a linear relation between the variables x and y.

Solution:



When $y = -1$, then $x = -3$

$\Rightarrow a = -3$

When $x = -5$, then $y = -2$

$\Rightarrow b = -2$

When $y = 4$, then $x = 7$

$\Rightarrow c = 7$

Let $y=px+q$ ....(1)
be a linear relation between x and y
Substitute $x=-3$ and $y=-1$ in the equation (1), we have,
$-1=-3p+q$ ....(2)
Substitute $x=-5$ and $y=-2$ in the equation (1), we have,
$-2=-5p+q$ ....(3)
Subtracting (3) from (2), we have,
$1=2p$

$$\Rightarrow p=\frac{1}{2}$$

From (3), we have,
$-2=-5p+q$

$$\Rightarrow -2=-5\left(\frac{1}{2}\right)+q$$

$$\Rightarrow -4=-5+2q$$

$$\Rightarrow 2q=5-4$$

$$\Rightarrow 2q=1$$

$$\therefore q=\frac{1}{2}$$

Thus, the linear relation is
$y=px+q$

$$\Rightarrow y=\frac{1}{2}x+\frac{1}{2}$$

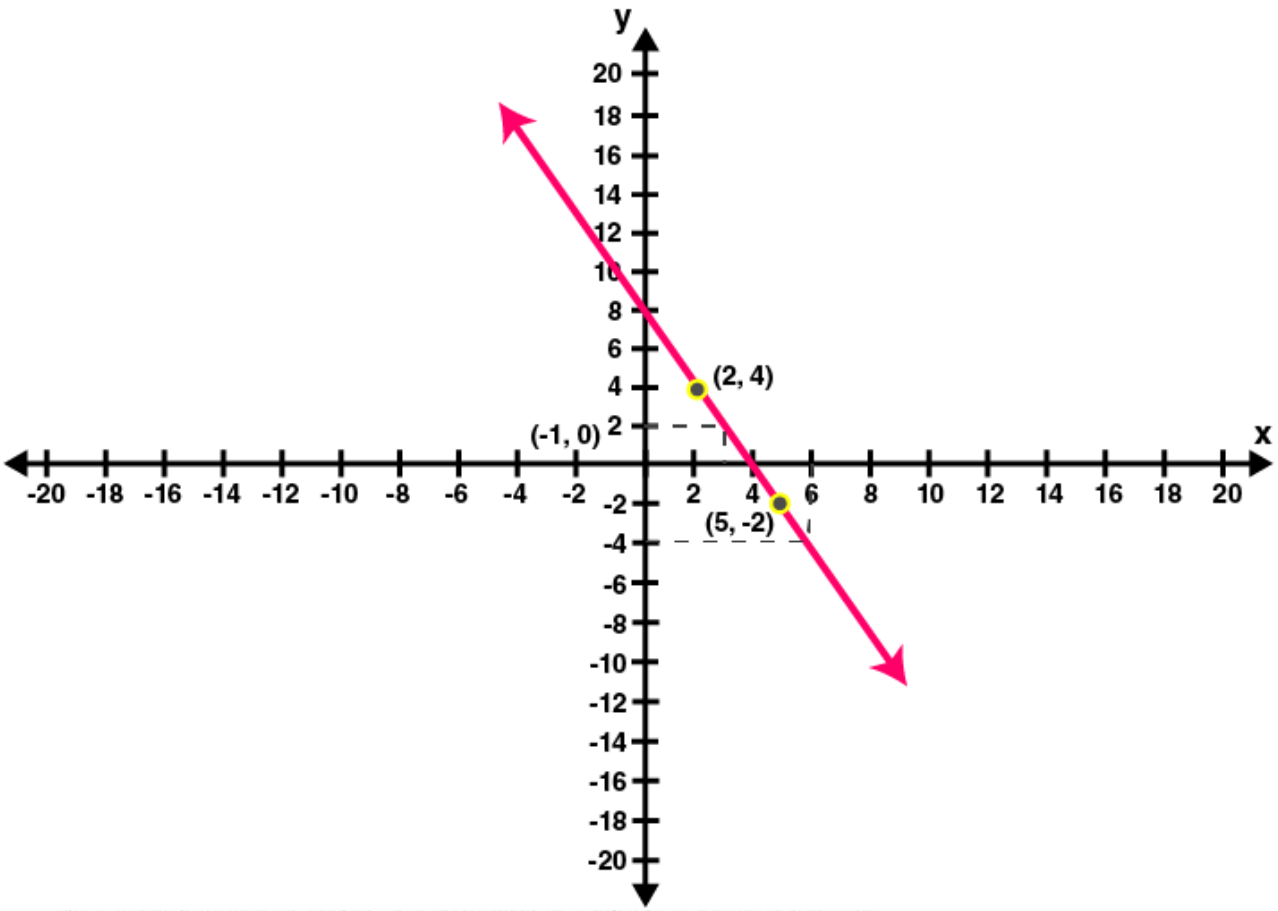
$$\Rightarrow y=\frac{x+1}{2}$$

8. A straight line passes through the points (2, 4) and (5, -2). Taking 1 cm = 1 unit; mark these points on a graph paper and draw the straight line through these points. If points (m, -4) and (3, n) lie on the line drawn; find the values of m and n.

Solution:

The table is:

x	2	3	5	m
y	4	n	-2	-4



Now draw a line x=3, parallel to y-axis to meet the line
It meets the line at y=2 and therefore, n=2
Now draw a line y=– 4, parallel to x-axis to meet the line
It meets the line at x=6 and therefore, m=6
Thus the values of m and n are 6 and 2 respectively.

9. Draw the graph (straight line) given by equation x - 3y = 18. If the straight line drawn passes through the points (m, -5) and (6, n); find the values of m and n.

Solution:

According to the question,

$x - 3y = 18$

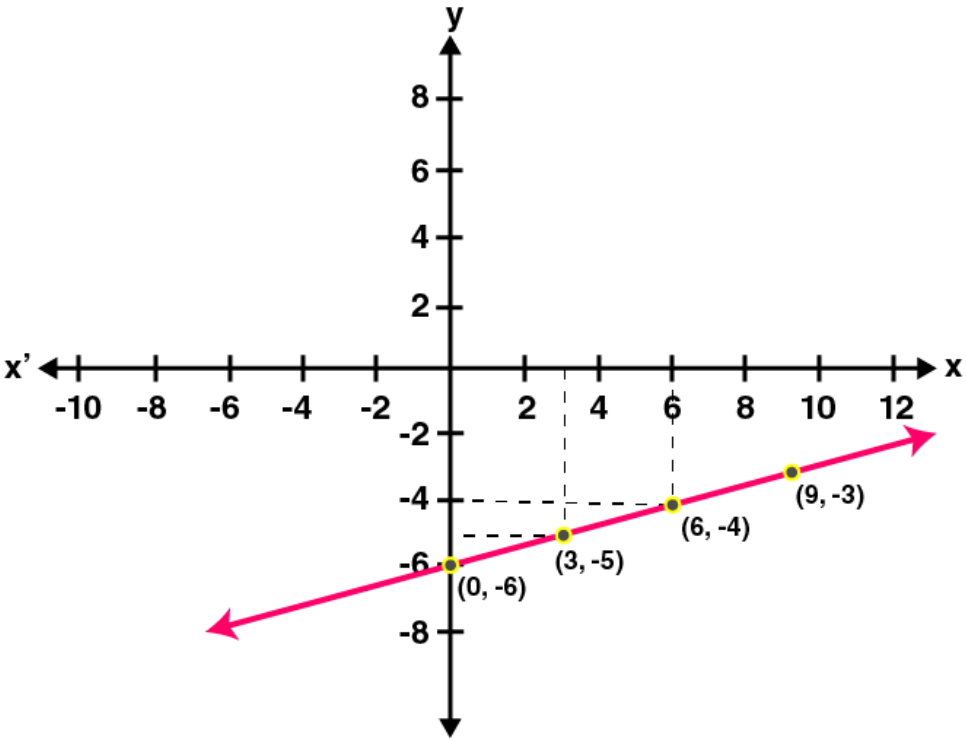
$\Rightarrow -3y = 18 - x$

$\Rightarrow 3y = x - 18$

$\Rightarrow y = \frac{x - 18}{3}$

The table for $x - 3y = 18$ is

x	9	0	6	3
y	-3	-6	-4	-5



Hence, from the graph, we can conclude that m=3 and n=-4.

10. Use the graphical method to find the value of k, if:

(i) (k, -3) lies on the straight line 2x + 3y = 1

(ii) (5, k - 2) lies on the straight line x - 2y + 1 = 0

Solution:

(i)

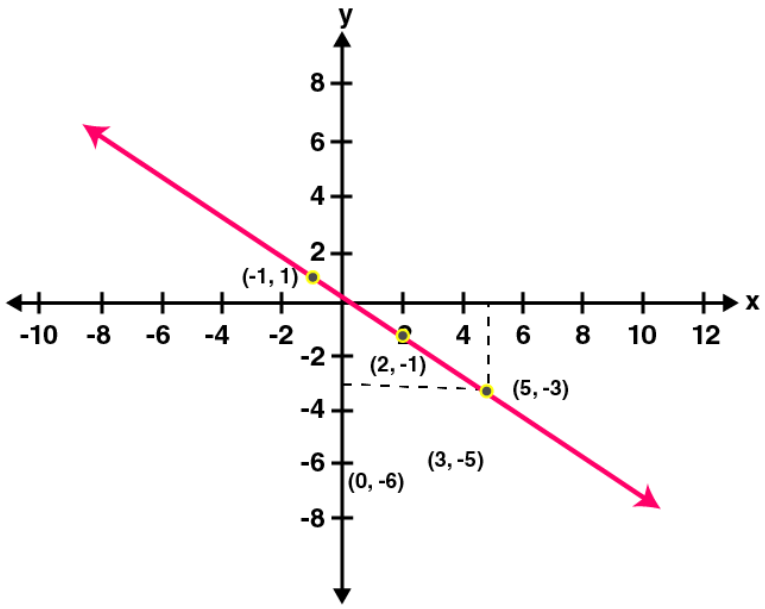
$2x + 3y = 1$

$\Rightarrow 3y = 1 - 2x$

$\Rightarrow y = \frac{1 - 2x}{3}$

The table for $2x + 3y = 1$ is

x	-1	2	5
y	1	-1	-3



Hence, from the graph, we can conclude that k=5.

(ii)

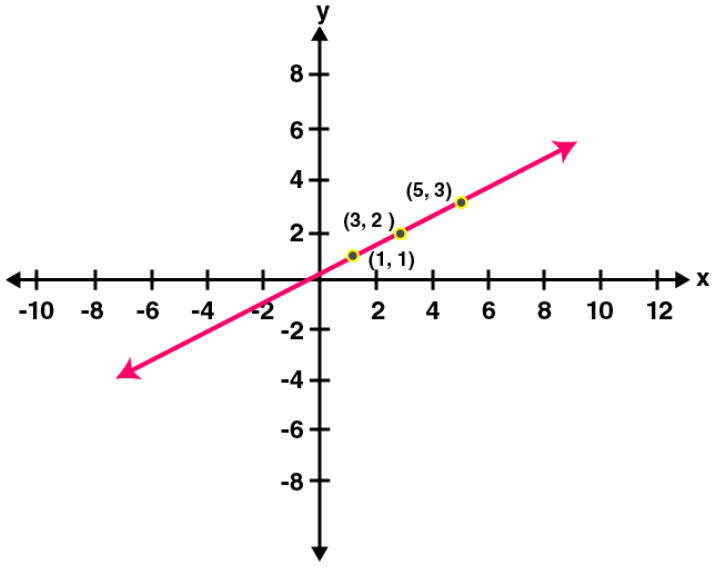
$x - 2y + 1 = 0$

$\Rightarrow 2y = x + 1$

$\Rightarrow y = \frac{x+1}{2}$

The table for $x - 2y + 1 = 0$ is

x	1	3	5
y	1	2	3



Hence, from the graph, we can conclude that,

k – 2 = 3

k = 5

EXERCISE 27(B) PAGE:329

1. **Solve, graphically, the following pairs of equations :**

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

(ii) $2x + y = 23$
$4x - y = 19$

(iii) $3x + 7y = 27$
$8 - y = \frac{5}{2}x$

(iv) $\frac{x+1}{4} = \frac{2}{3}(1 - 2y)$
$\frac{2+5y}{3} = \frac{x}{7} - 2$

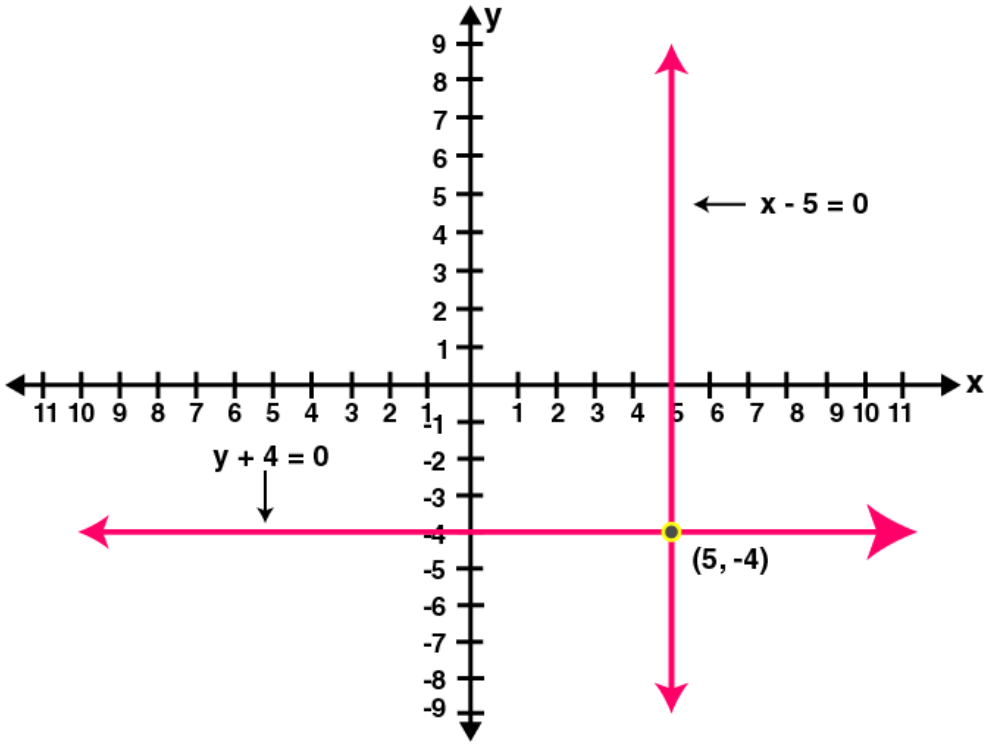
Solution:

(i)

$x - 5 = 0 \Rightarrow x = 5$

$y + 4 = 0 \Rightarrow y = -4$

Following is the graph of the two equations $x = 5$ and $y = -4$:



(ii)

$2x + y = 23 \Rightarrow y = 23 - 2x$

The table for $y = 23 - 2x$ is

x	5	10	15
y	13	3	-7

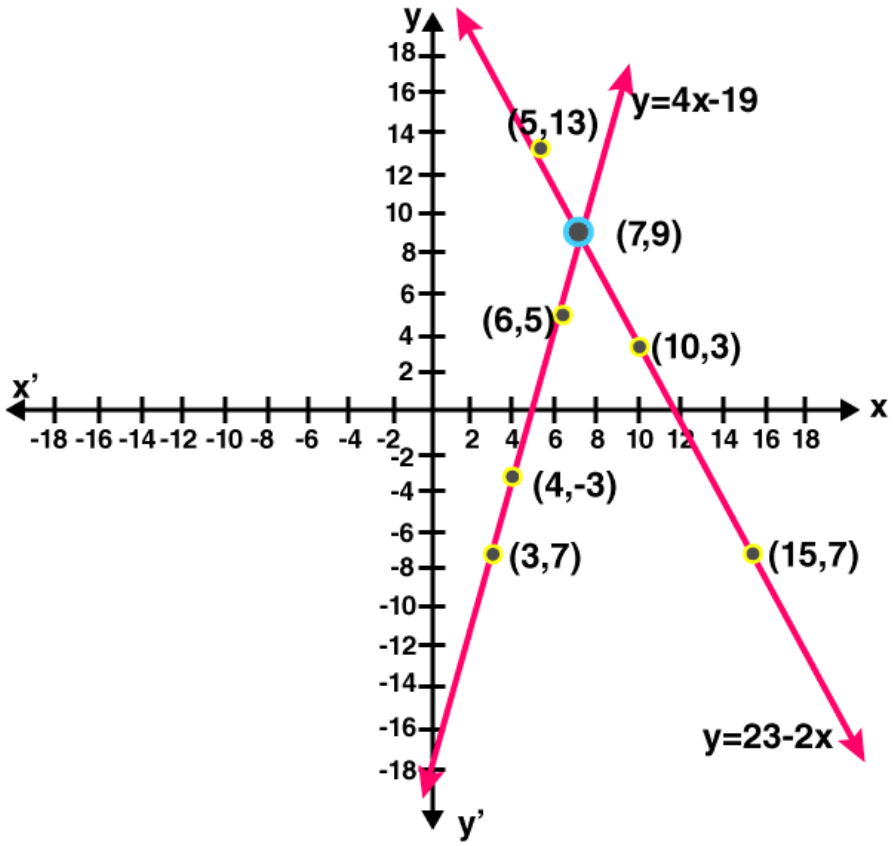
Also, we have

$4x - y = 19$

$\Rightarrow y = 4x - 19$

The table for $y = 4x - 19$ is

x	3	4	6
y	-7	-3	5



Intersection point = (7,9)

(iii)

$3x + 7y = 27 \Rightarrow 3x = 27 - 7y$

$\Rightarrow x = \frac{27 - 7y}{3}$

The table for $3x + 7y = 27$ is

x	9	2	-5
y	0	3	6

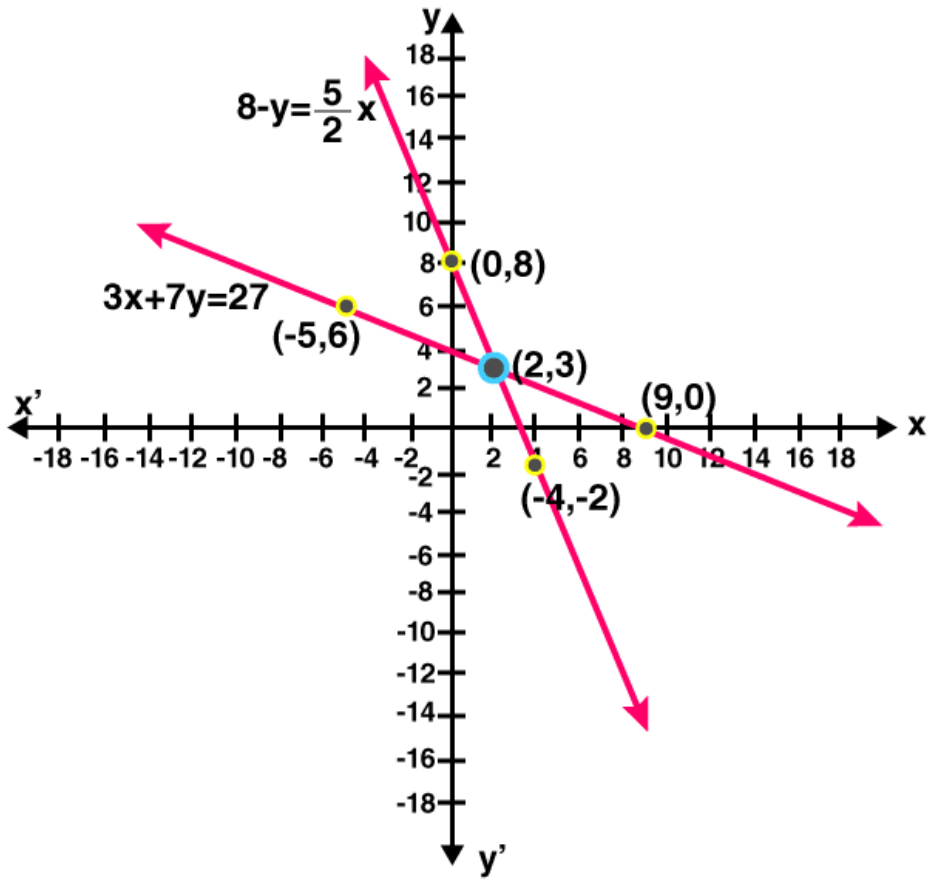
Also, we have

$8 - y = \frac{5}{2}x$

$\Rightarrow x = (8 - y) \times \frac{2}{5}$

The table for $5x + 2y = 16$ is

x	2	4	0
y	3	-2	8



Intersection point = (2,3)

(iv)

$$\frac{x+1}{4}=\frac{2}{3}(1-2y)$$

$$\Rightarrow \quad \frac{x+1}{4}=\frac{2}{3}-\frac{4y}{3}$$

$$\Rightarrow 12\times\frac{x+1}{4}=12\times\frac{2}{3}-12\times\frac{4y}{3}$$

$$\Rightarrow \quad 3(x+1)=8-16y$$

$$\Rightarrow \quad 3x+3=8-16y$$

$$\Rightarrow 3x+3-8=-16y$$

$$\Rightarrow \quad 3x-5=-16y$$

$$\Rightarrow \quad x=\frac{5-16y}{3}$$

The table for $\frac{x+1}{4}=\frac{2}{3}(1-2y)$ is

x	7	-9	23
y	-1	2	-4

Also, we have

$$\frac{2+5y}{3}=\frac{x}{7}-2$$

$$\Rightarrow 21\times\frac{2+5y}{3}=21\times\frac{x}{7}-21\times 2$$

$$\Rightarrow \quad 7(2+5y)=3x-42$$

$$\Rightarrow \quad 14+35y=3x-42$$

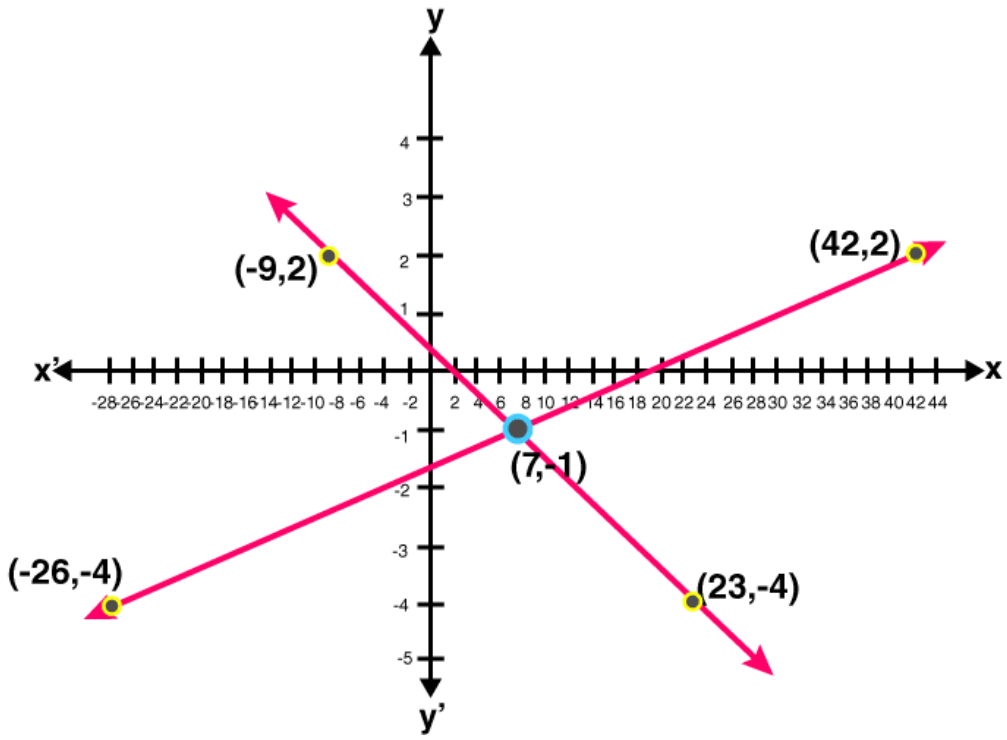
$$\Rightarrow \quad 3x=14+35y+42$$

$$\Rightarrow \quad 3x=56+35y$$

$$\Rightarrow \quad x=\frac{56+35y}{3}$$

The table for $\frac{2+5y}{3}=\frac{x}{7}-2$ is

x	7	-28	42
y	-1	-4	2



Intersection point = (7,-1)

2. **Solve graphically the simultaneous equations given below. Take the scale as 2 cm = 1 unit on both the axes.**

x - 2y - 4 = 0

2x + y = 3

Solution:

$x - 2y - 4 = 0$

$\Rightarrow x = 2y + 4$

The table for $x - 2y - 4 = 0$ is

x	4	6	2
y	0	1	-1

Also we have

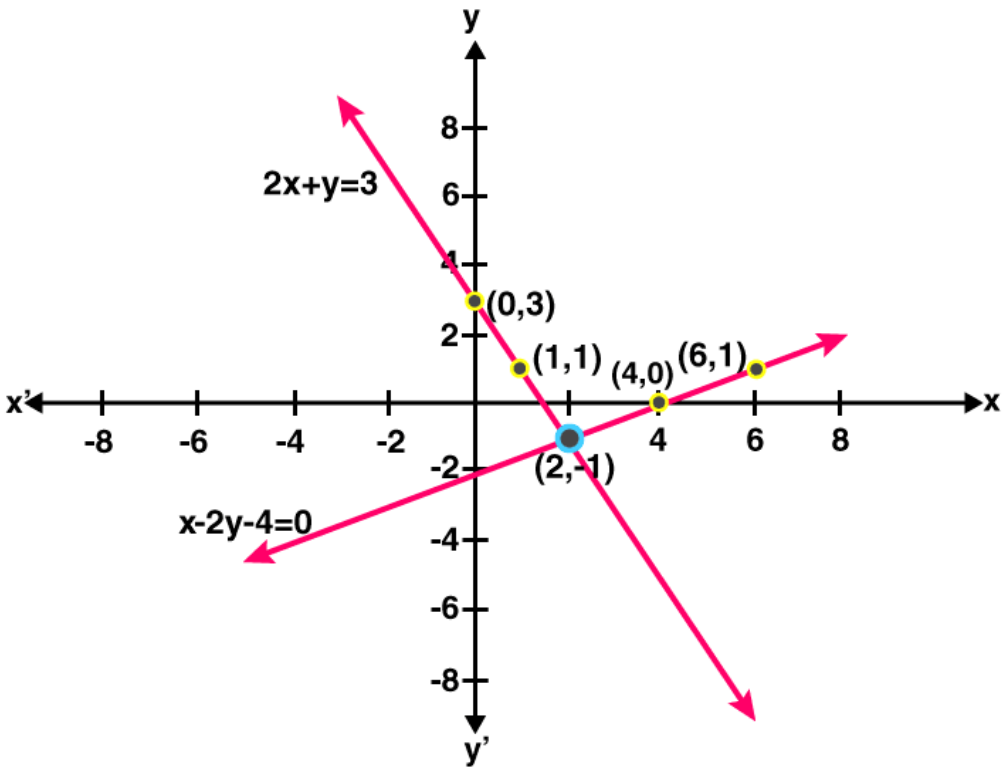
$2x+y=3$

$\Rightarrow 2x=3-y$

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

The table for $2x+y=3$ is

x	1	0	2
y	1	3	-1



Intersection point: (2,-1)

3. **Use graph paper for this question. Draw the graph of 2x - y - 1 = 0 and 2x + y = 9 on the same axes. Use 2 cm = 1 unit on both axes and plot only 3 points per line. Write down the co-ordinates of the point of intersection of the two lines.**

Solution:

$2x - y - 1 = 0$

$\Rightarrow 2x = y + 1$

$\Rightarrow x = \frac{y+1}{2}$

The table for $2x - y - 1 = 0$ is

x	2	1	0
y	3	1	-1

Also we have

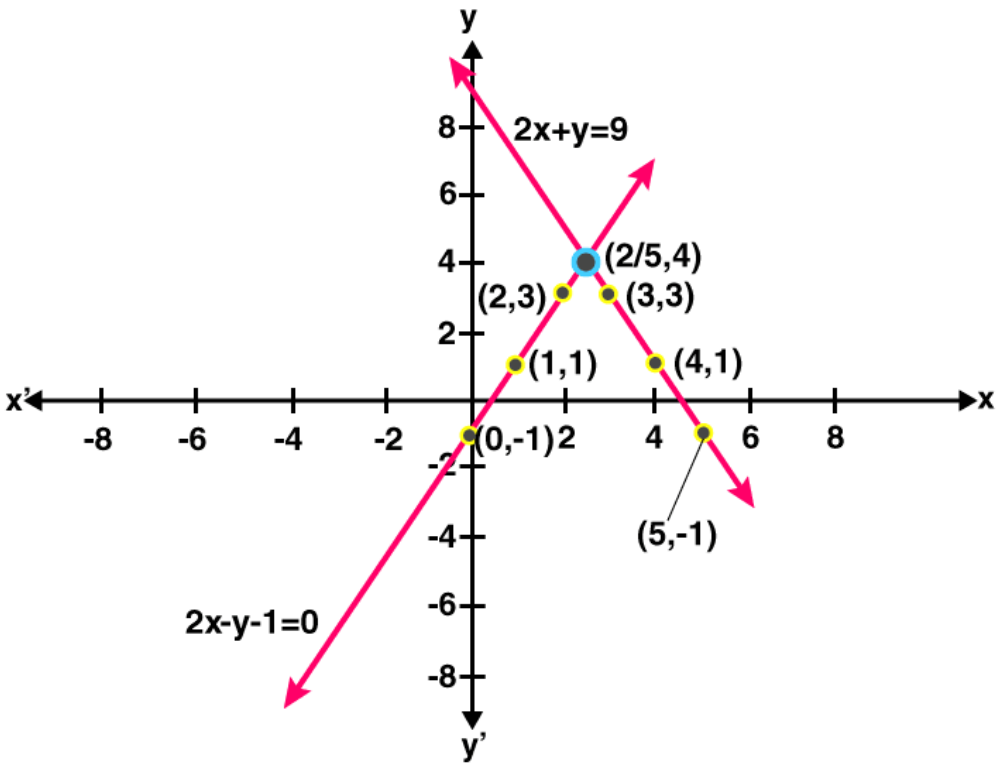
$2x+y=9$

$\Rightarrow 2x=9-y$

$\Rightarrow x = \frac{9-y}{2}$

The table for $2x+y=9$ is

x	4	3	5
y	1	3	-1



Intersection point: (2.5, 4)

4. **Use graph paper for this question. Take 2 cm = 2 units on x-axis and 2 cm = 1 unit on y-axis.**
Solve graphically the following equations:
3x + 5y = 12
3x - 5y + 18 = 0
(Plot only three points per line)

Solution:

$3x + 5y = 12$

$\Rightarrow 3x = 12 - 5y$

$\Rightarrow x = \frac{12 - 5y}{3}$

The table for $3x + 5y = 12$ is

x	4	-1	-6
y	0	3	-1

Also we have

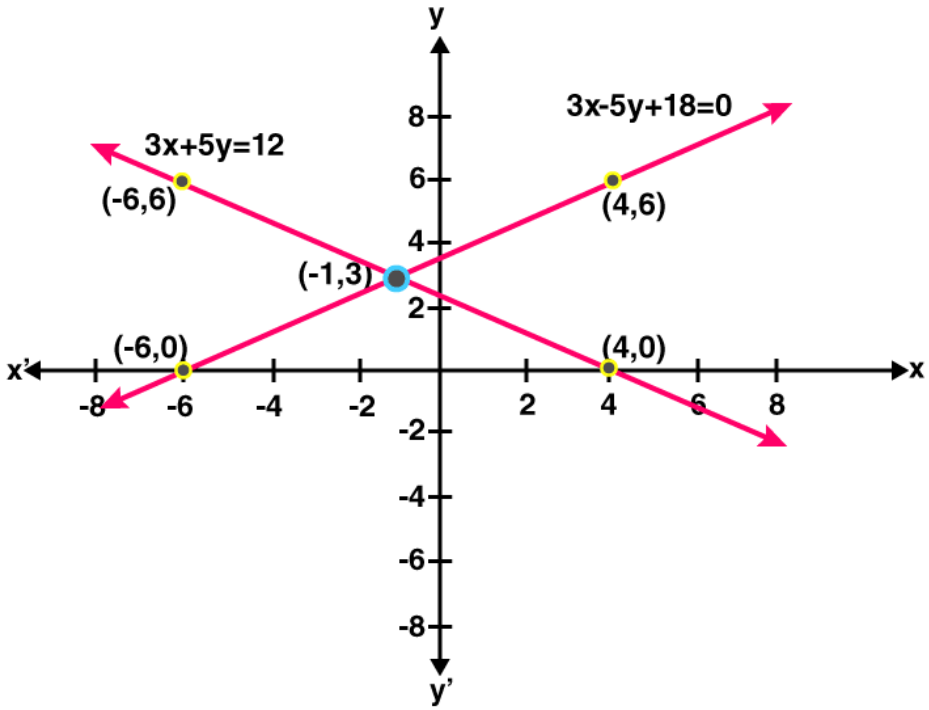
$3x - 5y + 18 = 0$

$\Rightarrow 3x = 5y - 18$

$\Rightarrow x = \frac{5y - 18}{3}$

The table for $3x - 5y + 18 = 0$ is

x	-6	4	-1
y	0	6	3



Intersection Point: (-1, 3)

5. **Use graph paper for this question. Take 2 cm = 1 unit on both the axes.**
   (i) Draw the graphs of x + y + 3 = 0 and 3x - 2y + 4 = O. Plot only three points per line.
   (ii) Write down the co-ordinates of the point of intersection of the lines.
   (iii) Measure and record the distance of the point of intersection of the lines from the origin in cm.

Solution:

(i)

$x + y + 3 = 0$

$\Rightarrow x = -3 - y$

The table for $x + y + 3 = 0$ is

x	1	0	-2
y	-4	-3	-1

Also we have

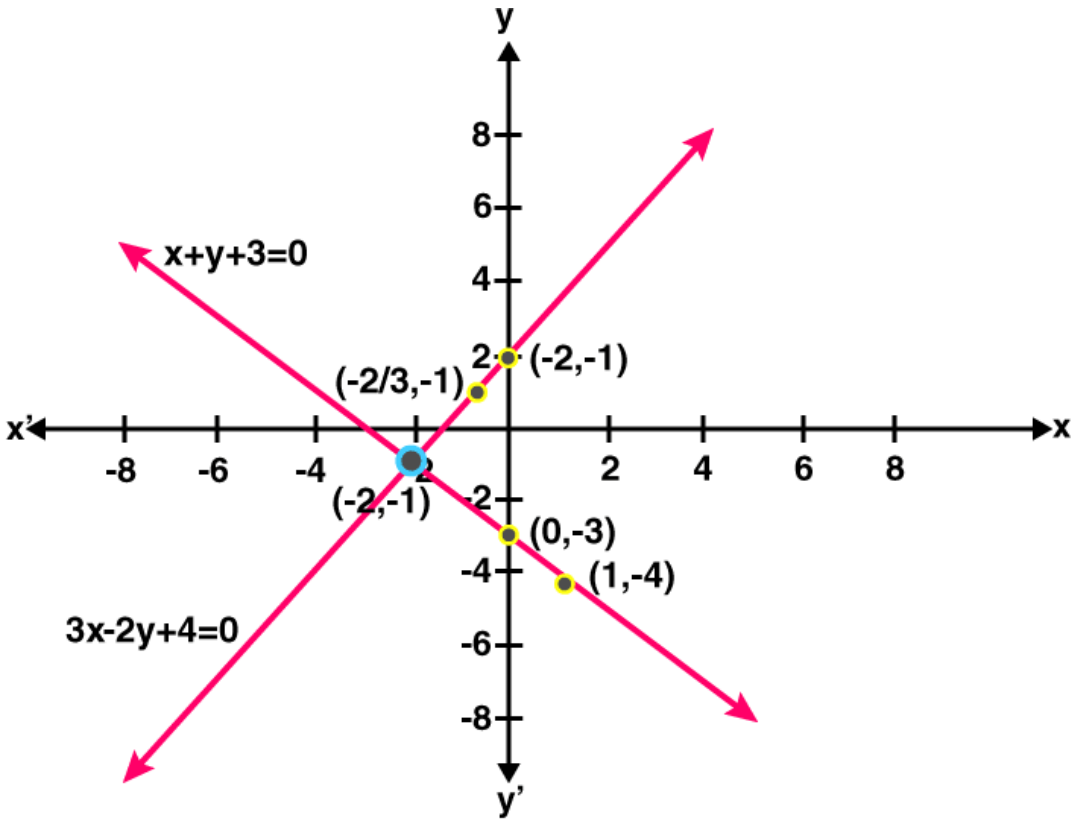
$3x - 2y + 4 = 0$

$\Rightarrow 3x = 2y - 4$

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

The table for $3x - 2y + 4 = 0$ is

x	0	-2	$-\frac{2}{3}$
y	2	-1	1



(ii)

Intersection points: (-2, -1)

(iii)

Applying Pythagoras Theorem,

$$\text{the distance from the origin} = \sqrt{(-2-0)^2+(-1-0)^2}$$
$$= \sqrt{2^2+1^2}$$
$$= \sqrt{4+1}$$
$$= \sqrt{5}$$
$$= 2.2 \text{ cm (approx)}$$

6. The sides of a triangle are given by the equations y - 2 = 0; y + 1 = 3 (x - 2) and x + 2y = O. Find, graphically:

(i) the area of triangle;

(ii) the co-ordinates of the vertices of the triangle.

Solution:

$y - 2 = 0$

$\Rightarrow y = 2$

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

$\Rightarrow y + 1 = 3x - 6$

$\Rightarrow y = 3x - 6 - 1$

$\Rightarrow y = 3x - 7$

The table for $y + 1 = 3(x - 2)$ is

x	1	2	3
y	-4	-1	2

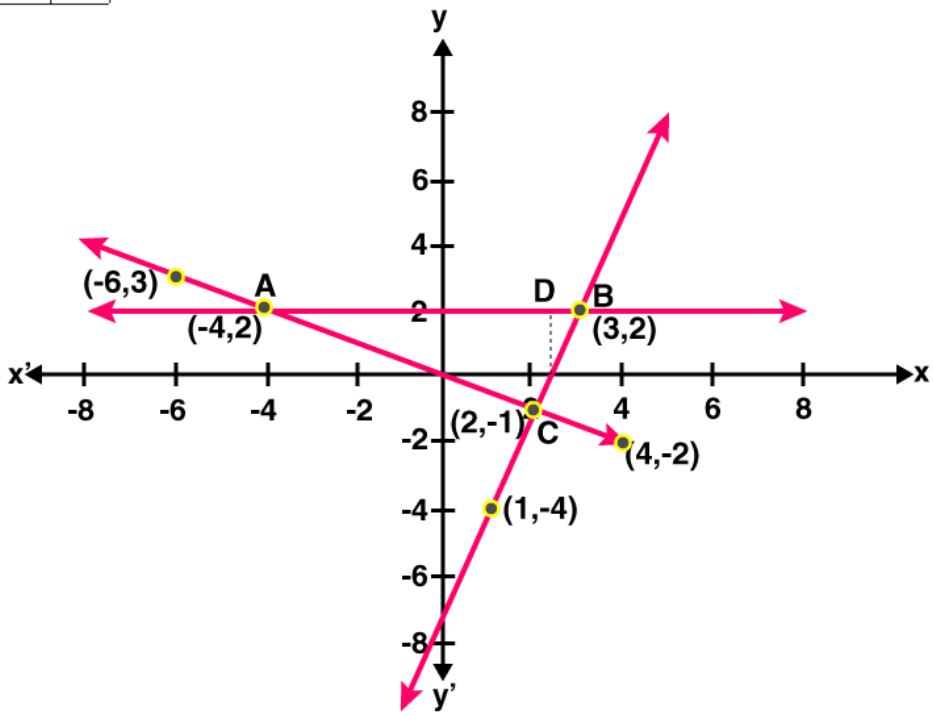
Also we have

$x + 2y = 0$

$\Rightarrow x = -2y$

The table for $x + 2y = 0$ is

x	-4	4	-6
y	2	-2	3



The area of the triangle ABC $= \frac{1}{2} \times AB \times CD$

$= \frac{1}{2} \times 7 \times 3$

$= \frac{21}{2}$

$= 10.5$ sq.units

(iii) The coordinates of the vertices of the triangle= (-4,2), (3,2) and (2,-1)

7. By drawing a graph for each of the equations 3x + y + 5 = 0; 3y - x = 5 and 2x + 5y = 1 on the same graph paper; show that the lines given by these equations are concurrent (i.e. they pass through the same point).
Take 2 cm = 1 unit on both the axes.

Solution:

$3x+y+5=0 \Rightarrow y=-3x-5$

The table of $3x+y+5=0$ is

x	1	-3	-2
y	-8	4	1

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

The table of $3y-x=5$ is

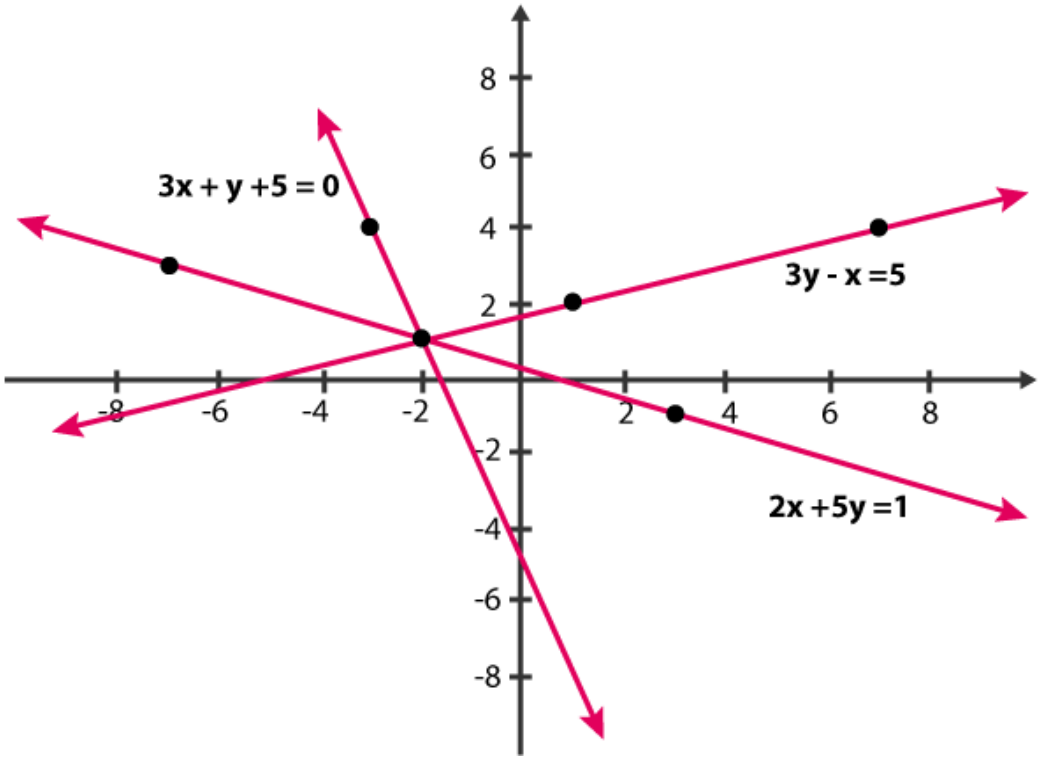
x	-2	1	7
y	1	2	4

$2x+5y=1$

$\Rightarrow 2x=1-5y \Rightarrow x=\frac{1-5y}{2}$

The table of $2x+5y=1$ is

x	3	-7	-2
y	-1	3	1



Hence,
According to the graph,
The lines of the graphs are concurrent.

8. Using a scale of 1 cm to 1 unit for both the axes, draw the graphs of the following equations:

$6y = 5x + 10$, $y = 5x - 15$.

From the graph find:

(i) the co-ordinates of the point where the two lines intersect;

(ii) the area of the triangle between the lines and the x-axis.

Solution:

$6y = 5x + 10$

$\Rightarrow y = \frac{5x + 10}{6}$

The table of $6y = 5x + 10$ is

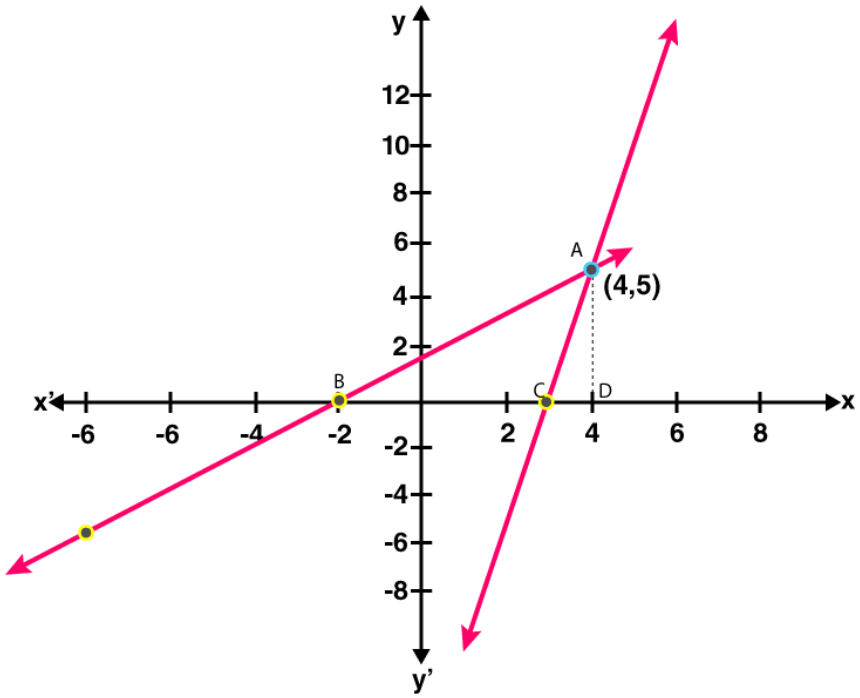
x	4	-2	-8
y	5	0	-5

Also, we have

$y = 5x - 15$

The table of $y = 5x - 15$ is

x	3	4	5
y	0	5	10



(i)

The two lines intersect at $(4,5)$

$\therefore AD \perp BC$

$AD = 5$ units and $BC = 5$ units

(ii)

The area of the triangle $= \frac{1}{2} \times BC \times AD$

$= \frac{1}{2} \times 5 \times 5$

$= \frac{25}{2}$ sq.units

$= 12.5$ sq.units

9. The cost of manufacturing x articles is Rs.(50 + 3x). The selling price of x articles is Rs.4x. On a graph sheet, with the same axes, and taking suitable scales draw two graphs, first for the cost of manufacturing against no. of articles and the second for the selling price against number of articles. Use your graph to determine:

(i) No. of articles to be manufactured and sold to break even (no profit and no loss),

(ii) The profit or loss made when (a) 30 (b) 60 articles are manufactured and sold

Solution:

Given that C.P. is 50+3x

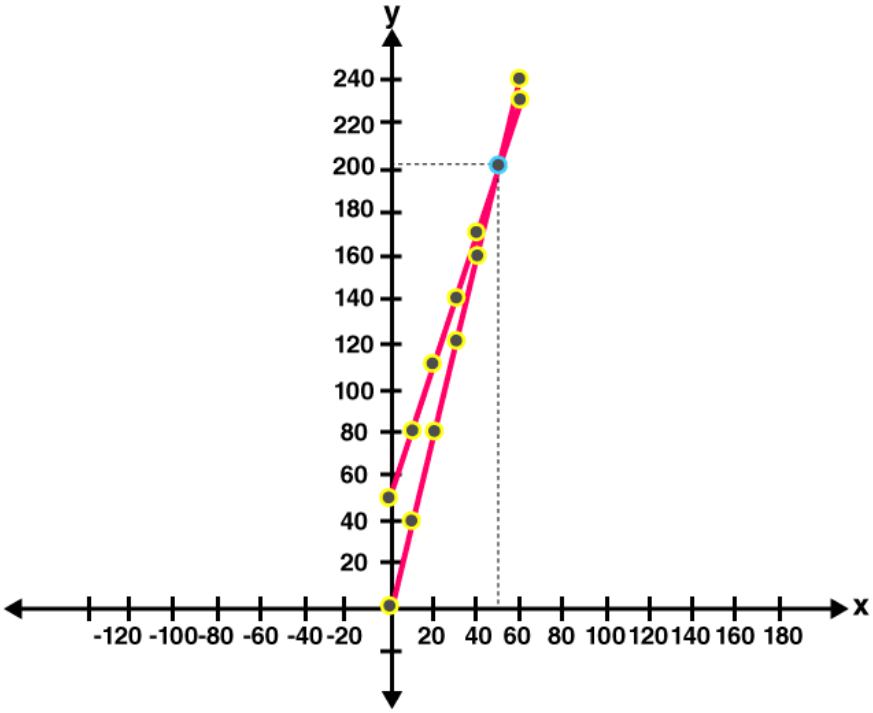
Table of C.P

x	0	10	20	30	40	50	60
C.P	50	80	110	140	170	200	230

and S.P. =4x

∴ Table of S.P.

x	0	10	20	30	40	50	60
S.P	0	40	80	120	160	200	240



(i)

No. of articles to be manufactured and sold are 50 when there is no loss and no profit.
C.P = S.P = Rs.200

(ii)

a.

On 30 article,
C.P = Rs.140 and S.P. = 120
Loss = 140 - 120 = Rs.20

b.

On 60 article,
C.P.=Rs.230 and S.P.= Rs.240
Profit = 240 - 230 = Rs.10

10. Find graphically, the vertices of the triangle whose sides have the equations 2y - x = 8; 5y - x = 14 and y - 2x = 1 respectively.
Take 1 cm = 1 unit on both the axes.

Solution:

$2y - x = 8;$

$y = \frac{8+x}{2};$

The table of $2y - x = 8$ is

x	-6	-2	0
y	1	3	4

$5y - x = 14 \Rightarrow x = 5y - 14$

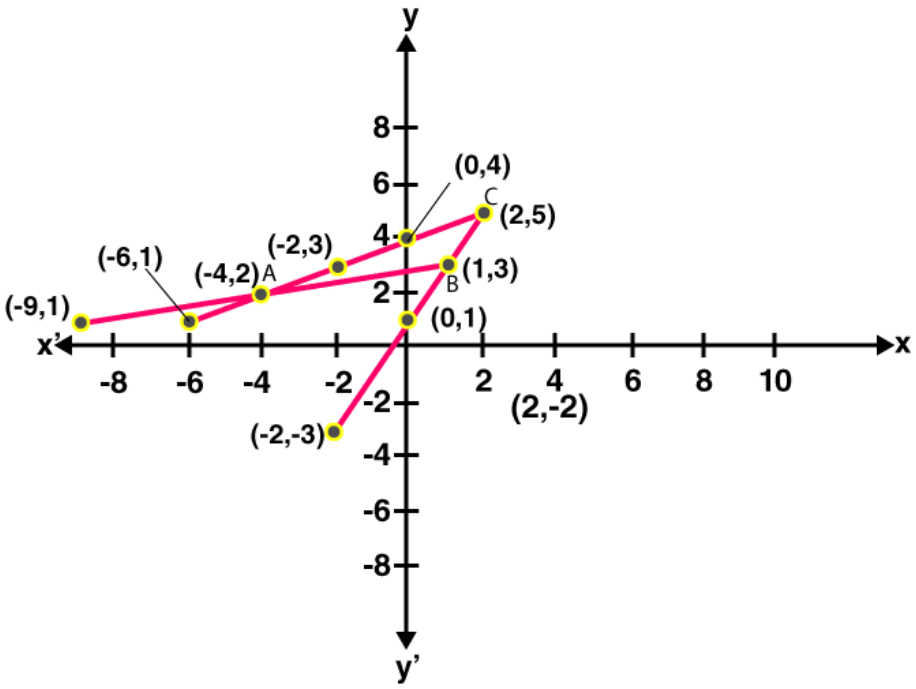
The table of $x = 5y - 14$ is

x	-9	-4	1
y	1	2	3

$y - 2x = 1 \Rightarrow y = 1 + 2x$

The table of $y - 2x = 1$ is

x	2	-2	0
y	5	-3	1



The coordinates of the vertices of the triangle = A (-4, 2), B (1, 3) and C (2,5)

11. Using the same axes of co-ordinates and the same unit, solve graphically :
x + y = 0 and 3x - 2y = 10.
(Take at least 3 points for each line drawn).

Solution:

$x + y = 0$

$y = -x;$

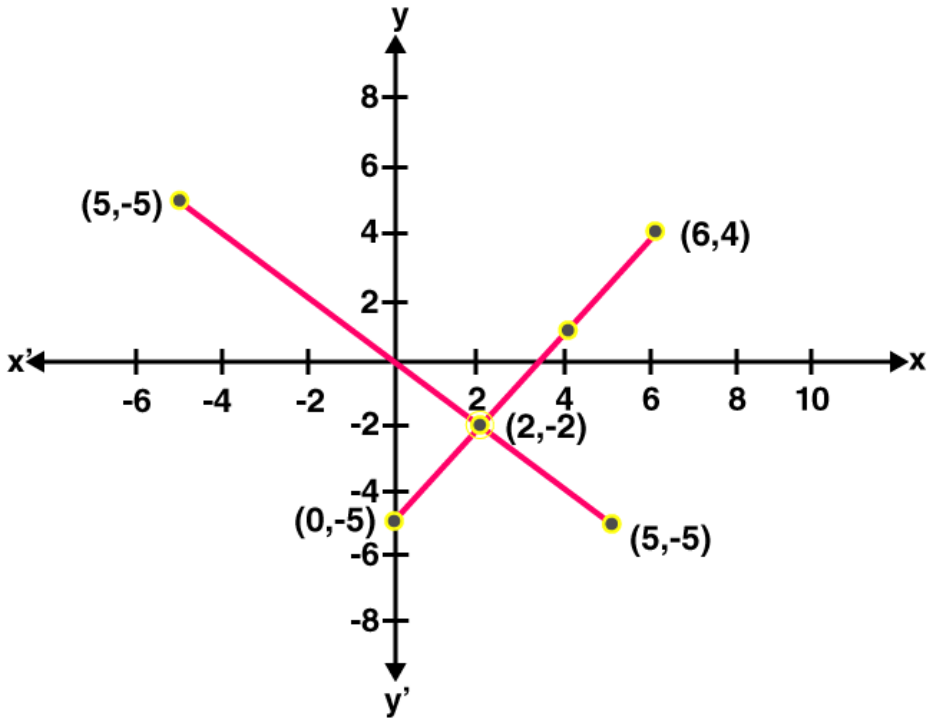
The table of $x + y = 0$ is

x	5	2	-5
y	-5	-2	5

$3x - 2y = 10 \Rightarrow x = \frac{10 + 2y}{3}$

The table of $3x - 2y = 10$ is

x	4	6	2
y	1	4	-2



Intersection point = (2, -2)
i.e., x = 2 and y = -2

12. Solve graphically, the following equations.
x + 2y = 4; 3x - 2y = 4.
Take 2 cm = 1 unit on each axis.
Also, find the area of the triangle formed by the lines and the x-axis.

Solution:

$x + 2y = 4$

$\Rightarrow x = 4 - 2y$

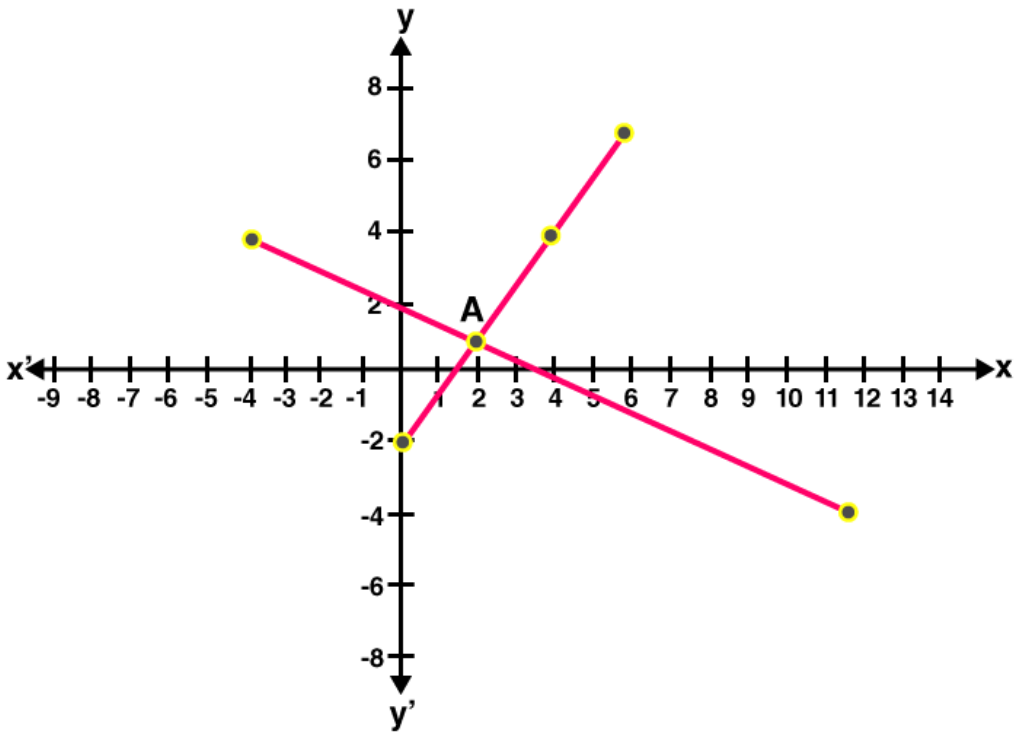
The table of $x + 2y = 4$ is

x	2	-4	12
y	1	4	-4

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

The table of $3x - 2y = 4$ is

x	2	4	6
y	1	4	7



Hence, the solution of the given system of equations is (2,1).

Thus the vertices of the triangle are:

$A(2,1), B\left(\frac{4}{3},0\right)$ and $C(4,0)$

$AD \perp BC$ and $D \equiv (2,0)$

$\therefore AD = 1$ and $BC = 2\frac{2}{3}$ units $= \frac{8}{3}$ units

Area of the triangle $ABC = \frac{1}{2} \times AD \times BC$

$= \frac{1}{2} \times 1 \times \frac{8}{3}$

$= \frac{4}{3}$ sq.units

$= 1\frac{1}{3}$ sq.units

13. Use the graphical method to find the value of 'x' for which the expressions $\frac{x+2}{2}$ and $\frac{3}{4}x - 2$ are equal.

Solution:

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

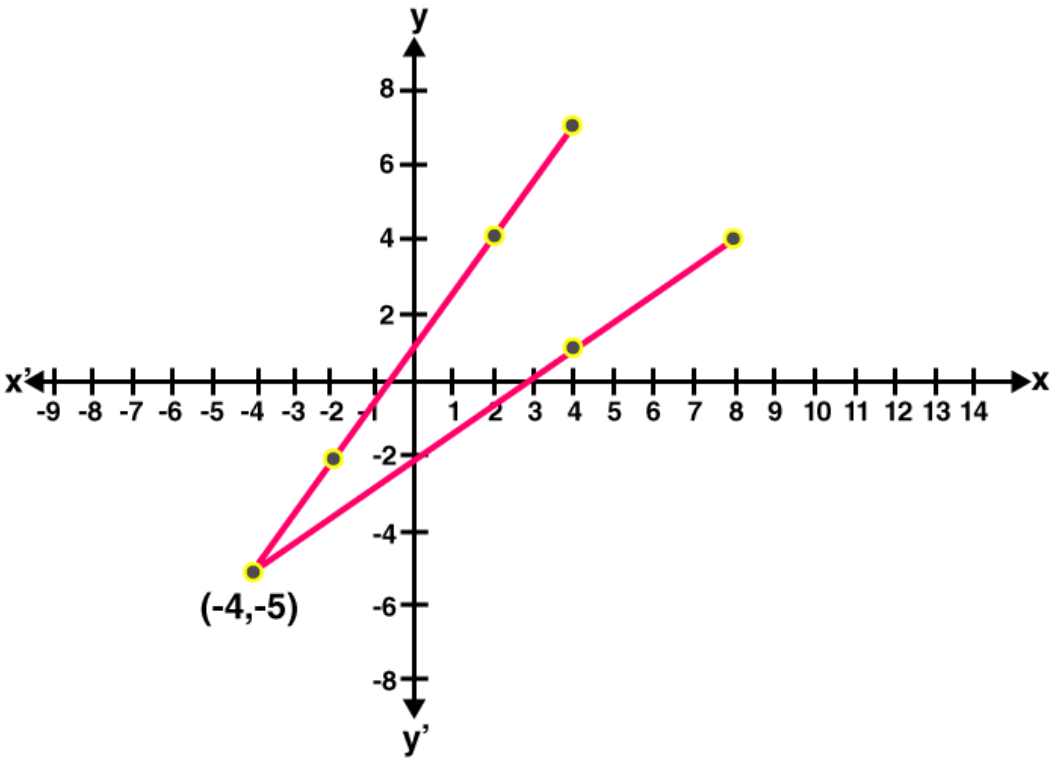
The table for $y = \frac{3x + 2}{2}$ is

x	2	4	-2
y	4	7	-2

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

The table for $y = \frac{3}{4}x - 2$ is

x	4	-4	8
y	1	-5	4



x = - 4

14. The course of an enemy submarine, as plotted on rectangular co-ordinate axes, gives the equation 2x + 3y = 4. On the same axes, a destroyer's course is indicated by the graph x - y = 7. Use the graphical method to find the point at which the paths of the submarine and the destroyer intersect ?

Solution:

$2x + 3y = 4$

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

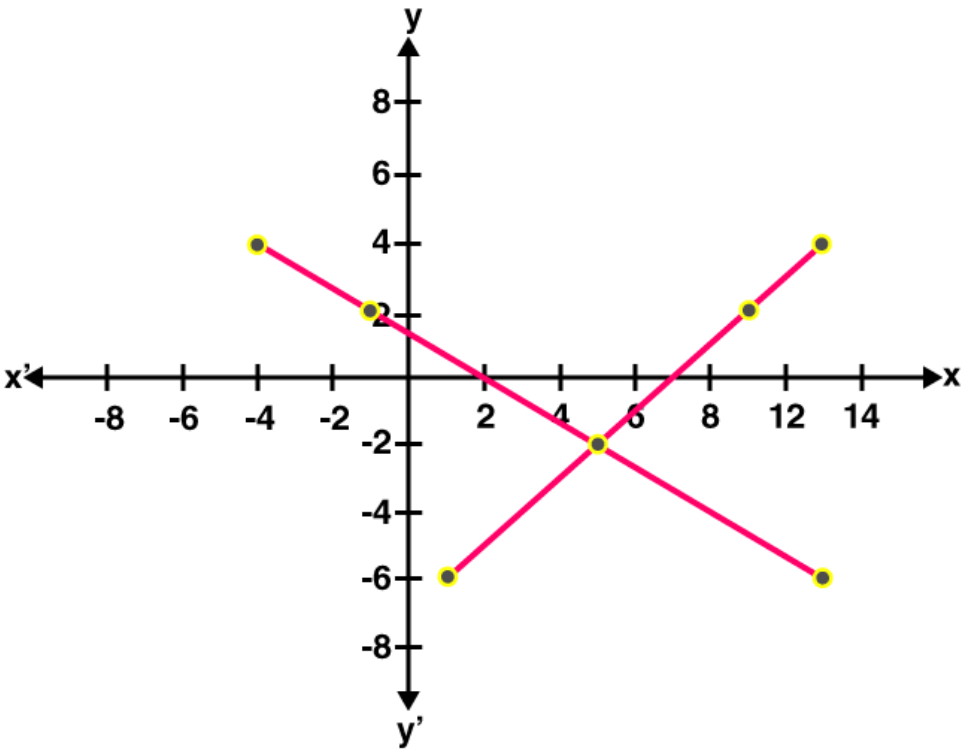
The table for $2x + 3y = 4$ is

x	-1	-4	5
y	2	4	-2

$x - y = 7 \Rightarrow x = y + 7$

The table for $x - y = 7$ is

x	5	11	9
y	-2	4	2



Hence, the point at which the paths of submarine and the destroyer intersect are (5, -2)