LINEAR EQUATIONS IN TWO VARIABLE - CHAPTER – 4

EXERCISE – 4A

Answer.1.

(i) $3x + 5y = 7.5$

We have,

$\Rightarrow 3x + 5y - 7.5 = 0$

$\Rightarrow 6x + 10y - 15 = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = 6, b = 10 \text{ and } c = -15$

(ii) $2x - \frac{y}{5} + 6 = 0$

We have,

$2x - \frac{y}{5} + 6 = 0$

$\Rightarrow 10x - y + 30 = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = 10, b = -1 \text{ and } c = 30$

(iii) $3y - 2x = 6$

We have,

$3y - 2x = 6$

$\Rightarrow -2x + 3y - 6 = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = -2, b = 3 \text{ and } c = -6$

(iv) $4x = 5y$

We have,

$4x = 5y$

$\Rightarrow 4x - 5y = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = 4, b = -5 \text{ and } c = 0$

(v) $\frac{x}{5} - \frac{y}{6} = 1$

We have,

$\frac{x}{5} - \frac{y}{6} = 1$

$\Rightarrow (6x - 5y)/30 = 1$

$\Rightarrow 6x - 5y = 30$

$\Rightarrow 6x - 5y - 30 = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = 6, b = -5 \text{ and } c = -30$

(vi) $\sqrt{2}x + \sqrt{3}y = 5$

We have,

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

$\Rightarrow \sqrt{2}x + \sqrt{3}y - 5 = 0$

Comparing this equation with $ax + by + c = 0$, we get

$a = \sqrt{2}, b = \sqrt{3} \text{ and } c = -5$

Answer.2.

(i) $x = 6$

We have,

$x = 6$

$\Rightarrow x - 6 = 0$

$\Rightarrow x - 0y - 6 = 0$

Comparing this equation with $ax + by + c = 0$, we get
$a = 1, b = 0 \; and \; c = -6$

(ii) $3x - y = x - 1$

We have,
$3x - y = x - 1$
$\Rightarrow 3x - x - y + 1 = 0$
$\Rightarrow 2x - y + 1 = 0$

Comparing this equation with $ax + by + c = 0$, we get
$a = 2, b = -1 \; and \; c = 1$

(iii) $2x + 9 = 0$

We have,
$2x + 9 = 0$
$\Rightarrow 2x + 0y + 9 = 0$

Comparing this equation with $ax + by + c = 0$, we get
$a = 2, b = 0 \; and \; c = 9$

(iv) $4y = 7$

We have,
$4y = 7$
$\Rightarrow 0x + 4y - 7 = 0$
Comparing this equation with $ax + by + c = 0$, we get
$a = 0, b = 4 \; and \; c = -7$

(v) $x + y = 4$

We have,
$x + y = 4$
$\Rightarrow x + y - 4 = 0$
Comparing this equation with $ax + by + c = 0$, we get
$a = 1, b = 1 \; and \; c = -4$

(vi) $\frac{x}{2} - \frac{y}{3} = \frac{1}{6} + y$

We have,

$\frac{x}{2} - \frac{y}{3} = \frac{1}{6} + y$
$\Rightarrow \frac{x}{2} - \frac{y}{3} - y = \frac{1}{6}$
$\Rightarrow \frac{3x - 2y - 6y}{6} = \frac{1}{6}$
$\Rightarrow 3x - 8y = 1$
$\Rightarrow 3x - 8y - 1 = 0$
Comparing this equation with $ax + by + c = 0$, we get
$a = 3, b = -8 \; and \; c = -1$

Answer.3.

(i) (4,0)

Equation is 5x - 4y = 20
Substituting x = 4 and y = 0 in L.H.S. of equation,
L.H.S. = 5x - 4y
= 5(4) - 4(0)
= 20 - 0
= 20

= R.H.S.
Hence, (4, 0) is the solution of the equation

(ii) (0,5)

Equation is 5x - 4y = 20
Substituting x = 0 and y = 5 in L.H.S. of equation,
L.H.S. = 5x - 4y
= 5(0) - 4(5)
= 0 - 20
= -20
≠ R.H.S.
Hence, (0, 5) is **NOT** the solution of the equation.

(iii) $\left(-2, \frac{5}{2}\right)$

Equation is 5x - 4y = 20
Substituting x = -2 and y = $\left(\frac{5}{2}\right)$ in L.H.S. of equation,
L.H.S. = 5x - 4y
= 5(-2) – 4$\left(\frac{5}{2}\right)$
= -10 - 10
= -20
≠ R.H.S.
Hence, $\left(-2, \frac{5}{2}\right)$ is **NOT** the solution of the equation.

(iv) (0, -5)

Equation is 5x - 4y = 20
Substituting x = 0 and y = -5 in L.H.S. of equation,
L.H.S. = 5x - 4y
= 5(0) - 4(-5)
= 0 + 20
= 20
= R.H.S.
Hence, (0, -5) is the solution of the equation.

(v) $\left(2, \frac{-5}{2}\right)$

Equation is 5x - 4y = 20
Substituting x = 2 and y = $\left(\frac{-5}{2}\right)$ in L.H.S. of equation,
L.H.S. = 5x - 4y
= 5(2) - 4$\left(\frac{-5}{2}\right)$
= 10 + 10
= 20
= R.H.S.
Hence, $\left(2, \frac{-5}{2}\right)$ is the solution of the equation.

Answer.4.

(i) Equation is $\boldsymbol{2x - 3y = 6}$
Substituting $x = 0$ in the equation,
$2(0) - 3y = 6$
$\Rightarrow 0 - 3y = 6$
$\Rightarrow 3y = -6$
$\Rightarrow y = -2$
So, $(\mathbf{0}, \mathbf{-2})$ is the solution of the equation.
Substituting $y = 0$ in the equation,
$2x - 3(0) = 6$
$\Rightarrow 2x - 0 = 6$

$\Rightarrow 2x = 6$
$\Rightarrow x = 3$
So, $(\mathbf{3}, \mathbf{0})$ is the solution of the equation.
Substituting $x = 6$ in the equation,
$2(6) - 3y = 6$
$\Rightarrow 12 - 3y = 6$
$\Rightarrow 3y = 6$
$\Rightarrow y = 2$
So, $(\mathbf{6}, \mathbf{2})$ is the solution of the equation.
Substituting $y = 4$ in the equation,
$2x - 3(4) = 6$
$\Rightarrow 2x - 12 = 6$
$\Rightarrow 2x = 18$
$\Rightarrow x = 9$
So, $(\mathbf{9}, \mathbf{4})$ is the solution of the equation.
Substituting $x = -3$ in the equation,
$2(-3) - 3y = 6$
$\Rightarrow -6 - 3y = 6$
$\Rightarrow 3y = -12$
$\Rightarrow y = -4$
So, $(\mathbf{-3}, \mathbf{-4})$is the solution of the equation.

(ii) Equation is $\frac{2x}{5} + \frac{3y}{10} = 3$
$\Rightarrow \frac{4x+3y}{10} = 3$
$\Rightarrow \mathbf{4x + 3y = 30}$ ...(*i*)
Substituting $x = 0$ in (i),
$4(0) + 3y = 30$
$\Rightarrow 3y = 30$
$\Rightarrow y = 10$
So, $(\mathbf{0}, \mathbf{10})$ is the solution of the equation.
Substituting $x = 3$ in (i),
$4(3) + 3y = 30$
$\Rightarrow 12 + 3y = 30$
$\Rightarrow 3y = 18$
$\Rightarrow y = 6$
So, $(\mathbf{3}, \mathbf{6})$ is the solution of the equation.
Substituting $x = -3$ in (i),
$4(-3) + 3y = 30$
$\Rightarrow -12 + 3y = 30$
$\Rightarrow 3y = 42$
$\Rightarrow y = 14$
So, $(\mathbf{-3}, \mathbf{14})$is the solution of the equation.
Substituting $y = 2$ in (i),
$4x + 3(2) = 30$
$\Rightarrow 4x + 6 = 30$
$\Rightarrow 4x = 24$
$\Rightarrow x = 6$
So, $(\mathbf{6}, \mathbf{2})$ is the solution of the equation.
Substituting $y = -2$ in (i),
$4x + 3(-2) = 30$
$\Rightarrow 4x - 6 = 30$
$\Rightarrow 4x = 36$
$\Rightarrow x = 9$
So, $(\mathbf{9}, \mathbf{-2})$ is the solution of the equation.

(iii) Equation is $3y = 4x$

Substituting $x = 3$ in the equation,

$3y = 4(3)$

$\Rightarrow 3y = 12$

$\Rightarrow y = 4$

So, $(3, 4)$ is the solution of the equation.

Substituting $x = -3$ in the equation,

$3y = 4(-3)$

$\Rightarrow 3y = -12$

$\Rightarrow y = -4$

So, $(-3, -4)$ is the solution of the equation.

Substituting $x = 9$ in the equation,

$3y = 4(9)$

$\Rightarrow 3y = 36$

$\Rightarrow y = 12$

So, $(9, 12)$ is the solution of the equation.

Substituting $y = 8$ in the equation,

$3(8) = 4x$

$\Rightarrow 4x = 24$

$\Rightarrow x = 6$

So, $(6, 8)$ is the solution of the equation.

Substituting $y = -8$ in the equation,

$3(-8) = 4x$

$\Rightarrow 4x = -24$

$\Rightarrow x = -6$

So, $(-6, -8)$ is the solution of the equation.

Answer.5. Given x = 3 and y = 4 is a solution of the equation 5x - 3y = k,

Substituting x = 3 and y = 4 in equation 5x - 3y = k, we get

5(3) - 3(4) = k

⇒ 15 - 12 = k

⇒ k = 3

Answer.6. Given x = 3k + 2 and y = 2k - 1 is a solution of the equation 4x - 3y + 1 = 0,

Substituting these values in equation, we get

4(3k + 2) - 3(2k - 1) + 1 = 0

⇒ 12k + 8 - 6k + 3 + 1 = 0

⇒ 6k + 12 = 0

⇒ 6k = -12

⇒ k = -2

Answer.7. Let the cost of a pencil and cost of ballpoint to be ₹ x and ₹ y respectively.

So,

Cost of 5 pencils = ₹ $5x$

Cost of 2 ballpoints = ₹ $2y$

According to question,

$5x = 2y$

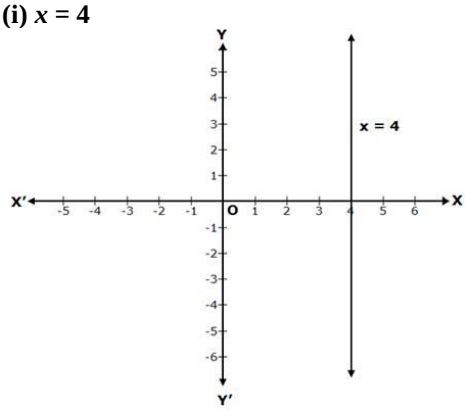
$\Rightarrow 5x - 2y = 0$

∴ Required Equation, $5x - 2y = 0$

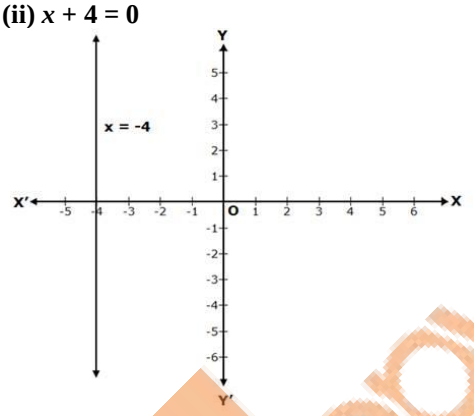
EXERCISE – 4B

Answer.1.

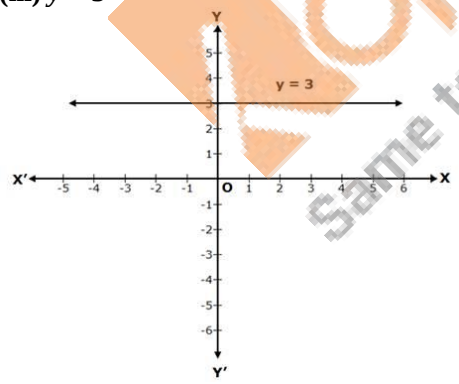
(i) $x = 4$



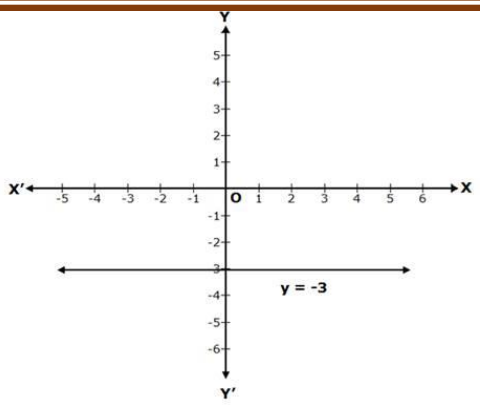
(ii) $x + 4 = 0$



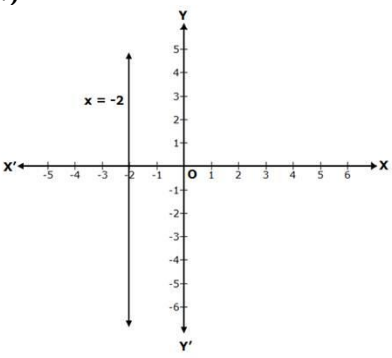
(iii) $y = 3$



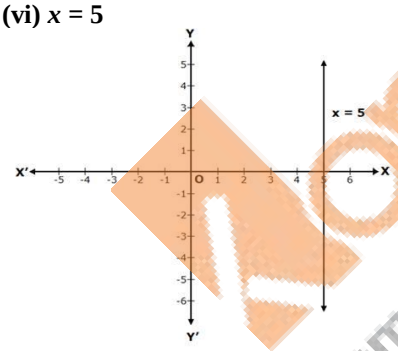
(iv) $y = -3$



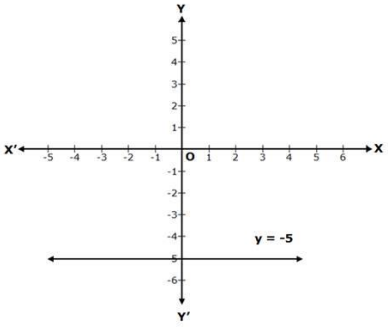
(v) $x = -2$



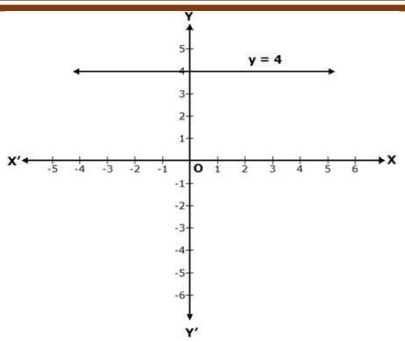
(vi) $x = 5$



(vii) $y + 5 = 0$



(viii) $y = 4$



Answer.2. Given equation: $y = 3x$.

Putting $x = -2, y = 3 \times -2 = -6$

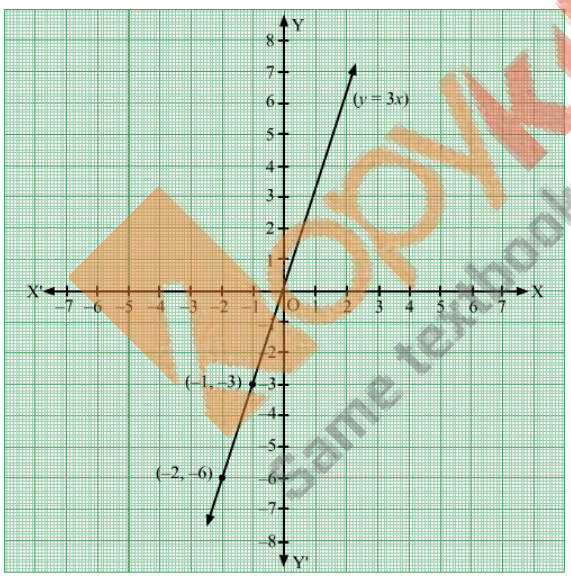
Putting $x = -1, y = 3 \times -1 = -3$

Thus, we have the following table:

x	-2	-1
y	-6	-3

Now plot the points $(-2, -6), (-1, -3)$ on a graph paper.

Join the points and extend the line in both the directions.



(i) From the graph we can see that when $x = 2$, $y = 6$

(ii) Also, from the graph we can see that when $x = -2$, $y = -6$

Answer.3. Given equation: $x + 2y - 3 = 0$

$or,\ x + 2y = 3$

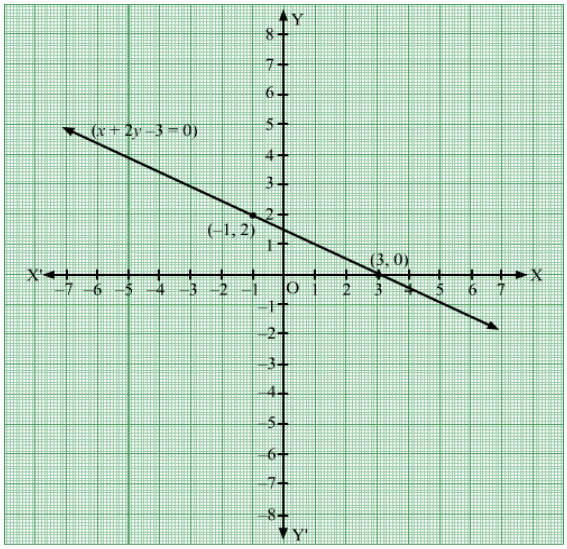
When $y = 0, x + 0 = 3 \Rightarrow x = 3$

When $y = 1, x + 2 = 3 \Rightarrow x = 3 - 2 = 1$

When $y = 2, x + 4 = 3 \Rightarrow x = 3 - 4 = -1$

Thus, we have the following table:

x	3	1	-1
y	0	1	2



(i) From the graph we can see that when $x = 5, y = -1$

(ii) Also, from the graph we can see that when $x = -5, y = 4$

Answer.4. Given equation: $2x - 3y = 5$

$\Rightarrow 2x = 3y + 5$

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

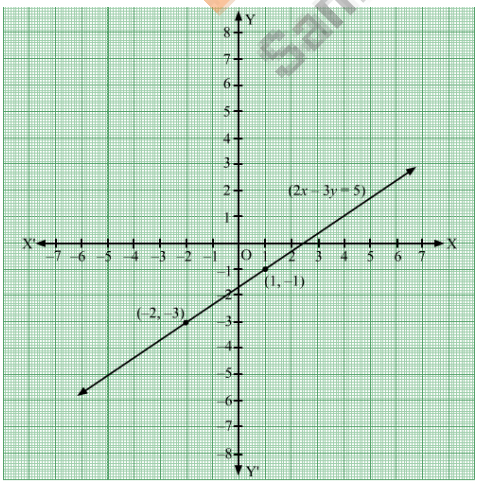
When, $y = -1$, $x = \frac{(-3+5)}{2} = \frac{2}{2} = 1$

When, $y = -3$, $x = \frac{(-9+5)}{2} = -\frac{4}{2} = -2$

Thus, we have the following table:

x	1	-2
y	-1	-3

Plot the points $(-2, -3)$, $(1,-1)$(-2, -3) , (1,-1) on the graph paper and extend the line in both directions.



(i) From the graph we can see that when $x = 4, y = 1$

(ii) Also, from the graph we can see that when $y = 3, x = 7$

Answer.5. Given equation: $2x + y = 6$

$\Rightarrow y = 6 - 2x$

When, $x = 0, y = 6 - 0 = 6$

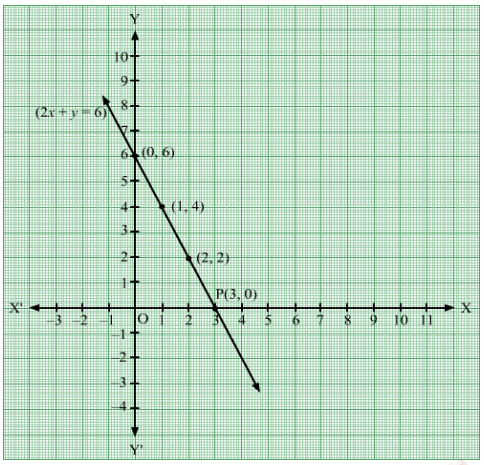
When, $x = 1, y = 6 - 2 = 4$

When, $x = 2, y = 6 - 4 = 2$

Thus, we have the following table:

x	0	1	2
y	6	4	2

Plot the points $(0,6)$, $(1,4)$ and $(2,2)$ on the graph paper. Join these points and extend the line.



Clearly, the graph cuts the x −axis at $P(3,0)$.

Answer.6. Given equation: $3x + 2y = 6$

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

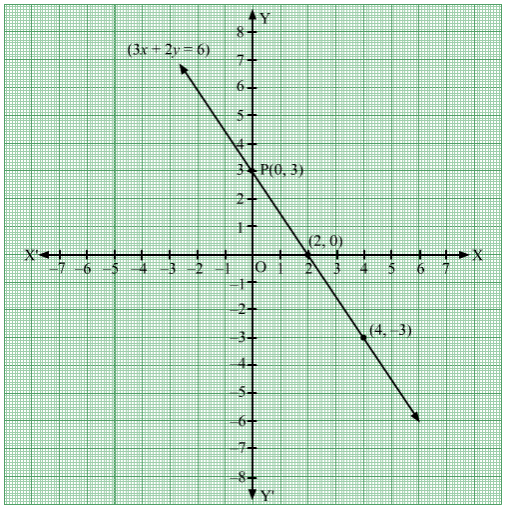
When $x = 2, y = \frac{(6-6)}{2} = 0$

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

Thus, we get the following table:

x	2	4
y	0	-3

Plot the points $(2,0)$, $(4,-3)$ on the graph paper. Join the points and extend the graph in both the directions.



Clearly, the graph cuts the y −axis at $P(0,3)$.

Answer.7. $3x - 2y = 4$

$\Rightarrow 2y = 3x - 4$

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

When $x = 0$, $y = \dfrac{3\times 0-4}{2} = \dfrac{0-4}{2} = -\dfrac{4}{2} = -2$

When $x = 2$, $y = \dfrac{3\times 2-4}{2} = \dfrac{6-4}{2} = \dfrac{2}{2} = 1$

When $x = -2$, $y = \dfrac{3\times(-2)-4}{2} = \dfrac{-6-4}{2} = -\dfrac{10}{2} = -5$

Thus, the points on the line $3x - 2y = 4$ are as given in the following table:

x	0	2	–2
y	–2	1	–5

Plotting the points $(0, -2)$, $(2, 1)$ *and* $(-2, -5)$ and drawing a line passing through these points, we obtain the graph of the line $3x - 2y = 4$.

$x + y - 3 = 0$

$\Rightarrow y = -x + 3$

When $x = 0$, $y = -0 + 3 = 3$

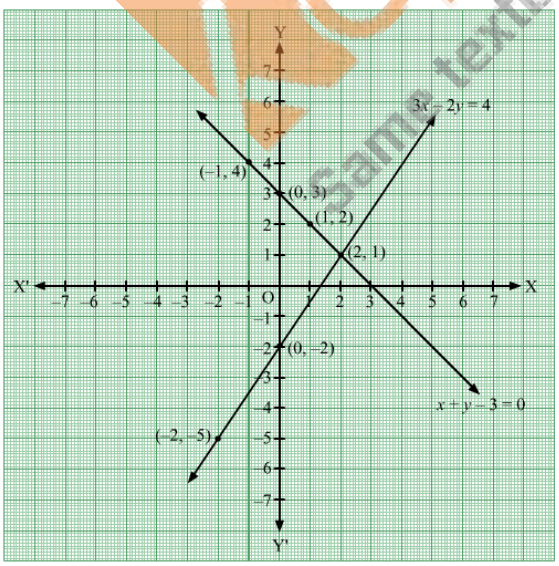
When $x = 1$, $y = -1 + 3 = 2$

When $x = -1$, $y = -(-1) + 3 = 1 + 3 = 4$

Thus, the points on the line $x + y - 3 = 0$ are as given in the following table:

x	0	1	–1
y	3	2	4

Plotting the points $(0, 3)$, $(1, 2)$ *and* $(-1, 4)$ and drawing a line passing through these points, we obtain the graph of the line $x + y - 3 = 0$.



It can be seen that the lines $3x - 2y = 4$ and $x + y - 3 = 0$ intersect at the point $(2, 1)$.

Answer.8. $4x + 3y = 24$

$\Rightarrow 3y = -4x + 24$

$\Rightarrow y = \dfrac{(-4x + 24)}{3}$

When $x = 0$, $y = \dfrac{-4 \times 0 + 24}{3} = \dfrac{0 + 24}{3} = \dfrac{24}{3} = 8$

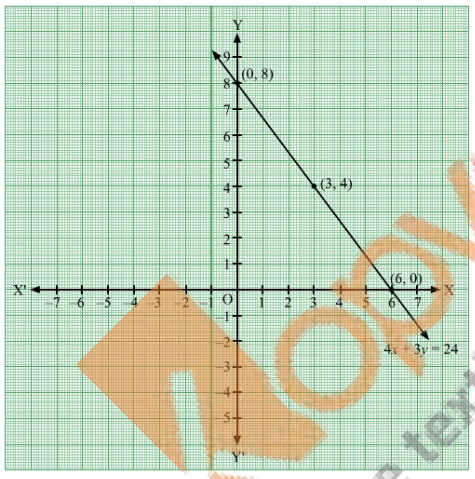
When $x = 3$, $y = \dfrac{-4 \times 3 + 24}{3} = \dfrac{-12 + 24}{3} = \dfrac{12}{3} = 4$

When $x = 6$, $y = \dfrac{-4 \times 6 + 24}{3} = \dfrac{-24 + 24}{3} = 0$

Thus, the points on the line $4x + 3y = 24$ are as given in the following table:

X	0	3	6
Y	8	4	0

Plotting the points $(0, 8)$, $(3, 4)$ *and* $(6, 0)$ and drawing a line passing through these points, we obtain the graph of the line $4x + 3y = 24$.



(i) It can be seen that the line $4x + 3y = 24$ intersects the x-axis at $(6, 0)$ and y-axis at $(0, 8)$.

(ii) The triangle formed by the line and the coordinate axes is a right triangle right angled at the origin.

$\therefore$ Area of the triangle $= \frac{1}{2} \times 6 \times 8$

$= 24\ sq\ units$

Answer.9. $2x + y = 6$

$\Rightarrow y = -2x + 6$

When $x = 0$, $y = -2 \times 0 + 6 = 0 + 6 = 6$

When $x = 1$, $y = -2 \times 1 + 6 = -2 + 6 = 4$

When $x = 2$, $y = -2 \times 2 + 6 = -4 + 6 = 2$

Thus, the points on the line $2x + y = 6$ are as given in the following table:

x	0	1	2
y	6	4	2

Plotting the points $(0, 6)$, $(1, 4)$ *and* $(2, 2)$ and drawing a line passing through these points, we obtain the graph of the line $2x + y = 6$.

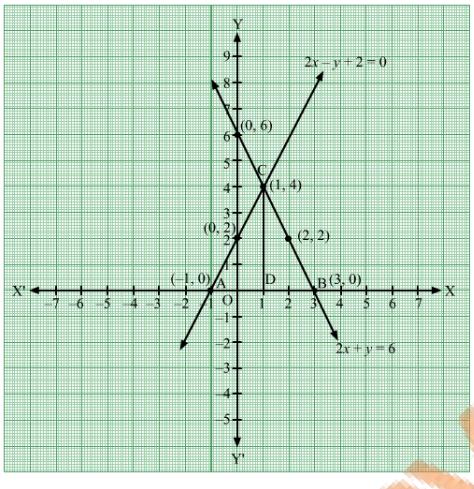
$2x - y + 2 = 0$

$\Rightarrow y = 2x + 2$
When $x = 0, y = 2 \times 0 + 2 = 0 + 2 = 2$
When $x = 1, y = 2 \times 1 + 2 = 2 + 2 = 4$
When $x = -1, y = 2 \times (-1) + 2 = -2 + 2 = 0$

Thus, the points on the line $2x - y + 2 = 0$ are as given in the following table:

x	0	1	–1
y	2	4	0

Plotting the points $(0, 2), (1, 4)$ *and* $(-1, 0)$ and drawing a line passing through these points, we obtain the graph of the line $2x - y + 2 = 0$.



The shaded region represents the area bounded by the lines $2x + y = 6, 2x - y + 2 = 0$ and the x-axis. This represents a triangle.
It can be seen that the lines intersect at the point $C(1, 4)$. Draw CD perpendicular from C on the x-axis.
Height = CD = 4 units
Base = AB = 4 units

∴ Area of the shaded region = Area of ΔABC

$$= \frac{1}{2} \times AB \times CD$$
$$= \frac{1}{2} \times 4 \times 4$$
$$= 8\ sq\ units$$

Answer.10. $x - y = 1$
$\Rightarrow y = x - 1$
When $x = 0, y = 0 - 1 = -1$
When $x = 1, y = 1 - 1 = 0$
When $x = 2, y = 2 - 1 = 1$
Thus, the points on the line $x - y = 1$ are as given in the following table:

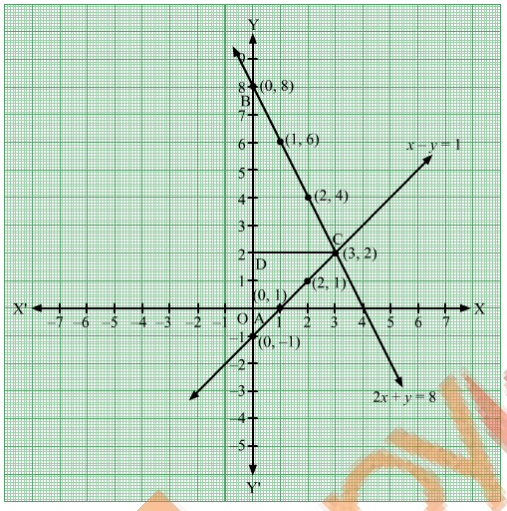
X	0	1	2
Y	–1	0	1

Plotting the points $(0, -1), (1, 0)$ *and* $(2, 1)$ and drawing a line passing through these points, we obtain the graph of the line $x - y = 1$.

$2x + y = 8$
$\Rightarrow y = -2x + 8$
When $x = 1$, $y = -2 \times 1 + 8 = -2 + 8 = 6$
When $x = 2$, $y = -2 \times 2 + 8 = -4 + 8 = 4$
When $x = 3$, $y = -2 \times 3 + 8 = -6 + 8 = 2$
Thus, the points on the line $2x + y = 8$ are as given in the following table:

X	1	2	3
Y	6	4	2

Plotting the points $(1, 6)$, $(2, 4)$ *and* $(3, 2)$ and drawing a line passing through these points, we obtain the graph of the line $2x + y = 8$.



The shaded region represents the area bounded by the lines $x - y = 1, 2x + y = 8$ and the y-axis.
This represents a triangle.
It can be seen that the lines intersect at the point $C(3, 2)$. Draw CD perpendicular from C on the y-axis.
Height = CD = 3 units
Base = AB = 9 units

∴ Area of the shaded region = Area of ΔABC

$$= \frac{1}{2} \times AB \times CD$$
$$= \frac{1}{2} \times 9 \times 3$$
$$= \frac{27}{2}\ sq\ units$$
$$= 13.5\ sq\ units$$

Answer.11. $x + y = 6$
$\Rightarrow y = -x + 6$
When $x = 0$, $y = -0 + 6 = 6$
When $x = 1$, $y = -1 + 6 = 5$
When $x = 3$, $y = -3 + 6 = 3$
Thus, the points on the line $x + y = 6$ are as given in the following table:

x	0	1	3
y	6	5	3

Plotting the points $(0, 6)$, $(1, 5)$ and $(3, 3)$ and drawing a line passing through these points, we obtain the graph of the line $x + y = 6$.

$x - y = 2$

$\Rightarrow y = x - 2$

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

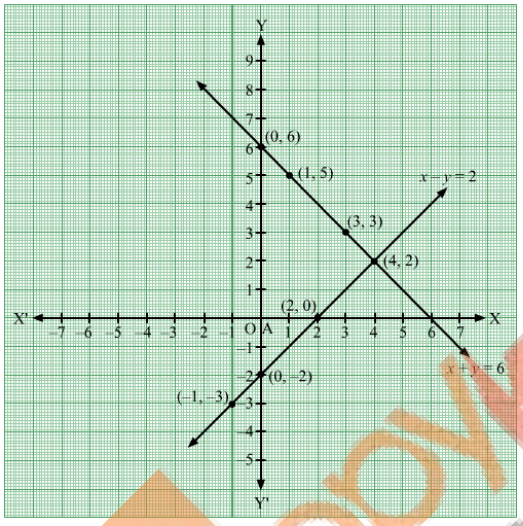
When $x = 2$, $y = 2 - 2 = 0$

When $x = -1$, $y = -1 - 2 = -3y = -1 - 2 = -3$

Thus, the points on the line $x - y = 2$ are as given in the following table:

x	0	2	–1
y	–2	0	–3

Plotting the points $(0, -2)$, $(2, 0)$ *and* $(-1, -3)$ and drawing a line passing through these points, we obtain the graph of the line $x - y = 2$.



It can be seen that the lines $x + y = 6$ and $x - y = 2$ intersect at the point (4, 2).

Answer.12. Let the contribution of A and B be ₹ x and ₹ y, respectively.

Total contribution of A and B = ₹ x + ₹ y = ₹ $(x + y)$

It is given that the total contribution of A and B is ₹ 100.

$\therefore x + y = 100$

This is the linear equation satisfying the the given data.

$x + y = 100$

$\Rightarrow y = 100 - x$

When $x = 10$, $y = 100 - 10 = 90$

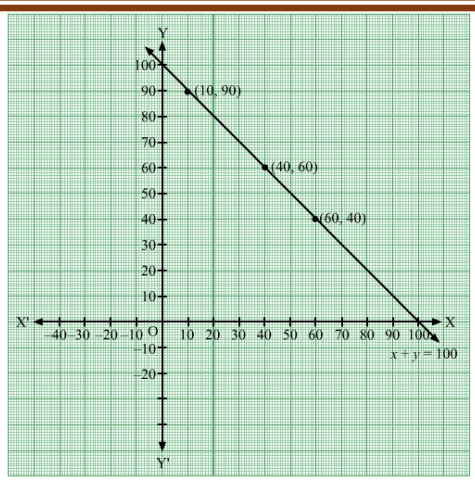
When $x = 40$, $y = 100 - 40 = 60$

When $x = 60$, $y = 100 - 60 = 40$

Thus, the points on the line $x + y = 100$ are as given in the following table:

x	10	40	60
y	90	60	40

Plotting the points (10, 90), (40, 60) and (60, 40) and drawing a line passing through these points, we obtain the graph of the line $x + y = 100$.



MULTIPLE CHOICE QUESTIONS (MCQ)

Answer.1. Correct option: (b)

The equation of the $x-$axis is $y = 0$.

Answer.2. Correct option: (a)

The equation of the $y-$axis is $x = 0$.

Answer.3. Correct option: (c)

A point which lies on the $x-$ axis has its $y-$ coordinate = 0, while a point which lies on the $y-$ axis has its coordinate = 0.

So, the points of the form (a, a) lies on the line $y = x$ since it satisfies the equation of the given line and doesn't satisfy the equation of the line $x + y = 0$.

Answer.4. Correct option: (d)

A point which lies on the $x-$ axis has its $y-$ coordinate = 0, while a point which lies on the $y-$ axis has its coordinate = 0.

So, the points of the form $(a, -a)$ will not lie on either axis.

Also, it does not satisfy the line $y = x$.

The points of the form $(a, -a)$ lies on the line $x + y = 0$ since it satisfies the equation of the given line.

Answer.5. Correct option: (c)

The linear equation $3x - 5y = 15$ has infinitely many solutions since any every point on this line will be a solution of this equation.

For different values of x, we will get the corresponding different values of y.

Since, x can take infinitely many values, y will also have infinite values.

Hence, the line will have infinitely many solutions.

Answer.6. Correct option: (a)

The equation $2x + 5y = 7$ has a unique solution, if x and y are natural numbers.

If we take $x = 1$ and $y = 1$, the given equation is satisfied.

Answer.7. Correct option: (c)

The graph of y = 5 is a line parallel to the x-axis at a distance of 5 units from the origin.

Answer.8. Correct option: (c)

The graph of y = 5 is a line parallel to the x-axis at a distance of 5 units from the origin.

Answer.9. Correct option: (c)

The graph of $x + 3 = 0$ is a line parallel to the y-axis at a distance of 3 units to the left of y-axis.

Answer.10. Correct option: (c)

The graph of $y + 2 = 0$ is a line parallel to the x-axis at a distance of 2 units below the x-axis.

Answer.11. Correct option: (c)

When a graph meets the y-axis, the x coordinate is zero.

Thus, substituting x = 0 in the given equation, we get

$2(0) + 3y = 6$

$\Rightarrow 3y = 6$

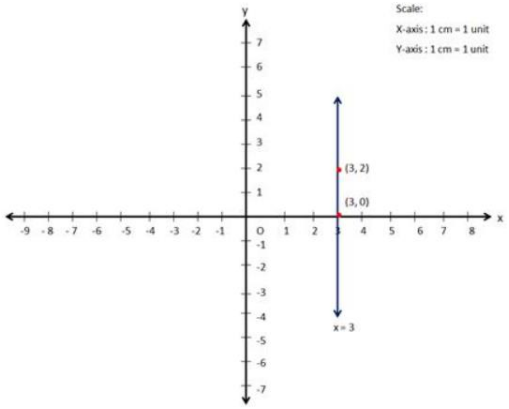
$\Rightarrow y = 2$

Hence, the required point is (0, 2).

Answer.12. Correct option: (c)

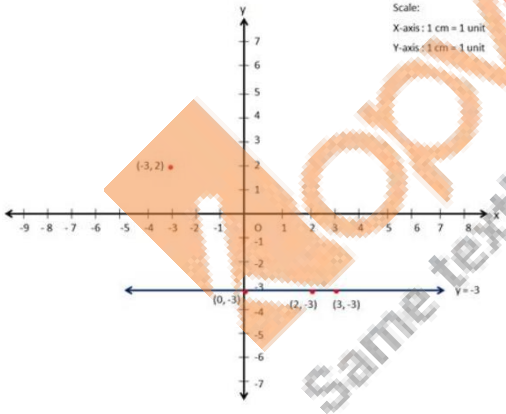
When a graph meets the x-axis, the y coordinate is zero.
Thus, substituting y = 0 in the given equation, we get
$2x + 5(0) = 10$
$\Rightarrow 2x = 10$
$\Rightarrow x = 5$
Hence, the required point is (5, 0).

Answer.13. Correct option: (c)
The line $x = 3$ passes through the point (3,2)



Answer.14. Correct option: (c)
Since, the y coordinate is 3, the graph of the line $y = 3$ passes through the point (2, 3).

Answer.15. Correct option: (d)
The line $y = -3$ does not pass through the point $(-3,2)$ since $y \neq 2$.



Answer.16. Correct option: (d)
The given linear equation is $x - y = 0$
Case – 1) Substituting $x = -\frac{1}{2}$ and $y = \frac{1}{2}$
$\text{L.H.S} = x - y$
$= -\frac{1}{2} - \frac{1}{2}$
$= -1$
$\neq \text{R.H.S}$
$\therefore x = -\frac{1}{2}$ and $y = \frac{1}{2}$ doesn't satisfy the given linear equation.
Case – 2) Substituting $x = \frac{3}{2}$ and $y = -\frac{3}{2}$
$\text{L.H.S} = x - y$
$= \frac{3}{2} + \frac{3}{2}$
$= 3$

$\neq$ R.H.S

$\therefore x = \frac{3}{2}$ and $y = -\frac{3}{2}$ doesn't satisfy the given linear equation.

Case – 3) Substituting $x = 0$ and $y = 1$

L.H.S $= x - y$

$= 0 - 1$

$= -1$

$\neq$ R.H.S

$\therefore x = 0$ and $y = 1$ doesn't satisfy the given linear equation.

Case – 4) Substituting $x = 1$ and $y = 1$

L.H.S $= x - y$

$= 1 - 1$

$= 0$

= R.H.S

$\therefore x = 1$ and $y = 1$ satisfies the given linear equation.

Answer.17. Correct option: (b)

Since given that each of the three points is a solution of the linear equation, all three points have to satisfy the linear equation.

Substituting $x = -2$ and $y = 2$ in option (b), we get

L.H.S = $x + y$

$= -2 + 2$

= 0

= R.H.S

$\therefore x = -2$ and $y = 2$ satisfy the given linear equation.

Substituting $x = 0$ and $y = 0$ in option (b), we get

L.H.S $= x + y$

$= 0 + 0$

= 0

= R.H.S

$\therefore x = 0$ and $y = 0$ satisfy the given linear equation.

Substituting $x = 2$ and $y = -2$ in option (b), we get

L.H.S $= x + y$

$= 2 - 2$

= 0

= R.H.S

$\therefore x = 2$ and $y = -2$ satisfy the given linear equation.

Answer.18. Correct option: (d)

Infinitely many linear equations can be satisfied by x = 2 and y = 3.

Answer.19. Correct option: (d)

$a \neq 0, b \neq 0$

Answer.20. Correct option: (d)

Since, $(2, 0)$ is a solution of the linear equation $2x + 3y = k$, substituting $x = 2$ and $y = 0$ in the given equation, we have

$2(2) + 3(0) = k$

$\Rightarrow 4 + 0 = k$

$\Rightarrow k = 4$

Answer.21. Correct option: (c)

Any point on $x -$ axis is of the form $(x, 0)$, where $x \neq 0$, since its $y -$ coordinate will be 0 always.

Answer.22. Correct option: (b)

Any point on $y -$ axis is of the form $(0, y)$, where $y \neq 0$, since its $x -$ coordinate will be 0.

Answer.23. Correct option: (c)

Putting $x = 5$ and $y = 2$ in L.H.S of equation $x + y = 7$, we get

L.H.S $= 5 + 2 = 7 =$ R.H.S

Hence, $x = 5$ and $y = 2$ is a solution of the linear equation $x + y = 7$.

Answer.24. Correct option: (b)

Since the point $(3, 4)$ lies on the graph of $3y = ax + 7$, substituting $x = 3$ and $y = 4$ in the given equation, we get

$3(4) = a(3) + 7$

$\Rightarrow 12 = 3a + 7$

$\Rightarrow 3a = 5$

$\Rightarrow a = \frac{5}{3}$