Linear Equations in Two Variables

Exercise 5:

Solution 1:

(1) $\frac{7}{3}x+\frac{5}{2}y+\frac{1}{2}=0$ is a linear equation in two variables.
It is in the form $ax+by+c=0$.

(2) $\frac{3}{x}+2y-1=0$ is not a linear equation in two variables as the index of x in the first term is -1.
If written as $3+2xy-x=0$, it contains a term having xy.

(3) $\frac{x}{2}+\frac{y}{2}=3$ is a linear equation in two variables.
It can be written in the form $ax+by+c=0$

(4) $\frac{2}{y}+\frac{2}{x}=\frac{1}{3}$ is not a linear equation in two variables as the index of x as well as y is -1.
If written as $6x+6y=xy$, it contains a term having xy.

(5) $y+3=0$ is a linear equation in two variables.
It can be written in the form $ax+by+c=0$

(6) $2x-5=0$ is a linear equation in two variables.
It can be written in the form $ax+by+c=0$

Solution 2(1):

The given equation is $\frac{x}{2}+y=6$

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

For $x=0$, $y=6-\frac{0}{2}=6$.

So (0, 6) is the solution of $\frac{x}{2}+y=6$

For $x=1$, $y=6-\frac{1}{2}=12-1=11$

So (1, 11) is the solution of $\frac{x}{2}+y=6$.

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

So(4, 4) is the solution of $\frac{x}{2}+y=6$.

Thus, (0, 6), (1, 11) and (4, 4) are three distinct solutions of $\frac{x}{2}+y=6$.

Solution 2(2):

The given equation is $x + \frac{y}{3} = 9$.

$\therefore \frac{y}{3} = 9 - x$

$\therefore y = 3(9 - x)$

For $x = 0$, $y = 3(9 - 0) = 27$.

So $(0, 27)$ is the solution of $x + \frac{y}{3} = 9$.

For $x = 1$, $y = 3(9 - 1) = 24$

So, $(1, 24)$ is the solution of $x + \frac{y}{3} = 9$.

For $x = -1$, $y = 3[9 - (-1)] = 30$

So $(-1, 30)$ is the solution of $x + \frac{y}{3} = 9$.

Thus, $(0, 27)$, $(1, 24)$ and $(-1, 30)$ are three distinct solutions of $x + \frac{y}{3} = 9$.

Solution 2(3):

The equation is $x + y - 1 = 0$

$\therefore y = 1 - x$

For $x = 0$, $y = 1 - 0 = 1$

So $(0, 1)$ is the solution of $x + y - 1 = 0$.

For $x = 1$, $y = 1 - 1 = 0$

So $(1, 0)$ is the solution of $x + y - 1 = 0$

For $x = -1$, $y = 1 - (-1) = 1 + 1 = 2$

So, $(-1, 2)$ is the solution of $x + y - 1 = 0$.

Thus, $(0, 1)$, $(1, 0)$ and $(-1, 2)$ are three distinct solutions of $x + y - 1 = 0$.

Solution 2(4):

The given equation is $x - y + 1 = 0$.

$\therefore x + 1 = y$

$\therefore y = x + 1$

For $x = 0$, $y = 0 + 1 = 1$

$\therefore (0, 1)$ is the solution of $x - y + 1 = 0$

For $x = 1$, $y = 1 + 1 = 2$

$\therefore (1, 2)$ is the solution of $x - y + 1 = 0$

For $x = -1$, $y = (-1) + 1 = 0$

$\therefore (-1, 0)$ is the solution of $x + y - 1 = 0$.

Thus, $(0, 1)$, $(1, 2)$ and $(-1, 0)$ are three distinct solutions of $x - y + 1 = 0$.

Solution 2(5):

The given equation is $2x + 3y = 6$.

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

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

So, $(0, 2)$ is the solution of $2x + 3y = 6$.

For $x = 1$, $y = \frac{6-2(1)}{3} = \frac{4}{3}$

So, $\left(1, \frac{4}{3}\right)$ is the solution of $2x + 3y = 6$.

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

So, $\left(2, \frac{2}{3}\right)$ is the solution of $2x + 3y = 6$.

Thus, $(0, 2)$, $\left(1, \frac{4}{3}\right)$ and $\left(2, \frac{2}{3}\right)$ are three distinct solutions of $2x + 3y = 6$.

Solution 2(6):

The given equation is $3x - 5y - 15 = 0$.

$\therefore\ 3x - 15 = 5y$

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

For $x = 0$, $y = \frac{3(0)-15}{5} = \frac{-15}{5} = -3$

So $(0, -3)$ is the solution of $3x - 5y - 15 = 0$

For $x = 5$, $y = \frac{3(5)-15}{5} = \frac{0}{5} = 0$

So $(5, 0)$ is the solution of $3x - 5y - 15 = 0$.

For $x = -5$, $y = \frac{3(-5)-15}{5} = \frac{-30}{5} = -6$

So $(-5, -6)$ is the solution of $3x - 5y - 15 = 0$.

Thus, $(0, -3)$, $(5, 0)$ and $(-5, -6)$ are three distinct solutions of $3x - 5y - 15 = 0$.

Solution 3(1):

Given, $a = 2k$, $b = 5k$, $c = 7k$; $k \neq 0$ and $k \in R$.

$b - a = 5k - 2k = 3k$

$c - b = 7k - 5k = 2k$

Now, $(b - a, c - b) \equiv (3k, 2k)$ is a solution of $2x + 3y = 10$.

$\therefore\ 2(3k) + 3(2k) = 10$

$\therefore\ 6k + 6k = 10$

$\therefore\ 12k = 10$

$\therefore\ k = \frac{10}{12}$

$\therefore\ k = \frac{5}{6}$

Solution 3(2):

Given, $a = 2k$, $b = 5k$, $c = 7k$; $k \neq 0$ and $k \in R$.

$c - 3a = 7k - 3(2k) = k$

$3b - 2c = 3(5k) - 2(7k) = k$.

Now, $(c - 3a, 3b - 2c) \equiv (k, k)$ is a solution of $x + y - 3 = 0$.

$\therefore\ k + k - 3 = 0$

$\therefore\ 2k = 3$

$\therefore\ k = \frac{3}{2}$

Solution 3(3):

Given,

$a = 2k$, $b = 5k$, $c = 7k$ and $k \neq 0$ and $k \in R$.

$c + b - 5a = 7k + 5k - 5(2k) = 12k - 10k = 2k$

$c - b - a = 7k - 5k - 2k = 0$

Now, $(c + b - 5a, c - b - a)$ º $(2k, 0)$ is a solution of $2x + y - 8 = 0$.

$2(2k) + 0 - 8 = 0$

$\therefore 4k = 8$

$\therefore k = 2$

Solution 3(4):

Given, $a = 2k$, $b = 5k$, $c = 7k$; $k \neq 0$ and $k \in R$.

$a + b = 2k + 5k = 7k$

$c + 1 = 7k + 1$

Now, $(a + b, c + 1) \equiv (7k, 7k + 1)$ is a solution of $y = 2x$.

$\therefore\ 7k + 1 = 2(7k)$

$\therefore\ 7k + 1 = 14k$

$\therefore\ 1 = 14k - 7k$

$\therefore\ 7k = 1$

$\therefore\ k = \frac{1}{7}$

Solution 3(5):

Given,

$a = 2k$, $b = 5k$, $c = 7k$ and $k \neq 0$ and $k \in R$.

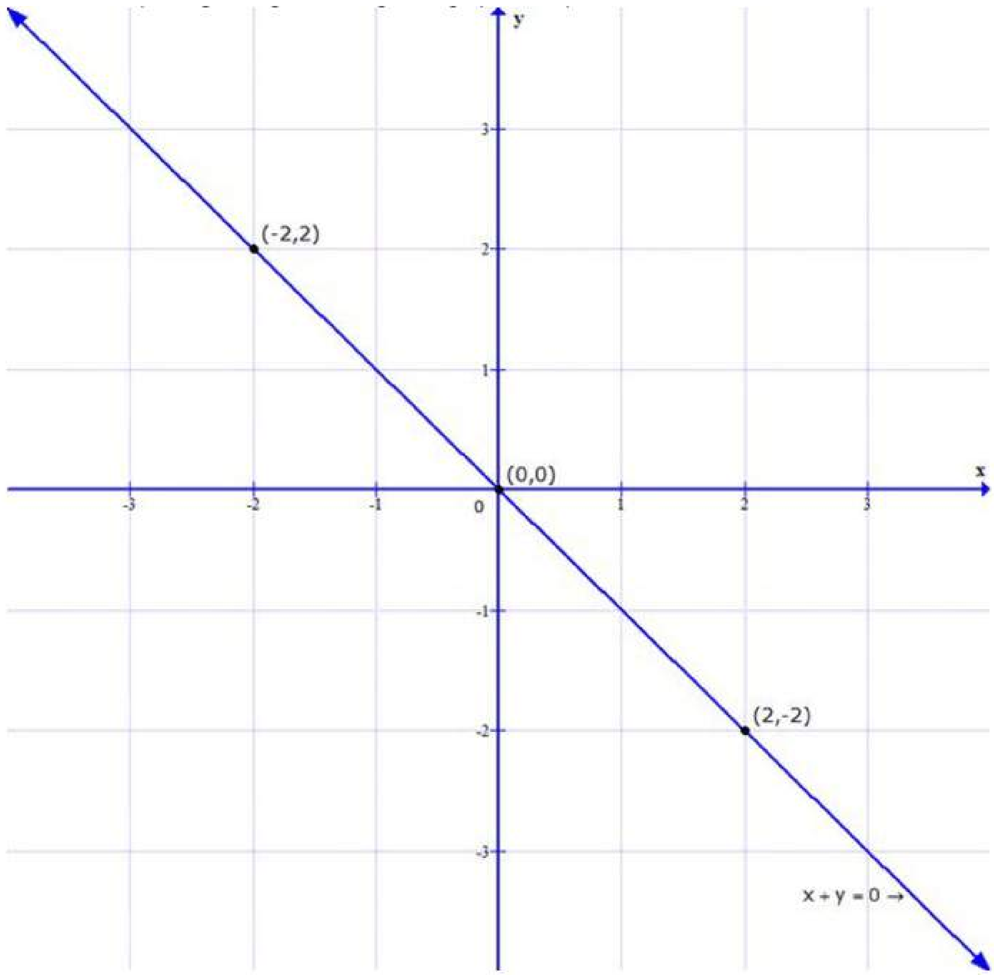
$2a + b - c - 2 = 2(2k) + 5k - (7k) - 2 = 2k - 2$

$3b + 2a - 3c + 2 = 3(5k) + 2(2k) - 3(7k) + 2 = -2k + 2$ Now, $(2a + b - c - 2, 3b + 2a - 3c + 2)$

º (2k – 2, -2k
+2) is the point of intersection of the co-ordinate axes i.e. the origin (0, 0).
(2k – 2, -2k +2) = (0, 0)
∴2k – 2 = 0 and -2k + 2 = 0
∴2k = 2 and 2k = 2
[∵ Both the equations are identical, we consider only one equation (2k = 2)]
∴ 2k = 2
∴ k = 1

Solution 4(1):

The given equation is x + y = 0.
∴ y = -x
For x = 0 ⇒ y = 0
For x = 2 ⇒ y = -2
For x = -2 ⇒ y = -(-2) = 2
Hence, the three solution of x + y = 0 can be given as (0, 0), (2, -2) and (-2, 2).
Now, plot the points (0, 0), (2, -2) and (-2, 2).
Draw the line passing through them to get the graph of x + y = 0.



The graph of x + y = 0 intersects both the axes at (0, 0).

Solution 4(2):

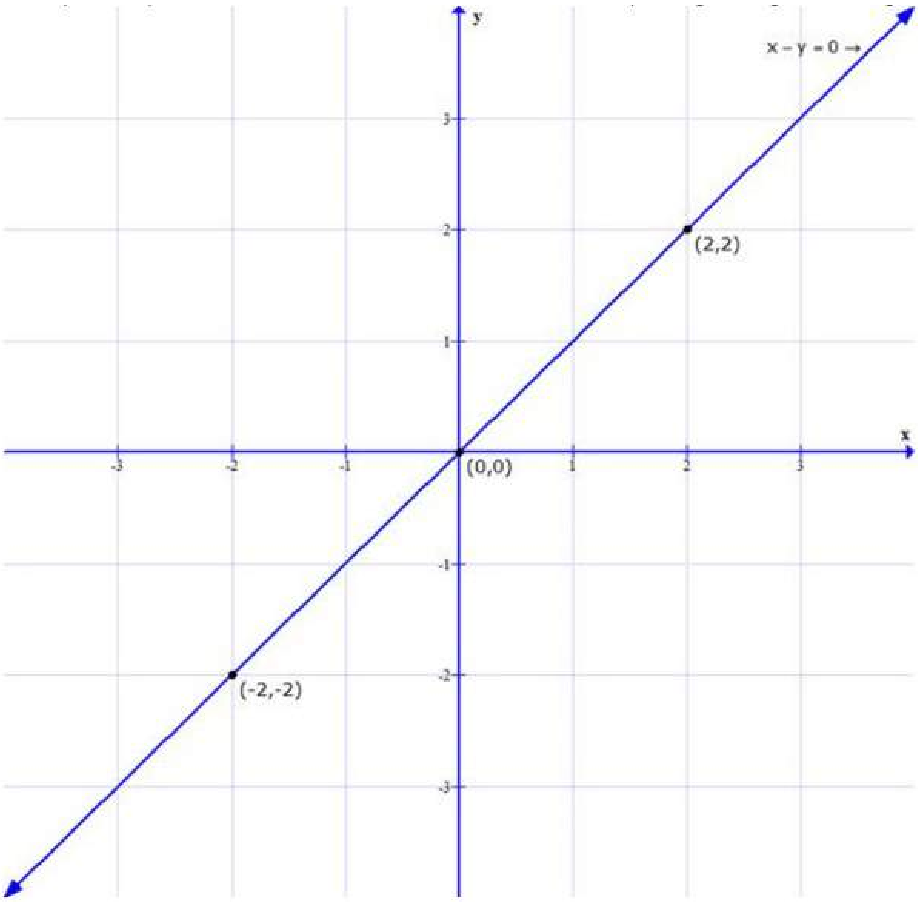
The given equation is x – y = 0.
∴ y = x
For x = 0 ⇒ y = 0

For x = 2 ⇒ y = 2

For x = -2 ⇒ y = -2

Hence, three solution of x – y = 0 can be given as (0, 0), (2, 2) and (-2, -2).

Now, plot the points (0, 0), (2, 2) and (-2, -2) and draw the line passing through them to get the graph of x – y = 0.



The graph of x – y = 0 intersects both the axes at (0, 0).

Solution 4(3):

The given equation is x + y = 2.

∴ y = 2 – x

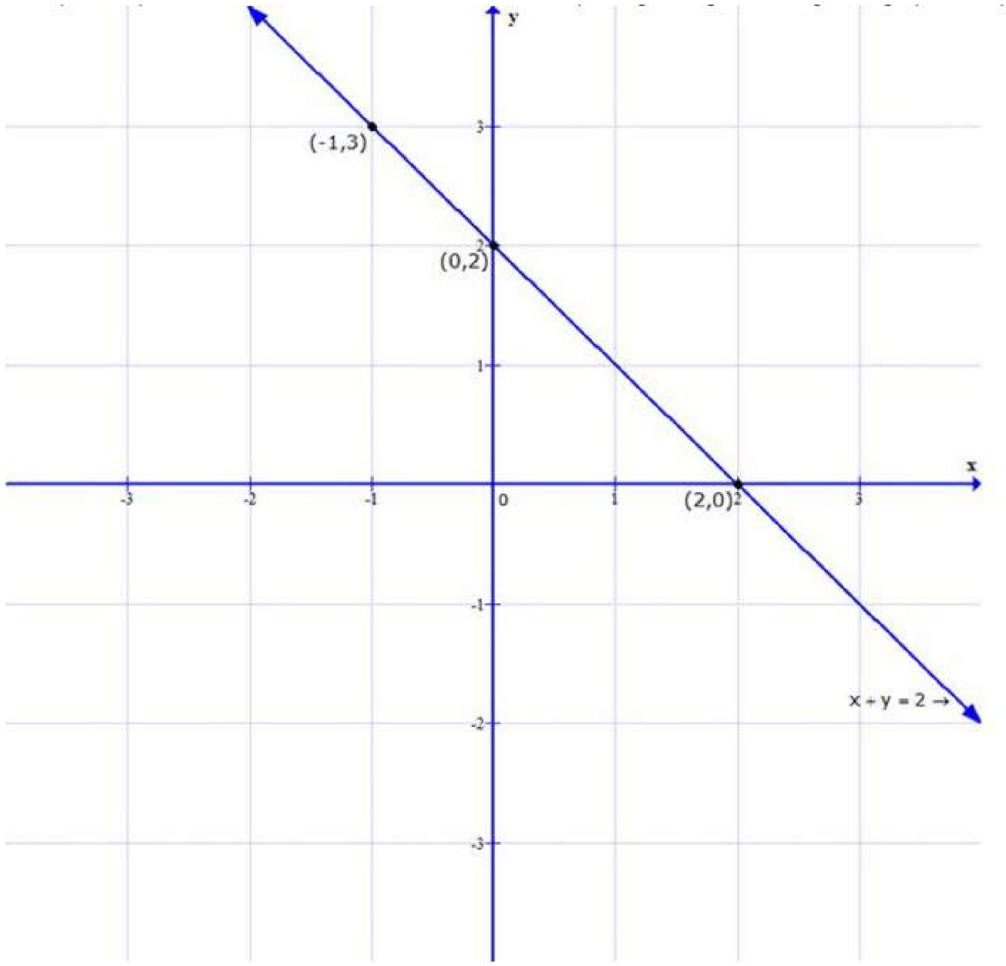
For x = 0 ⇒ y = 2 – 0 = 2

For x = -1 ⇒ y = 2 – (-1) = 3

For x = 2 ⇒ y = 2 – 2 = 0

Hence, three solution of x + y = 2 can be given as (0, 2), (-1, 3) and (2, 0).

Now, plot the points (0, 2), (-1, 3) and (2, 0) and draw the line passing through them to get the graph of x + y = 2.



The graph of x + y = 2 intersects the X-axis at (2, 0) and the Y-axis at (0, 2).

Solution 4(4):

The given equation is $x - y = 3$.

$\therefore x - 3 = y$

$\therefore y = x - 3$

For $x = 1 \Rightarrow y = 1 - 3 = -2$

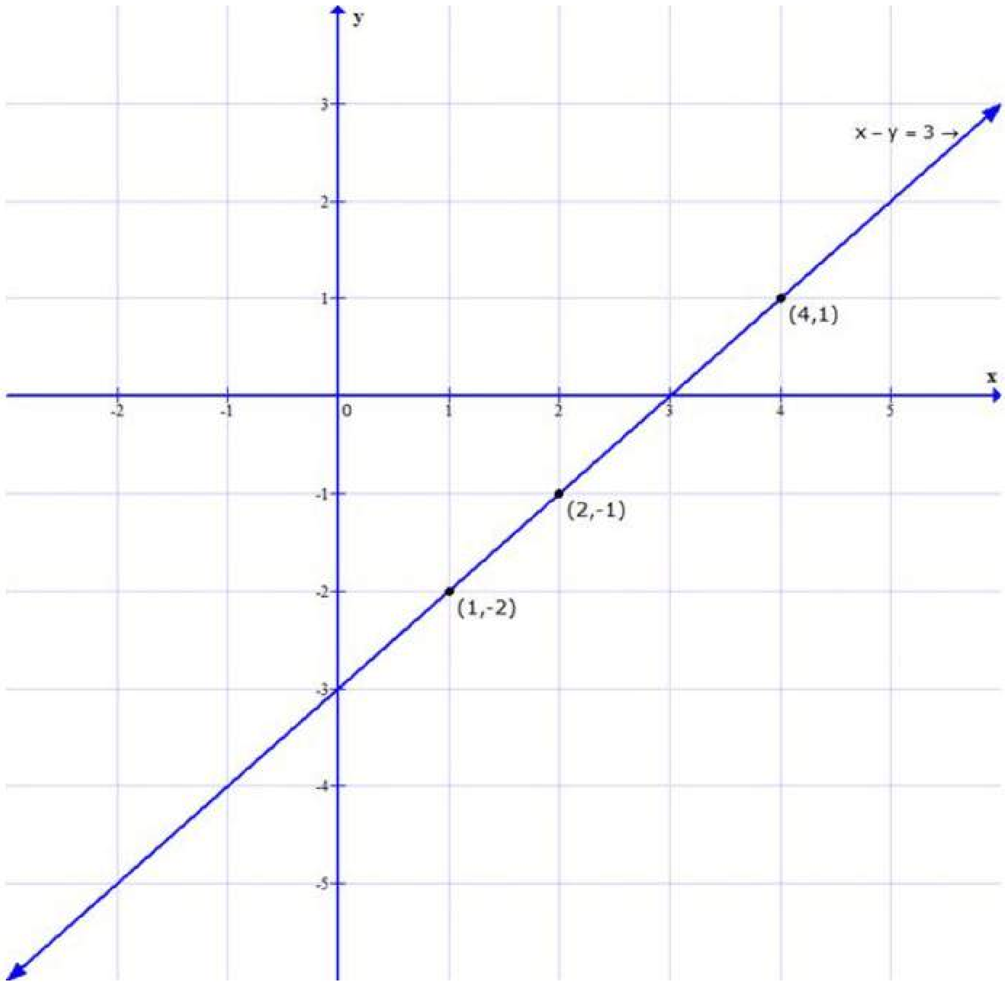
For $x = 2 \Rightarrow y = 2 - 3 = -1$

For $x = 4 \Rightarrow y = 4 - 3 = 1$

So, three solutions of $x - y = 3$ can be given as (1, -2), (2, -1) and (4, 1).

Now, plot the points (1, -2), (2, -1) and (4, 1).

Draw the line passing through them to get the graph of $x - y = 3$.



The graph of x – y = 3 intersects the X-axis at (3, 0) and the Y-axis at (0, -3).

Solution 4(5):

The given equation is $3x + 4y + 12 = 0$.

$\therefore\ 4y = -3x - 12$

$\therefore\ y = \dfrac{-3x - 12}{4}$

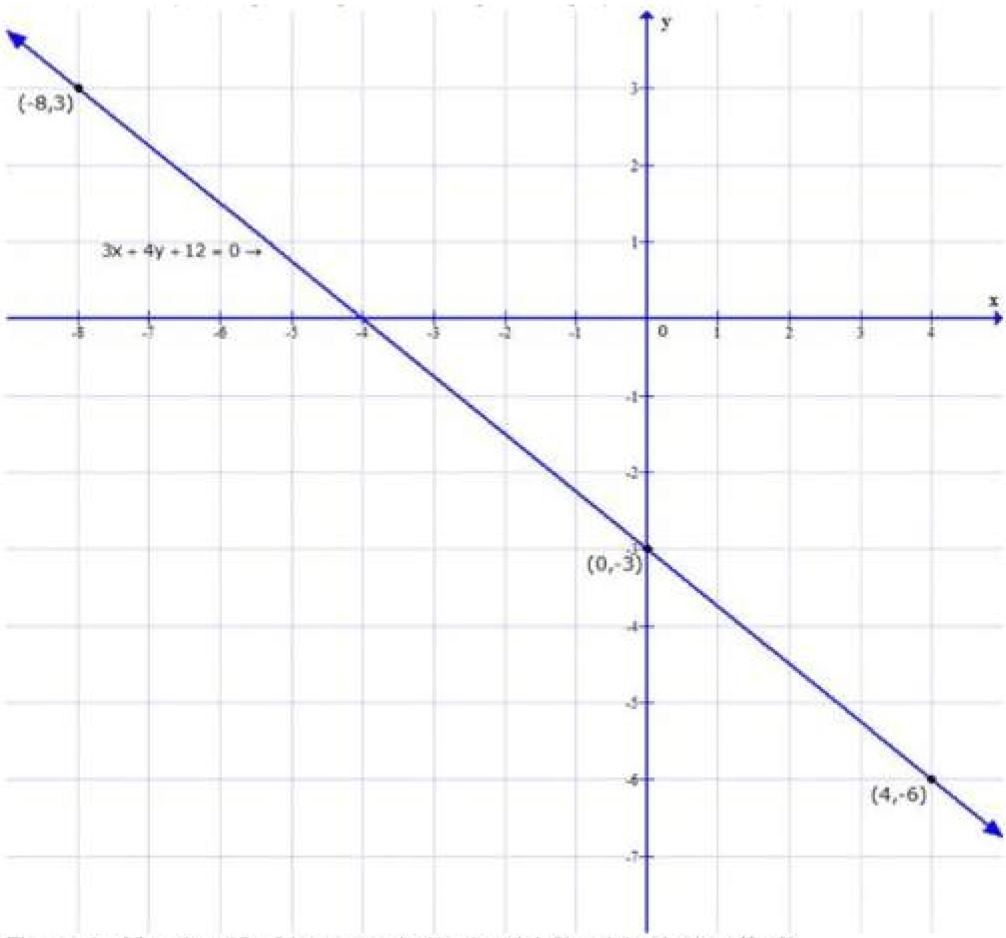
For $x = 0 \Rightarrow y = \dfrac{-3(0) - 12}{4} = \dfrac{-12}{4} = -3$

For $x = -8 \Rightarrow y = \dfrac{-3(-8) - 12}{4} = \dfrac{12}{4} = 3$

For $x = 4 \Rightarrow y = \dfrac{-3(4) - 12}{4} = \dfrac{-24}{4} = -6$

Now, plot the points $(0, -3)$, $(-8, 3)$ and $(4, -6)$.

Draw the line passing through them to get the graph of $3x + 4y + 12 = 0$.



The graph of 3x + 4y + 12 = 0 intersects the X-axis at (-4, 0) and the Y-axis at (0, -3).

Solution 4(6):

The given equation is $3x - 2y - 6 = 0$.

$\therefore 3x - 6 = 2y$

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

For $x = 0 \Rightarrow y = \dfrac{3(0)-6}{2} = \dfrac{-6}{2} = -3$

For $x = 2 \Rightarrow y = \dfrac{3(2)-6}{2} = 0$

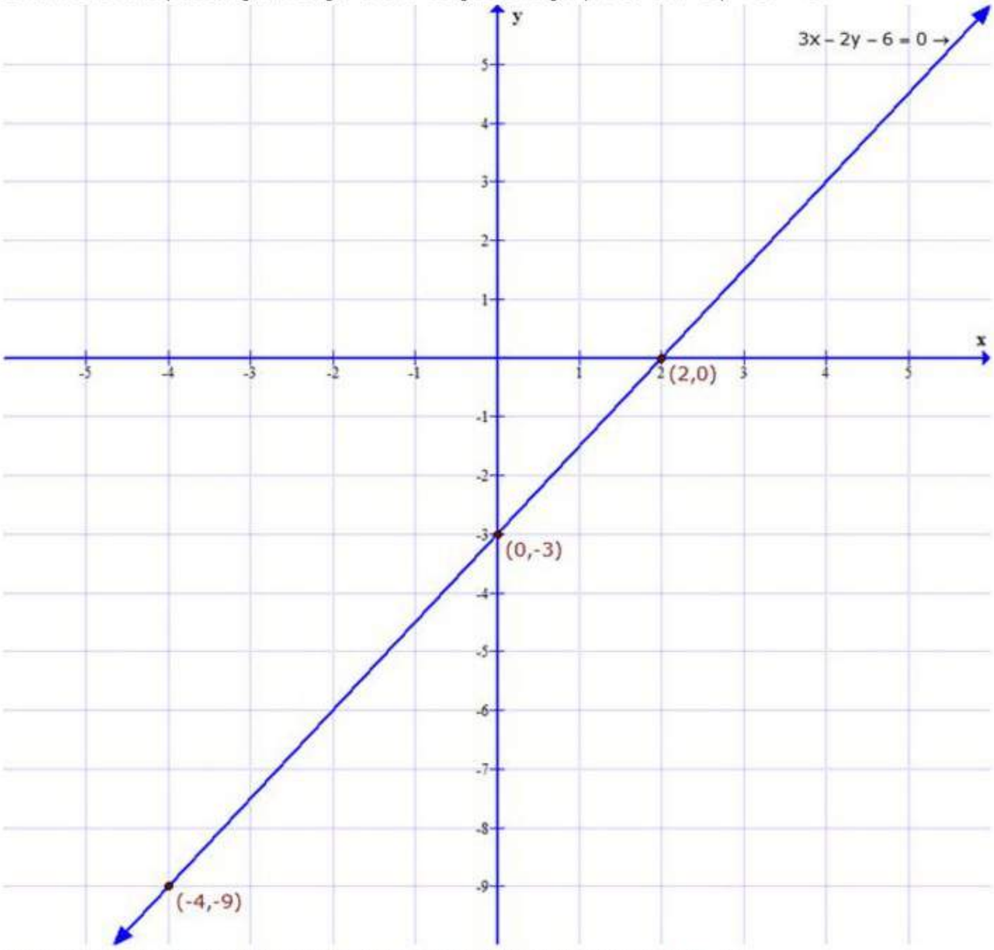
For $x = -4 \Rightarrow y = \dfrac{3(-4)-6}{2} = \dfrac{-18}{2} = -9$

Hence, three solution of $3x - 2y - 6 = 0$ can be given as

$(0, -3)$, $(2, 0)$ and $(-4, -9)$.

Now, plot the points $(0, -3)$, $(2, 0)$ and $(-4, -9)$.

Draw the line passing through them to get the graph of $3x - 2y - 6 = 0$.



The graph of 3x - 2y - 6 = 0 intersects the X-axis at (2, 0) and the Y-axis at (0, -3).

Solution 4(7):

$3x + 2y - 6 = 0$

$\therefore\ 2y = 6 - 3x$

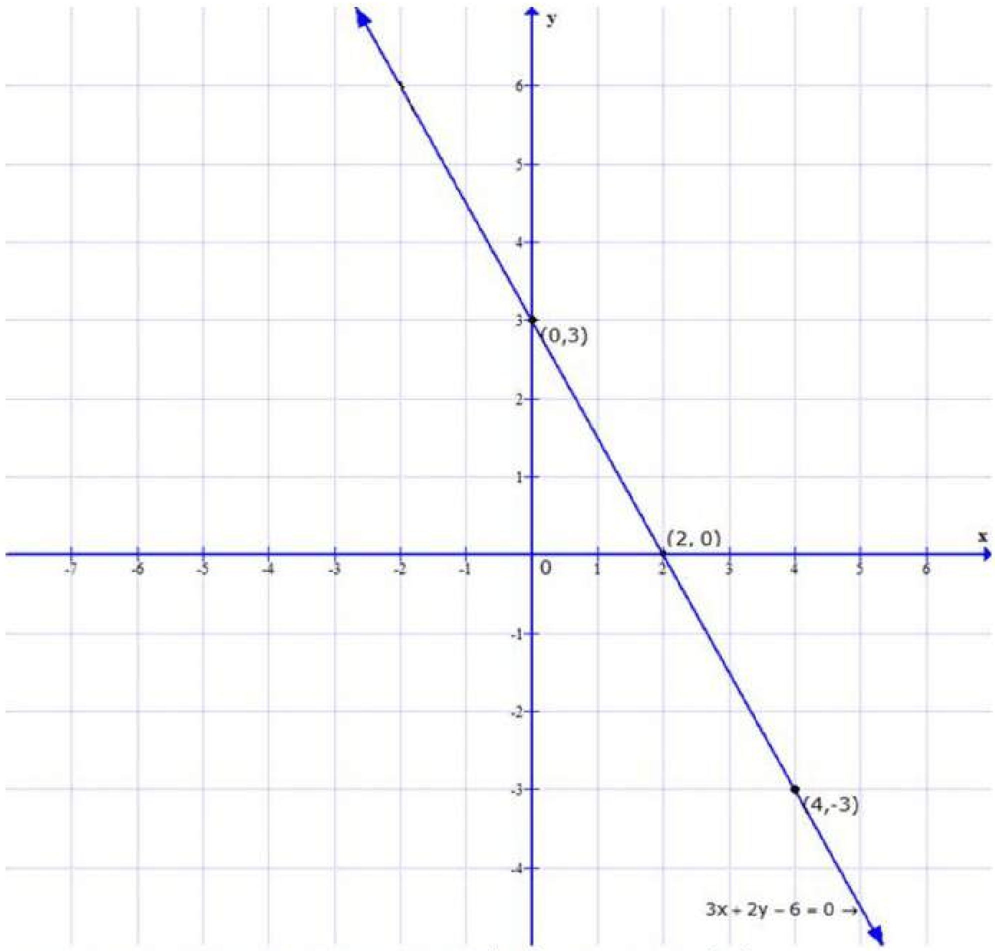
$\therefore\ y = \dfrac{6-3x}{2}$

For $x = 0$, $y = \dfrac{6-3(0)}{2} = \dfrac{6}{2} = 3$

For $x = 2$, $y = \dfrac{6-3(2)}{2} = \dfrac{0}{2} = 0$

For $x = 4$, $y = \dfrac{6-3(4)}{2} = \dfrac{-6}{2} = -3$

Hence, three solutions of $3x + 2y - 6 = 0$ can be given as (0, 3), (2, 0) and (4, − 3).
We plot the points (0, 3), (2, 0) and (4, − 3) and draw the line
passing through them to get the graph of $3x + 2y - 6 = 0$.



The graph of 3x + 2y - 6 = 0 intersects the X-axis at (2, 0) and the Y-axis at (0, 3).

Solution 4(8):

$3x - 4y + 12 = 0$

$\therefore\ 3x + 12 = 4y$

$\therefore\ y = \frac{3x + 12}{4}$

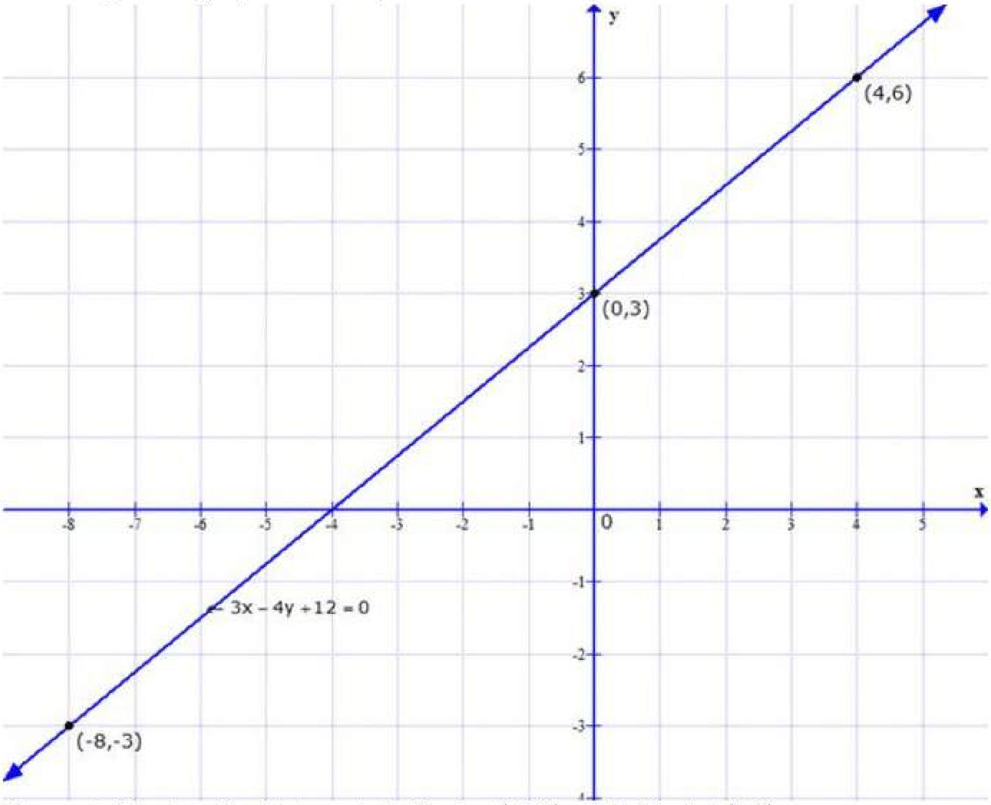
For $x = 0 \Rightarrow y = \frac{3(0) + 12}{4} = \frac{12}{4} = 3$

For $x = 4 \Rightarrow y = \frac{3(4) + 12}{4} = \frac{24}{4} = 6$

For $x = -8 \Rightarrow y = \frac{3(-8) + 12}{4} = \frac{-12}{4} = -3$

So, three solutions of $3x - 4y + 12 = 0$ can be given as (0, 3), (4, 6) and (−8, −3)

Now, plot the points (0, 3), (4, 6) and (−8, −3) and draw the line passing through them to get the graph of $3x - 4y + 12 = 0$.



The graph of 3x - 4y + 12 = 0 intersects the X-axis at (-4 , 0) and the Y-axis at (0, 3).

Solution 4(9):

$2x + 5 = 0$

$\therefore 2x = -5$

$\therefore x = -\frac{5}{2}$

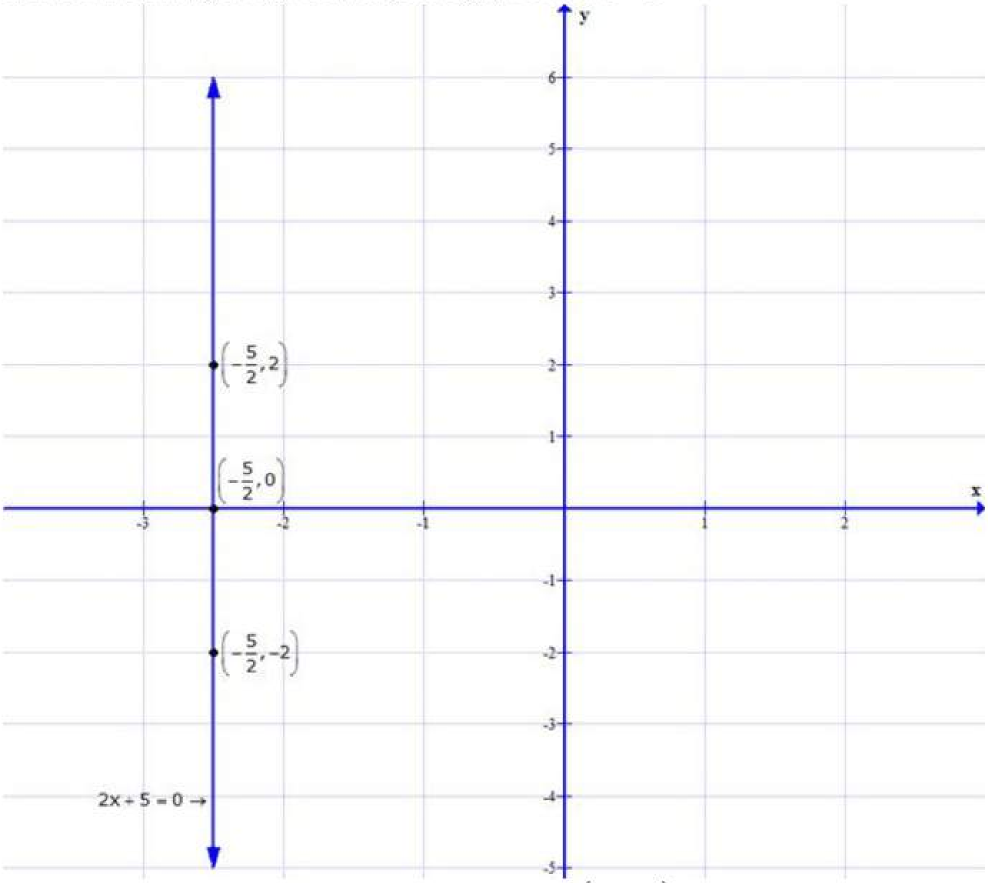
Here, y is absent in the equation.

Then for any value of y, the value of x is $-\frac{5}{2}$ always.

Hence, three solutions of $2x + 5 = 0$ can be given as $\left(-\frac{5}{2}, 0\right)$, $\left(-\frac{5}{2}, 2\right)$ and $\left(-\frac{5}{2}, -2\right)$

Now, plot the points $\left(-\frac{5}{2}, 0\right)$, $\left(-\frac{5}{2}, 2\right)$ and $\left(-\frac{5}{2}, -2\right)$.

Draw the line passing through them to get the graph of $2x + 5 = 0$.



The graph of $2x + 5 = 0$ intersects the x-axis at $\left(-\frac{5}{2}, 0\right)$. It does not intersect the y-axis as it is parallel to the y-axis.

Solution 4(10):

4y – 8 = 0

∴ 4y = 8

∴ y = 2

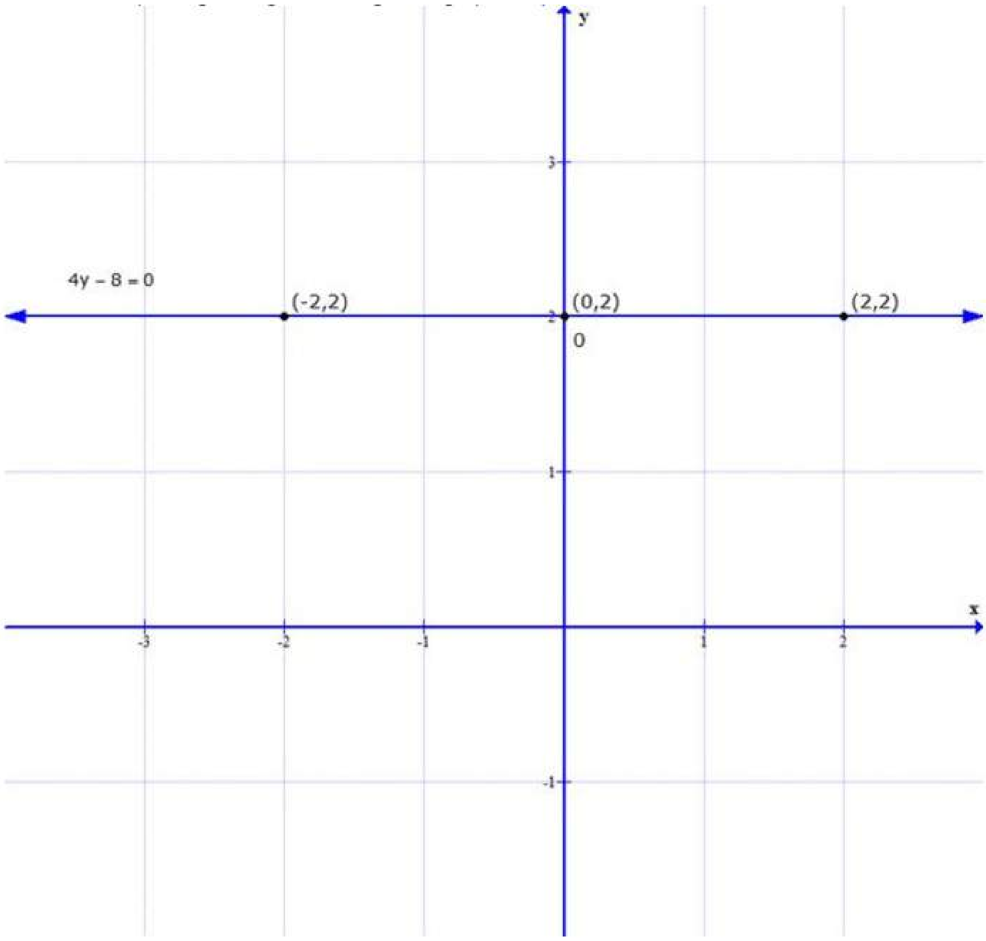
But, x is absent in the equation.

So, for any value of x, the value of y is 2 always.

Three solution of 4y – 8 = 0 can be given as (0, 2), (-2 , 2) and (2, 2).

Now, plot the points (0, 2), (-2 , 2) and (2, 2).

Draw the line passing through them to get the graph of 4y – 8 = 0.



The graph of 4y – 8 = 0 intersects the yY-axis at (0, 2), but it does not intersect the X-axis parallel to the X-axis.

Solution 5:

1. The given equation is 3x + 2 = -x + 10.
   ∴3x + x = 10 – 2
   ∴4x = 8
   ∴x = 2
   To represent the solution in the Cartesian plane, x = 2 is taken as the linear equation x + 0y = 2.
   But, y is absent in the equation.
   So, for any value of y, the value of x is always 2.
   Then three solutions of the equation can be given as (2, 0), (2, -5) and (2, 2)
2. The given equation is 4y – 3 = y + 6.
   ∴4y – y = 6 + 3
   ∴3y = 9
   ∴y = 3
   To represent the solution in the Cartesian plane, y = 3 is taken as the linear equation 0x + y = 3.
   But, x is absent in the equation.
   So, for any value of x, the value of y is always 3.
   Then three solutions of the equation can be given as (0, 3), (2, 3) and (-3, 3)
3. The given equation is 2x + 3 = x – 1.
   ∴ 2x – x = -1 – 3
   ∴ x = -4
   To represent the solution in the Cartesian plane, x = -4 is taken as the linear equation x

+ 0y = -4.

But, y is absent in the equation.

So, for any value of y, the value of x is always -4.

Then three solutions of the equation can be given as (-4, 3), (-4, 0) and (-4, -3).

4. The given equation is 3y + 3 = x – 1.

∴ 3y – 2y = -3 – 2

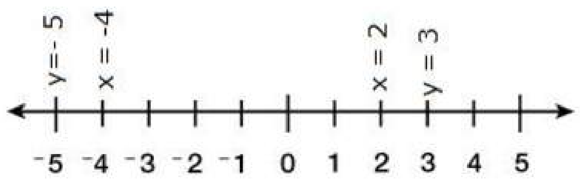
∴ y = – 5

To represent the solution in the Cartesian plane, x = -5 is taken as the linear equation 0x + y = -5.

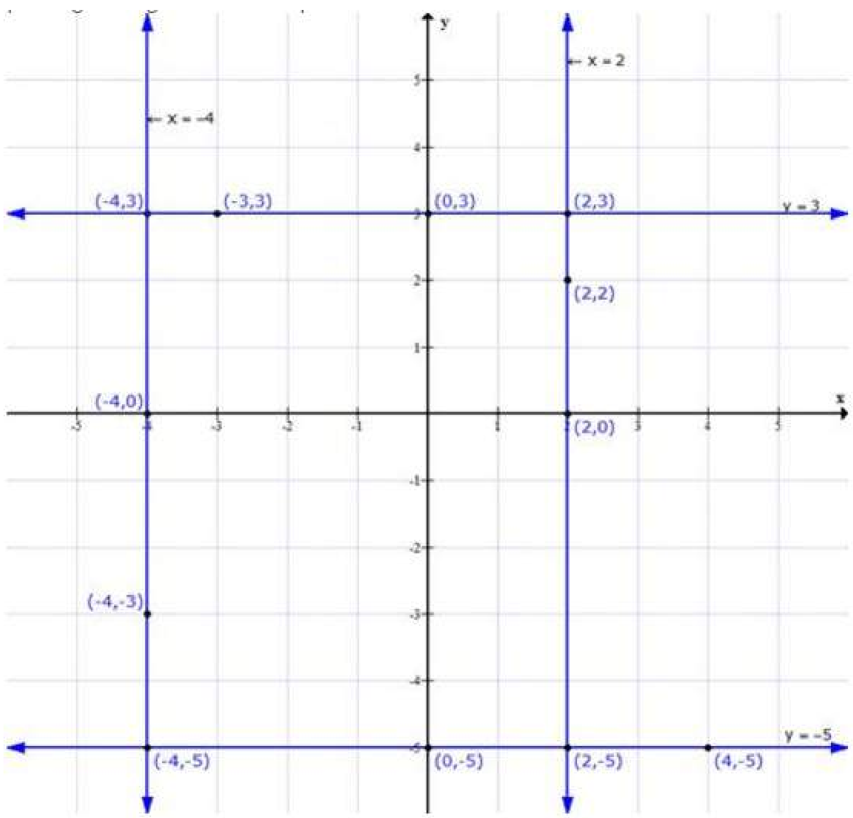
But, y is absent in the equation.

So, for any value of x, the value of y is always -5. Then three solutions of the equation can be given as (-4, -5), (0, -5) and (4, -5).

The geometric representation of all the above solutions. i.e. x = 2, y = 3, x = -4 and y = -5 on the same number line is shown below:



For geometric representation of all the above solutions
in the same Cartesian plane, we plot the three ordered pairs (x, y) obtained for each of them on the same graph paper and draw the line each passing through those three points.



Solution 6:

1. x = 4

Here, y is absent in the equation.

So, for any value of y, the value of x is always 4.

Three solutions of x = 4 can be given as (4, 2), (4, 0) and (4, -2).

2. y = 4

   Here, x is absent in the equation.

   So, for any value of x, the value of y is always 4.

   Three solutions of y = 4 can be given as (2, 4), (0, 4) and (-2, 4).

3. x = -4

   Here, y is absent in the equation.

   So, for any value of y, the value of x is always 4.

   Three solutions of x = -4 can be given as (-4, 2), (-4 , 0) and (-4, -2).

4. y = -4

   Here, x is absent in the equation.

   So, for any value of x, the value of y is -4 always.

   Three solutions of y = -4 can be given as (2, -4), (0, -4) and (-2, -4).

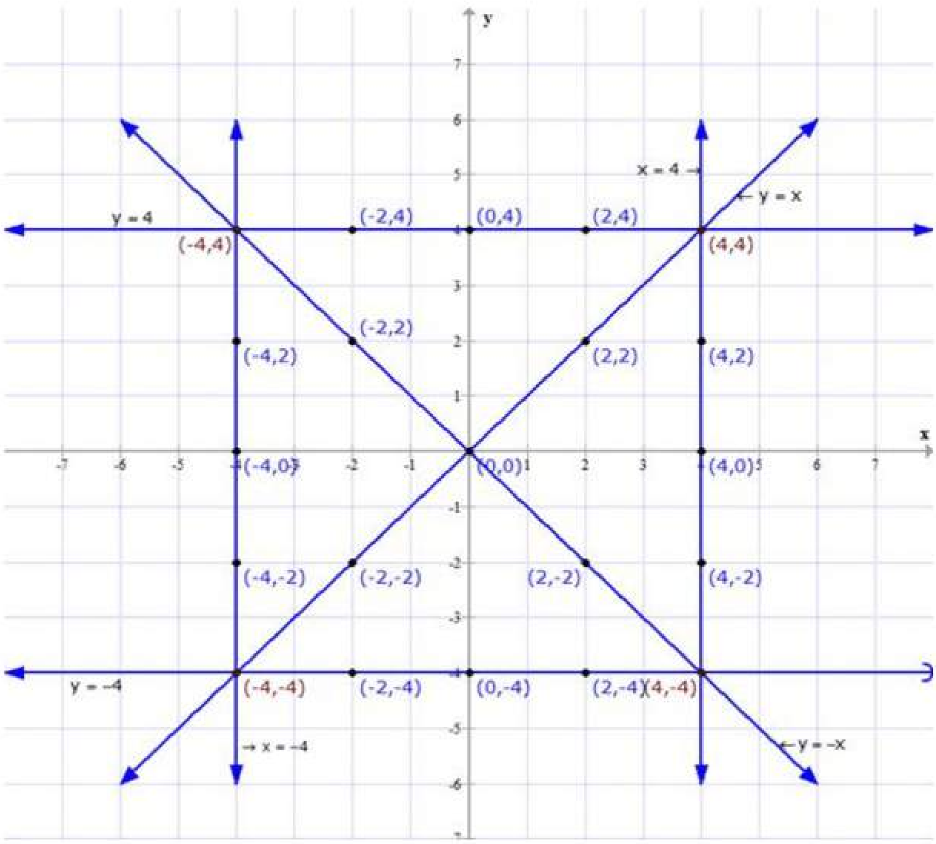
5. y = x

   Three solutions can be given as (2, 2), (0 , 0) and (-2, -2).

6. y = -x

   Three solutions can be given as (2, -2), (0, 0) and (-2, 2).

To draw the graph of all the above in R^2 on the same graph paper, plot the three ordered pairs (x, y) obtained for each of the lines on the same graph paper.
Draw a line each passing through those three points.



The points where these lines intersect each other are (0, 0), (4, 4), (-4, 4), (-4, -4) and (4, -4)

Solution 7:

(1) $x + 3y - 6 = 0$

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

For $x = 0 \Rightarrow y = \frac{6-0}{3} = \frac{6}{3} = 2$

For $x = 3 \Rightarrow y = \frac{6-3}{3} = \frac{3}{3} = 1$

For $x = (-3) \Rightarrow y = \frac{6-(-3)}{3} = \frac{9}{3} = 3$

So, the three solutions of $x + 3y - 6 = 0$ can be given as (0, 2), (3, 1) and (-3, 3).

Now, plot the points (0, 2), (3, 1) and (-3, 3).

Draw the line passing through them to get the graph of $x + 3y - 6 = 0$.

(2) $2x - y - 5 = 0$

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

For $x = 0 \Rightarrow y = 2(0) - 5 = -5$

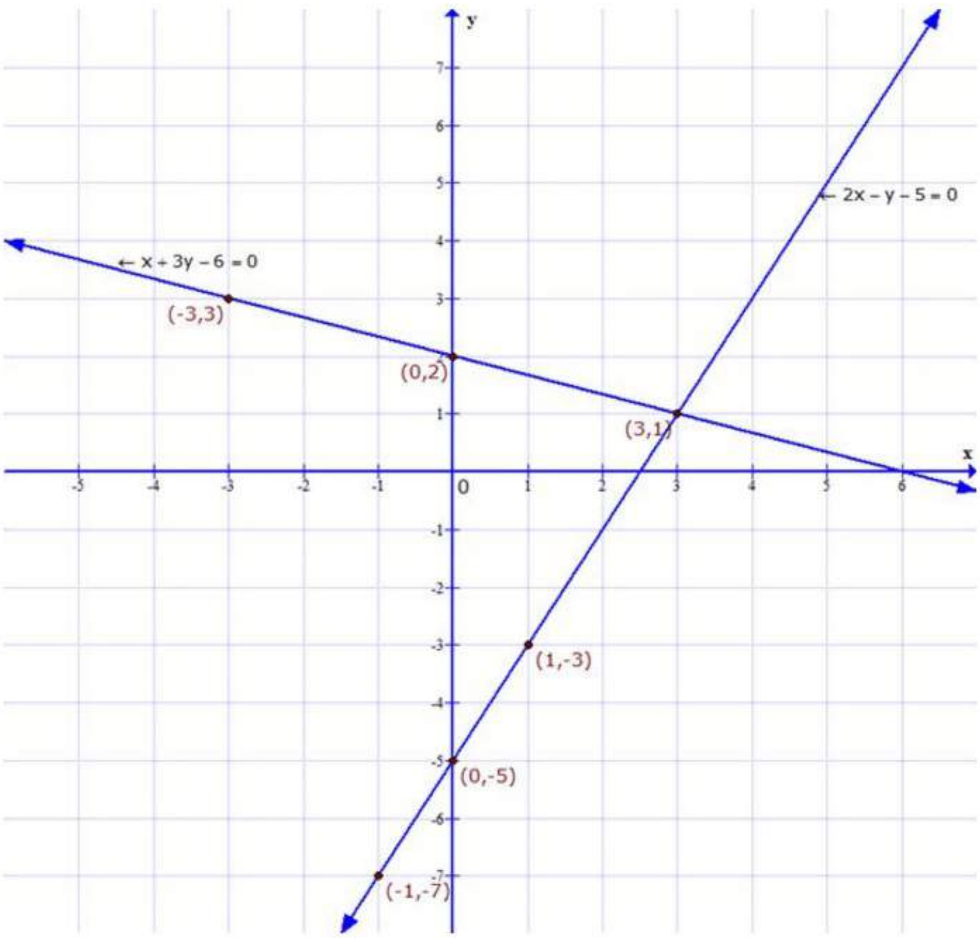
For $x = 1 \Rightarrow y = 2(1) - 5 = -3$

For $x = -1 \Rightarrow y = 2(-1) - 5 = -7$

So, the three solutions of $2x - y - 5 = 0$ can be given as (0, -5), (1, -3) and (-1, -7).

Now, plot the points (0, -5), (1, -3) and (-1, -7).

Draw the line passing through them to get the graph of $2x - y - 5 = 0$.



The point of intersection of lines x + 3y - 6 = 0 and 2x - y - 5 = 0 is (3, 1).

Solution 8:

(1) $3x + 2y = 9$

$\therefore\ 2y = 9 - 3x \Rightarrow y = \frac{9-3x}{2}$

For $x = 1 \Rightarrow y = \frac{9-3(1)}{2} = \frac{6}{2} = 3$

For $x = 3 \Rightarrow y = \frac{9-3(3)}{2} = \frac{0}{2} = 0$

For $x = 5 \Rightarrow y = \frac{9-3(5)}{2} = \frac{-6}{2} = -3$

So, three solutions of $3x + 2y = 9$ can be given as $(1, 3)$, $(3, 0)$ and $(5, -3)$.

Now, plot the points $(1, 3)$, $(3, 0)$ and $(5, -3)$.

Draw the line passing through them to get the graph of $3x + 2y = 9$.

(2) $x + 4y = 8$

$\therefore\ 4y = 8 - x \Rightarrow y = \frac{8-x}{4}$

For $x = 0 \Rightarrow y = \frac{8-0}{4} = 2$

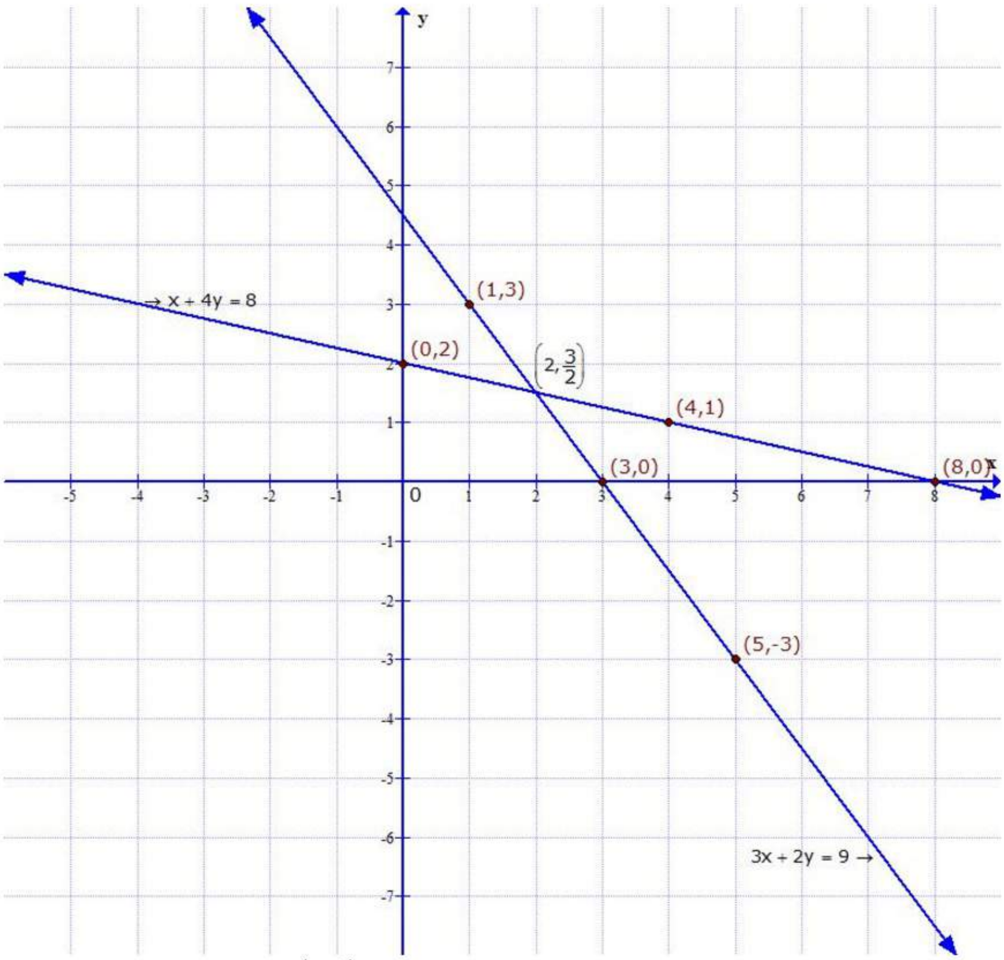
For $x = 4 \Rightarrow y = \frac{8-4}{4} = \frac{4}{4} = 1$

For $x = 8 \Rightarrow y = \frac{8-8}{4} = \frac{0}{4} = 0$

So, three solutions of $x + 4y = 8$ can be given as $(0, 2)$, $(4, 1)$ and $(8, 0)$.

Now, plot the points $(0, 2)$, $(4, 1)$ and $(8, 0)$.

Draw the line passing through them to get the graph of $x + 4y = 8$.



From the graph it is clear that $\left(2, \frac{3}{2}\right)$ is the point of intersection.

Solution 9(1):

C. I and III

In the equation $y = x$, both the x-coordinate and the y-coordinate have the same sign. So the points representing its solutions will lie in the Ist quadrant or the IIIrd quadrant or coincide with the origin.

Solution 9(2):

d. 1st, 2nd and 4th all

Line x + y = 2 passes through the points (2, 0) and (0, 2). Between these points the line passes through the 1st quadrant and beyond those points, the line passes through the 2nd quadrant on one side and the 4th quadrant on the other side.

Solution 9(3):

c.II and IV

If $x + y = 0 \Rightarrow x = -y$.

Here, the values of x and y will have the same numbers with opposite signs. Thus, all those solutions will either be in the II^{nd} quadrant or the IV^{th}quadrant.

Solution 9(4):

c. c = 0

Origin i.e. (0, 0) is always solution of ax + by = 0 for any values of a and b. So the graph of ax + by = c passes through the origin if c = 0.

Solution 9(5):

d. infinitely many solutions

A linear equation in two variables always has infinitely many solutions.

Solution 9(6):

c. 45

Given, x = 2, y = 5 is a solution of 5x + 7y – k = 0.

$\therefore 5(2) + 7(5) - k = 0$

$\therefore 10 + 35 = k$

$\therefore 45 = k$

$\therefore k = 45$

Solution 9(7):

b. $\frac{1}{9}(5F - 160)$

$$F = \left(\frac{9}{5}\right)C + 32$$

$$\therefore \quad 5F = 9C + 160$$

$$\therefore \quad 5F - 160 = 9C$$

$$\therefore \quad C = \frac{1}{9}(5F - 160)$$

Solution 9(8):

b. $\frac{1}{9}(5F - 160)$

$$F = \left(\frac{9}{5}\right)C + 32$$
$$\therefore\ 5F = 9C + 160$$
$$\therefore\ 5F - 160 = 9C$$
$$\therefore\ C = \frac{1}{9}\ (5F - 160)$$

Solution 9(9):

c. -170

$$F = -274$$
$$F = \left(\frac{9}{5}\right)C + 32$$
$$\therefore -274 = \left(\frac{9}{5}\right)C + 32$$
$$\therefore -274 - 32 = \left(\frac{9}{5}\right)C$$
$$\therefore -306 = \frac{9}{5}C$$
$$\therefore C = -306 \times \frac{5}{9}$$
$$\therefore C = -34 \times 5$$
$$\therefore C = -170$$

Solution 9(10):

c. lines through origin

The equation y = mx gives mx – y + 0 = 0 in standard form. Here, c = 0, so the equation y = mx represents lines through the origin for different values of m.

Solution 9(11):

c. parallel to X-axis

The graph of y = k (constant k ≠ 0) is a line parallel to the X-axis.

Solution 9(12):

b. parallel to Y-axis

The graph of the equation x = k (constant k ≠ 0) is a line parallel to the Y-axis.

Solution 9(13):

b. (-1, 3)

For (1, 2)

2x + 3y = 2(1) + 3(2) = 8 ≠ 7

For (-1, 3),

2x + 3y = 2(-1) + 3(3) = 7

For (-2, 5),

2x + 3y = 2(-2) + 3(5) = 11 ≠ 7

For (-2, 4),

$2x + 3y = 2(-2) + 3(4) = 8 \neq 7$

Thus, one of the solutions of the linear equation $2x + 3y = 7$ is (-1, 3).

Solution 9(14):

a. $x - 3 = 0$

Line $x - 3 = 0 \Rightarrow x = 3$

The graph of $x = k$ (constant $k \neq 0$) is a line parallel to the Y-axis.

Solution 9(15):

a. $x + y = 0$

In line $x + y = 0$ we have, $a = 1$, $b = 1$ and $c = 0$.

The graph of $ax + by + c = 0$ is a line passing through the origin if $a \neq 0$, $b \neq 0$ and $c = 0$.

Exercise 5.1:

Solution 1:

Let the cost of a notebook be Rs. x and the cost of a pen be Rs. y.

Now, cost of a notebook = Twice the cost of a pen

$\therefore x = 2 \times y$

$\therefore x = 2y$

Thus, $x = 2y$ is the representation of the given statement in the form of a linear equation in two variables.

Solution 2:

(1) The equation $5x = 6y$ is a linear equation in two variables.
It can be written as $5x - 6y + 0 = 0$ in the standard form.
Here, $a = 5$, $b = -6$ and $c = 0$

(2) The equation $y^2 = 3x$ is not a linear equation in two variables as the exponent index of y is 2.

(3) The equation $7x = 0$ is a linear equation in two variables.
It can be written as $7x + 0y + 0 = 0$ in the standard form.
Here, $a = 7$, $b = 0$ and $c = 0$.

(4) The equation $6y - 4x = 3$ is a linear equation in two variables.
It can be written as $-4x + 6y - 3 = 0$ in the standard form.
Here, $a = -4$, $b = 6$ and $c = -3$.

(5) The equation $3x + 4.5y = 8.2$ is a linear equation in two variables.
It can be written as $3x + 4.5y - 8.2 = 0$ in the standard form.
Here, $a = 3$, $b = 4.5$ and $c = -8.2$

(6) The equation $y - \frac{x}{4} - 3 = 0$ is a linear equation in two variables.
It can be written as $\frac{-x}{4} + y - 3 = 0$ in the standard form.
Here, $a = \frac{-1}{4}$, $b = 1$ and $c = -3$.

(7) The equation $9x = 3$ is a linear equation in two variables.
It can be written as $9x + 0y - 3 = 0$ in the standard form.
Here, $a = 9$, $b = 0$ and $c = -3$.

(8) The equation $3x = 2y - 4$ is a linear equation in two variables.
It can be written as $3x - 2y + 4 = 0$ in the standard form.
Here, $a = 3$, $b = -2$ and $c = 4$.

(9) The equation $y = 2x + 5$ is a linear equation in two variables.
It can be written as $-2x + y - 5 = 0$ in the standard form.
Here, $a = -2$, $b = 1$ and $c = -5$.

(10) The equation $\frac{3}{2}x + \frac{7}{2}y = 1$ is a linear equation in two variables.
It can be written as $\frac{3}{2}x + \frac{7}{2}y - 1 = 0$ in the standard form.
Here, $a = \frac{3}{2}$, $b = \frac{7}{2}$, and $c = -1$.

(11) The equation $3y^2 + 2x = 2$ is not a linear equation in two variables as the index of variable y is 2.

(12) The equation $\frac{x}{3} - \frac{4}{y} = 2$ is not a linear equation in two variables as the degree of variable y is (-1).

Exercise 5.2:

Solution 1(1):

The equation $2x = 3y + 5$ gives,

$\therefore 3y = 2x - 5$

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

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

$\therefore$ $(1, -1)$ is a solution of $2x = 3y + 5$.

For $x = 7$, $y = \frac{2(7) - 5}{3} = 3$

$\therefore$ $(7, 3)$ is a solution of $2x = 3y + 5$.

For $x = 13$, $y = \frac{2(13) - 5}{3} = 7$

$\therefore$ $(13, 7)$ is a solution of $2x = 3y + 5$.

For $x = 16$, $y = \frac{2(16) - 5}{3} = 9$

$\therefore$ $(16, 9)$ is a solution of $2x = 3y + 5$.

For $x = 19$, $y = \frac{2(19) - 5}{3} = 11$

$\therefore$ So, $(19, 11)$ is a solution of $2x = 3y + 5$.

Thus $(1, -1)$, $(7, 3)$, $(13, 7)$, $(16, 9)$ and $(19, 11)$ are five different solutions of the equation $2x = 3y + 5$.

Solution 1(2):

$6y = 9$

$\therefore y = \frac{9}{6}$

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

But, x is absent in the given equation.

So, for any value of x, the value of y is always $\frac{3}{2}$.

For $x = -2$, $y = \frac{3}{2}$

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

For $x = 0$, $y = \frac{3}{2}$

For $x = 1$, $y = \frac{3}{2}$

For $x = 2$, $y = \frac{3}{2}$

Therefore, $\left(-2, \frac{3}{2}\right)$, $\left(-1, \frac{3}{2}\right)$, $\left(0, \frac{3}{2}\right)$, $\left(1, \frac{3}{2}\right)$ and $\left(2, \frac{3}{2}\right)$ are five different solutions of the equation $6y = 9$.

Solution 2:

(1) $3x + 4y = 12$

For $x = 0 \Rightarrow 4y = 12$, i.e. $y = 3$

For $y = 0 \Rightarrow 3x = 12$, i.e. $x = 4$.

$\therefore$ (0, 3) and (4, 0) are two solutions of $3x + 4y = 12$.

(2) $5x - 2y = 0$

For $x = 0 \Rightarrow 0 - 2y = 0$, i.e. $y = 0$.

For $x = 2 \Rightarrow 5(2) - 2y = 0$, i.e. $2y = 10$ i.e. $y = 5$.

Thus (0, 0) and (2, 5) are two solutions of $5x - 2y = 0$.

(3) $3x + 5 = 0$

$\therefore 3x = -5$

$\therefore x = -\frac{5}{3}$

But, y is absent in the given equation. So, for any value of y,

the value of x is always $\left(-\frac{5}{3}\right)$.

Thus $\left(-\frac{5}{3}, 1\right)$ and $\left(-\frac{5}{3}, 2\right)$ are two solutions of $3x + 5 = 0$.

(4) $\pi x + y = 4$

For, $x = 0 \Rightarrow y = 4$

For, $y = 0 \Rightarrow \pi x = 4$, i.e $x = \frac{4}{\pi}$

Thus, (0, 4) and $\left(\frac{4}{\pi}, 0\right)$ are two solutions of $\pi x + y = 4$.

Solution 3(1):

The equation $3x - 2y = 3$ can be written as

$3x - 3 = 2y$

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

For $x = 5$, $y = \frac{3(5) - 3}{2} = \frac{12}{2} = 6$

So, (5, 6) is a solution of $3x - 2y = 3$.

For $x = 9$, $y = \frac{3(9) - 3}{2} = \frac{24}{2} = 12$

So, (9, 12) is a solution of $3x - 2y = 3$.

For $x = 11$, $y = \frac{3(11) - 3}{2} = \frac{30}{2} = 15$

So, (11, 15) is a solution of $3x - 2y = 3$.

Thus, (5, 6), (9, 12) and (11, 15) are three elements of the solution set of $3x - 2y = 3$.

Solution 3(2):

$2x = 4$

$\therefore x = 2$

But y is absent in the given equation.

Hence, for any value of x, the value of y is always 2.

Thus, (2, 1), (2, 2) and (2, 3) are three elements of the solution set of $2x = 4$.

Solution 3(3):

$6y = 15$

$\therefore y = \frac{15}{6}$

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

But, x is absent in the given equation. Hence, for any value of x, the value of y is always $\frac{5}{2}$.

Thus, $\left(-5, \frac{5}{2}\right)$, $\left(0, \frac{5}{2}\right)$ and $\left(5, \frac{5}{2}\right)$ are three elements of the solution set of $6y = 15$.

Solution 3(4):

The equation $5x + 3y = 0$ can be written as

$3y = -5x$

$\therefore y = -\frac{5}{3}x$

For $x = -6$, $y = \frac{-5}{3}(-6) = \frac{30}{3} = 10$

So, $(-6, 10)$ is a solution of $5x + 3y = 0$.

For $x = 0$, $y = \frac{-5}{3}(0) = 0$

So, $(0, 0)$ is a solution of $5x + 3y = 0$.

For $x = 6$, $y = \frac{-5}{3}(6) = \frac{-30}{3} = -10$

So, $(6, -10)$ is a solution of $5x + 3y = 0$.

Thus, $(-6, 10)$, $(0, 0)$ and $(6, -10)$ are three elements of the solution set of $5x + 3y = 0$.

Solution 3(5):

The equation $3x + 4y = 6$ can be written as

$4y = 6 - 3x$

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

For $x = -6$, $y = \frac{6 - 3(-6)}{4} = \frac{24}{4} = 6$

So $(-6, 6)$ is a solution of $3x + 4y = 6$.

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

So $(2, 0)$ is a solution of $3x + 4y = 6$.

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

So $(6, -3)$ is a solution of $3x + 4y = 6$.

Thus, $(-6, 6)$, $(2, 0)$ and $(6, -3)$ are three elements of the solution set of $3x + 4y = 6$.

Solution 3(6):

The equation x + y = 0 can be written as

y = -x

For x = -2, y = 2

So, (-2, 2) is a solution of x + y = 0.

For x = 0, y = 0

So, (0, 0) is a solution of x + y = 0.

For x = 2, y = -2

So (2, -2) is a solution of x + y = 0.

Thus (-2, 2), (0, 0) and (2, -2) are three elements of the solution set of x + y = 0.

Solution 3(7):

$x - y = 0$

$\therefore\ y = x$

For $x = 2,\ y = 2$

So $(2, 2)$ is a solution of $x - y = 0$.

For $x = -4,\ y = -4$

So $(-4, -4)$ is a solution of $x - y = 0$.

For $x = 7,\ y = 7$

So $(7, 7)$ is a solution of $x - y = 0$.

Thus, $(2, 2)$, $(-4, -4)$ and $(7, 7)$ are three elements of the solution set of $x - y = 0$.

Solution 3(8):

The given equation $6x + 3y = 9$ can be written as

$3y = 9 - 6x$

$\therefore\ y = \dfrac{9 - 6x}{3}$

$\therefore\ y = 3 - 2x$

For $x = 0,\ y = 3 - 2(0) = 3$

So $(0, 3)$ is a solution of $6x + 3y = 9$.

For $x = 1,\ y = 3 - 2(1) = 1$

So $(1, 1)$ is a solution of $6x + 3y = 9$.

For $x = 2,\ y = 3 - 2(2) = -1$

So $(2, -1)$ is a solution of $6x + 3y = 9$.

Thus, $(0, 3)$, $(1, 1)$ and $(2, -1)$ are three elements of the sdution set of $6x + 3y = 9$.

Solution 4:

Option (3) is true.

3y = 2x + 7 is a linear equation in two variables and hence, it has infinitely many solutions.

Solution 5:

Equation is $2x - y = 5$

(1) Taking $x = 3$ and $y = 1$, we have

L.H.S. $= 2x - y = 2(3) - 1 = 6 - 1 = 5 =$ R.H.S.

Thus, $(3, 1)$ is a solution of the equation $2x - y = 5$.

(2) Taking $x = -2$ and $y = -9$, we have

L.H.S. $= 2x - y = 2(-2) - (-9) = -4 + 9 = 5 =$ R.H.S.

Thus, $(-2, -9)$ is a solution of the equation $2x - y = 5$.

(3) Taking $x = 0$ and $y = 5$, we have

L.H.S. $= 2x - y = 2(0) - 5 = -5 \neq$ R.H.S.

Thus, $(0, 5)$ is not a solution of the equation $2x - y = 5$.

(4) Taking $x = 5$ and $y = 0$, we have

L.H.S. $= 2x - y = 2(5) - 0 = 10 \neq$ R.H.S.

Thus, $(5, 0)$ is not a solution of the equation $2x - y = 5$.

(5) Taking $x = 0$ and $y = -5$, we have

L.H.S. $= 2x - y = 2(0) - (-5) = 5 =$ R.H.S.

Thus, $(0, -5)$ is a solution of the equation $2x - y = 5$.

(6) Taking $x = 4$ and $y = 2$, we have

L.H.S. $= 2x - y = 2(4) - 2 = 8 - 2 = 6 \neq$ R.H.S.

Thus, $(4, 2)$ is not a solution of the equation $2x - y = 5$.

(7) Taking $x = 2$ and $y = 1$, we have

L.H.S. $= 2x - y = 2(2) - 1 = 4 - 1 = 3 \neq$ R.H.S.

Thus, $(2, 1)$ is not a solution of the equation $2x - y = 5$.

(8) Taking $x = \frac{-1}{2}$ and $y = \frac{-11}{2}$, we have

L.H.S. $= 2x - y = 2\left(\frac{-1}{2}\right) - \left(\frac{-11}{2}\right) = -1 + \frac{11}{2} = \frac{9}{2} \neq$ R.H.S.

Thus, $\left(\frac{-1}{2}, \frac{-11}{2}\right)$ is not a solution of the equation $2x - y = 5$.

(9) Taking $x = 1 + \sqrt{2}$ and $y = -3 + 2\sqrt{2}$, we have

L.H.S. $= 2x - y = 2\left(1 + \sqrt{2}\right) - \left(-3 + 2\sqrt{2}\right) = 2 + 2\sqrt{2} + 3 - 2\sqrt{2} = 5 =$ R.H.S.

Thus, $(1 + \sqrt{2}, -3 + 2\sqrt{2})$ is a solution of the equation $2x - y = 5$.

(10) Taking $x = 1$ and $y = -6$, we have

L.H.S. $= 2x - y = 2(1) - (-6) = 2 + 6 = 8 \neq$ R.H.S.

Thus, $(1, -6)$ is not a solution of the equation $2x - y = 5$.

Solution 6(1):

$x = 1$, $y = 2$ is a solution of the equation $3x – 2y = k$.

So, the equation is satisfied by replacing x by 1 and y by 3.

$\therefore 3(1) – 2(2) = k$

$\therefore 3 – 4 = k$

$\therefore -1 = k$

$\therefore k = -1$

Solution 6(2):

x = 1, y = 3 is a solution of the equation 3x + ky = 9.
So, the equation is satisfied by replacing x by 1 and y by 3.

$\therefore\ 3(1) + k(3) = 9$

$\therefore\ 3 + 3k = 9$

$\therefore\ 3k = 9 - 3$

$\therefore\ 3k = 6$

$\therefore\ k = \frac{6}{3}$

$\therefore\ k = 2$

Solution 6(3):

x = 4 and y = − 1 is a solution of the equation kx + 5y = 11.
So, the equation is satisfied by replacing x by 4 and y by − 1.

$\therefore\ k(4) + 5(-1) = 11$

$\therefore\ 4k - 5 = 11$

$\therefore\ 4k = 11 + 5$

$\therefore\ 4k = 16$

$\therefore\ k = \frac{16}{4}$

$\therefore\ k = 4$

Solution 6(4):

(2, 5) is a solution of the equation 4x + ky = 13k.
Hence, the equation is satisfied by replacing x by 2 and y by 5.

$\therefore\ 4(2) + k(5) = 13k$

$\therefore\ 8 + 5k = 13k$

$\therefore\ 8 = 13k - 5k$

$\therefore\ 8 = 8k$

$\therefore\ k = \frac{8}{8}$

$\therefore\ k = 1$

Exercise 5.3:

Solution 1(1):

Given equation is x + y = 6.

$\therefore y = 6 - x$

For $x = 0 \Rightarrow y = 6 - 0 = 6$ i.e. $y = 6$

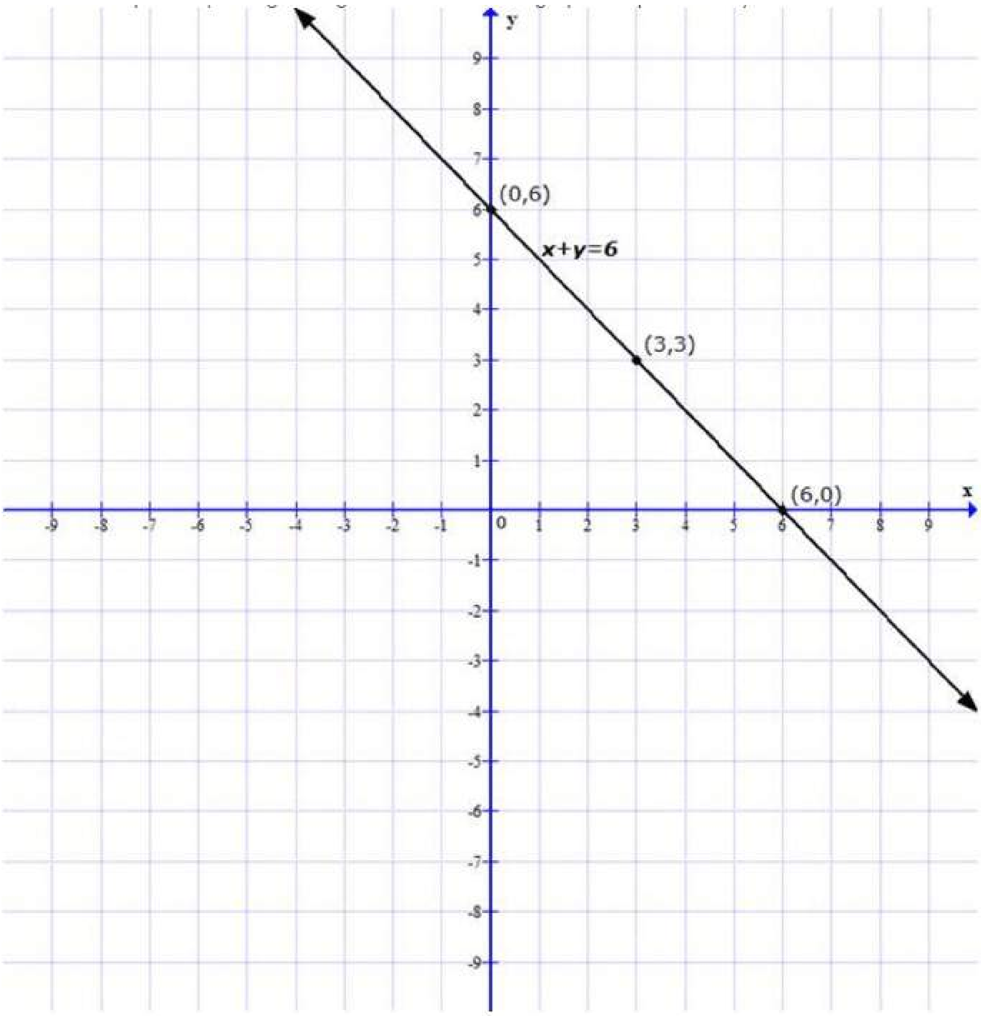
For $x = 6 \Rightarrow y = 6 - 6 = 0$ i.e. $y = 0$

For $x = 3 \Rightarrow y = 6 - 3 = 3$ i.e. $y = 3$

Hence, the three elements of the solution set of x + y = 6 can be given in the tabular form as below:

x	0	6	3
y	6	0	3

Now, plot the points (0, 6), (6, 0) and (3, 3) on the graph paper.
Draw the unique line passing through them which is the graph of equation x + y = 6.

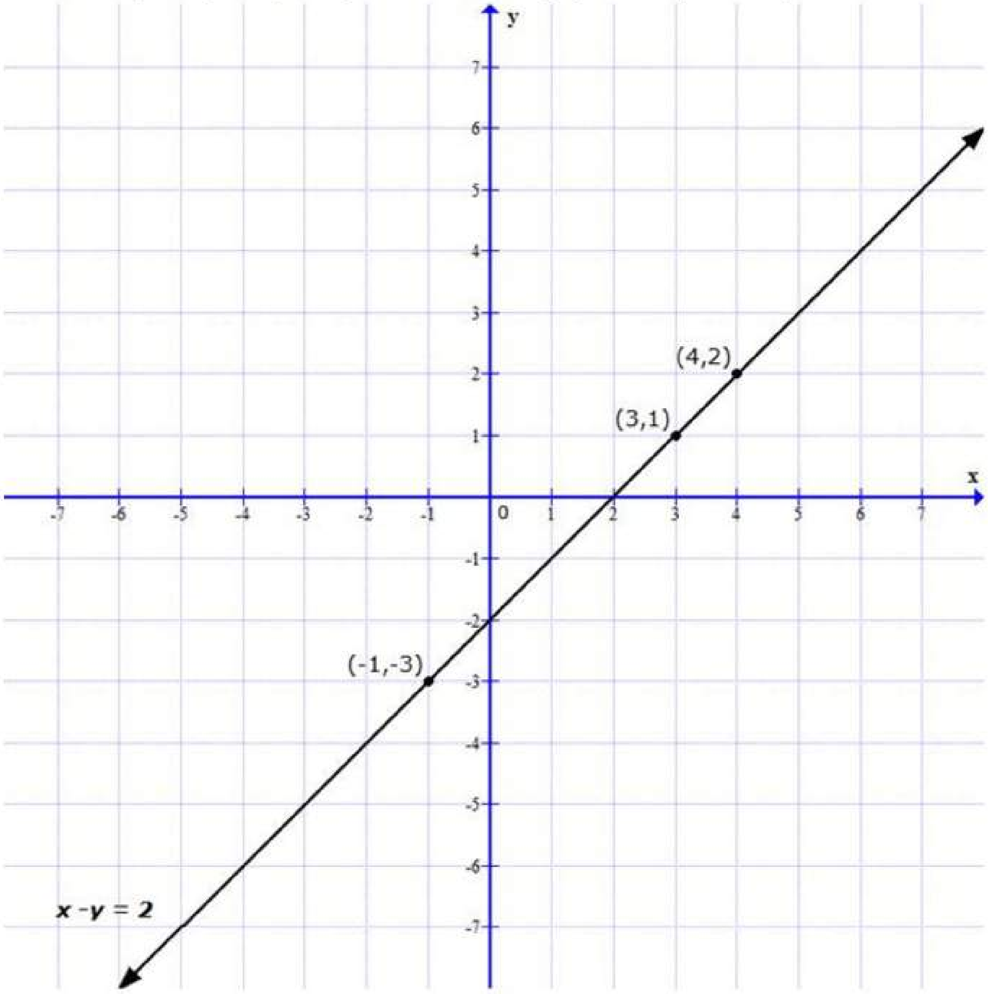


Solution 1(2):

Given equation is x – y = 2.
∴ y = x – 2
For x = -1 ⇒ y = -1 – 2 = -3 i.e. y = -3
For x = 3 ⇒ y = 3 – 2 = 1 i.e. y = 1
For x = 4 ⇒ y = 4 – 2 = 2 i.e. y = 2
Hence, three elements of the solution set of x – y = 2 can be given in the tabular form as below:

x	-1	3	4
y	-3	1	2

Now, plot the points (-1, -3), (3, 1) and (4, 2) on the graph paper.
Draw the unique line passing through them which is the graph of the equation x – y = 2.



Solution 1(3):

Given equation is $x - 2y = 6$.

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

For $x = 0$, $y = \frac{0-6}{2} = -3$ i.e. $y = -3$

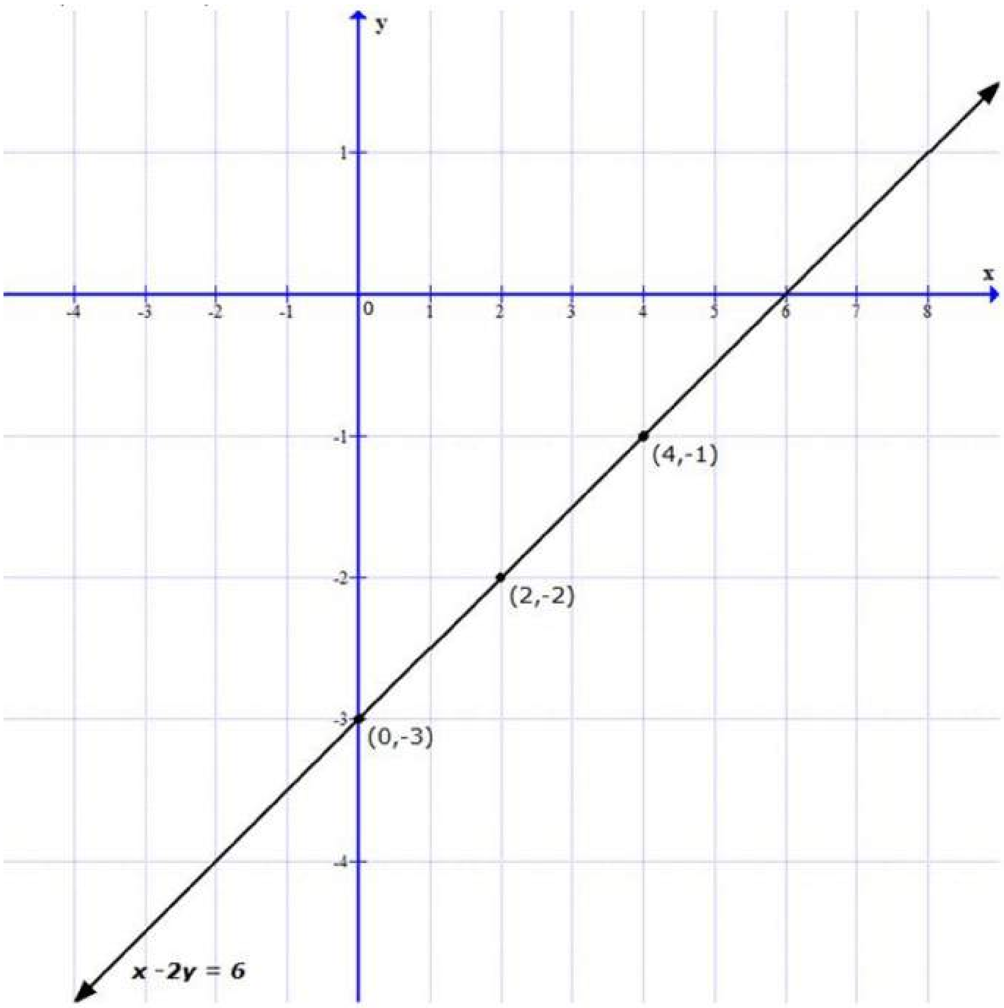
For $x = 2$, $y = \frac{2-6}{2} = -2$ i.e. $y = -2$

For $x = 4$, $y = \frac{4-6}{2} = -1$ i.e. $y = -1$

Hence, three elements of the solution set of $x - 2y = 6$ can be given in the tabular form as below:

x	0	2	4
y	−3	−2	−1

Now, plot the points $(0, -3)$, $(2, -2)$ and $(4, -1)$ on the graph paper. Draw the unique line passing through them which is the graph the of equation $x - 2y = 6$.



Solution 1(4):

Given equation is y = 3x.

For x = 0, y = 3(0) = 0

For x = 3, y = 3(3) = 9

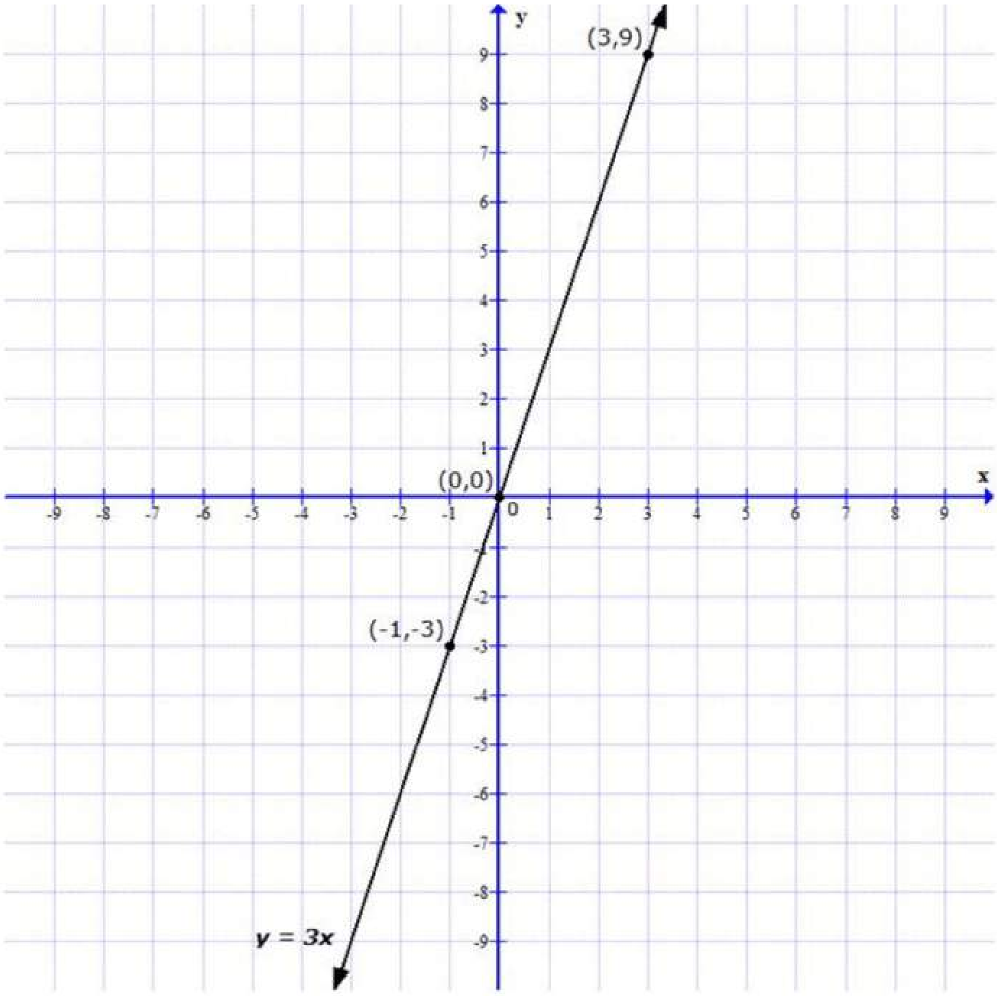
For x = -1, y = 3(-1) = -3

Hence, three elements of the solution set of y = 3x can be given in the tabular form as below:

x	0	3	-1
y	0	9	-3

Now, plot the points (0, 0), (3, 9) and (-1, -3) on the graph paper.

Draw the unique line passing through them which is the graph of the equation y = 3x.

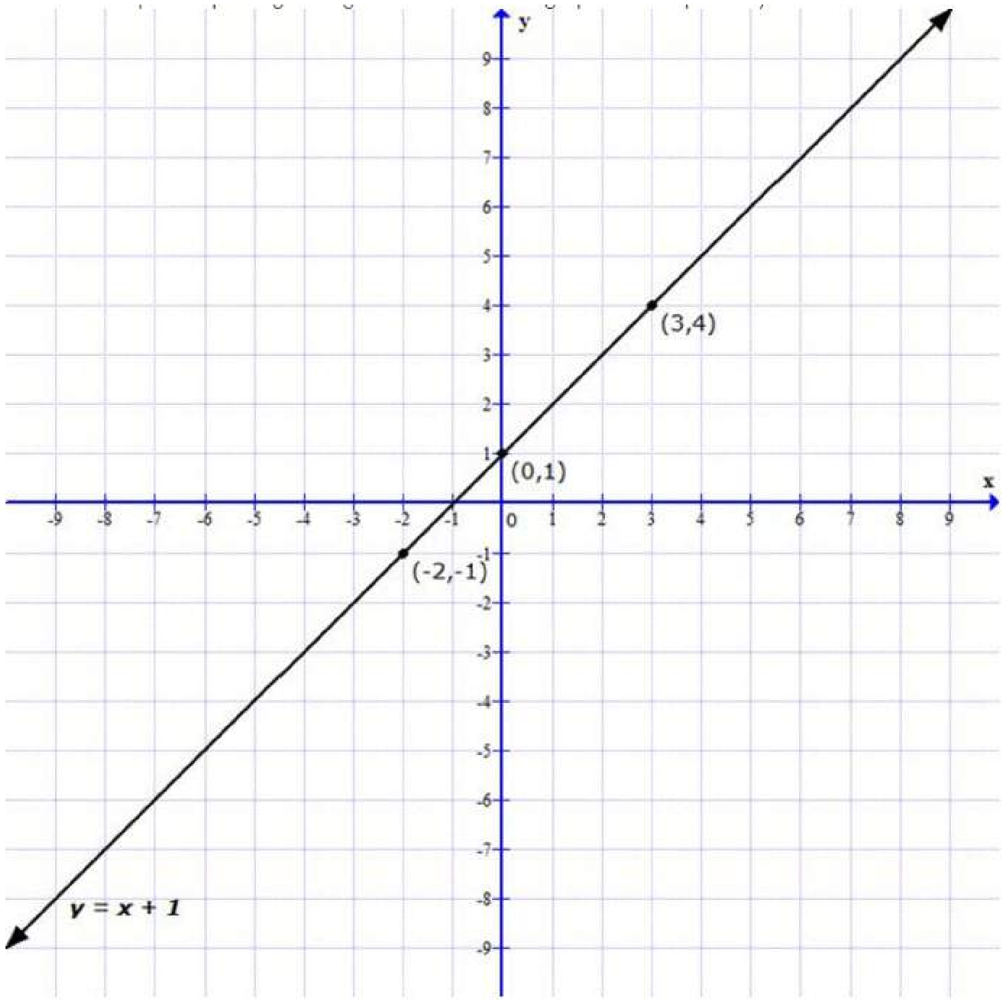


Solution 1(5):

Given equation is y = x + 1.
For x = 0, y = 0 + 1 = 1
For x = -2, y = -2 + 1 = -1
For x = 3, y = 3 + 1 = 4
Hence, three elements of the solution set of y = x + 1 can be given in the tabular form as below :

X	0	-2	3
y	1	-1	4

Now, plot the points (0, 1), (-2, -1) and (3, 4) on the graph paper.
Draw the unique line passing through them which is the graph of the equation y = x + 1.



Solution 1(6):

Given equation is 3x + y = 2

∴ y = 2 – 3x

For x = 0, y = 2 – 3(0) = 2

For x = 1, y = 2 – 3(1) = -1

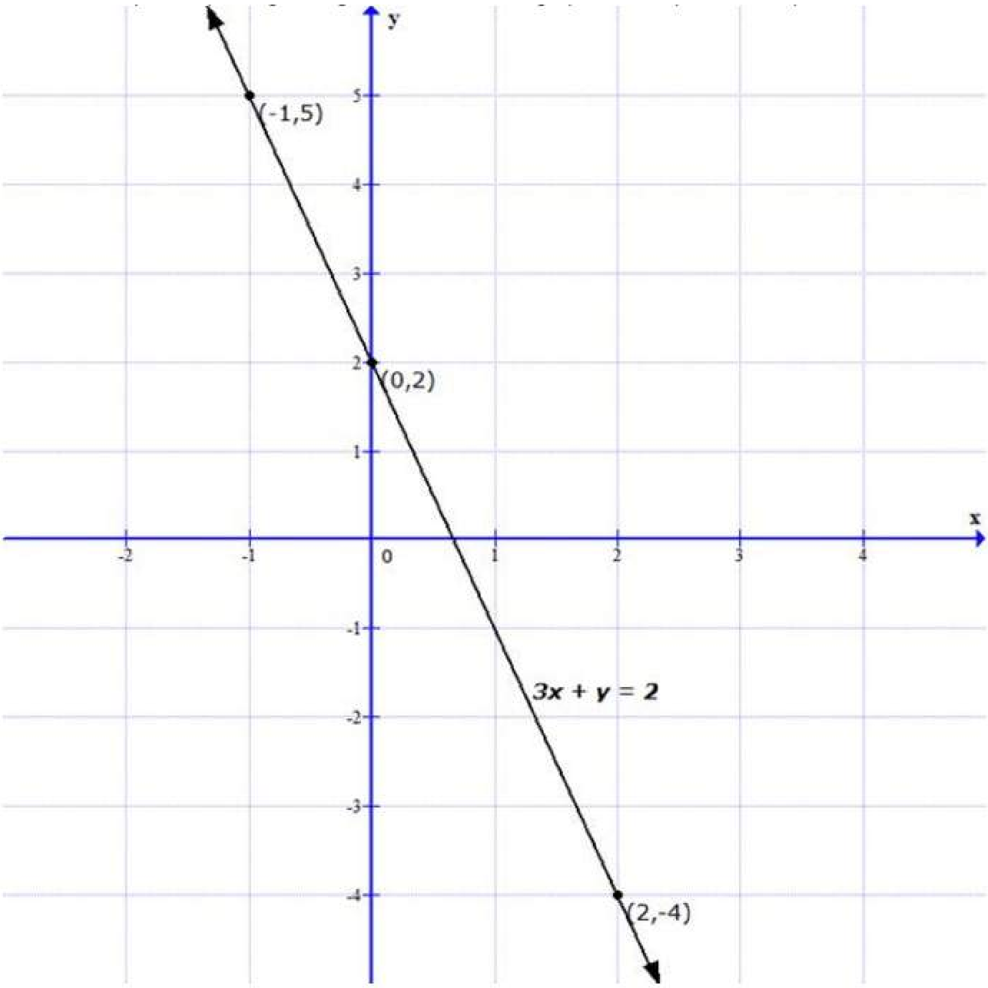
For x = -1, y = 2 – 3(-1) = 5

Hence, three elements of the solution set of 3x + y = 2 can be given in the tabular form as below:

X	0	1	-1
Y	2	-1	5

Now, plot the points (0, 2), (1, -1) and (-1, 5) on the graph paper.

Draw the unique line passing through them which is the graph of the equation 3x + y = 2.



Solution 2:

Given, point (2, 3) lies on the graph of the equation $2y = ax + 10$.
So, $x = 2$ and $y = 3$ satisfies the equation.
Substituting $x = 2$ and $y = 3$ in the equation $2y = ax + 10$, we get

$2(3) = a(2) + 10$

$\therefore 6 = 2a + 10$

$\therefore 6 - 10 = 2a$

$\therefore -4 = 2a$

$\therefore 2a = -4$

$\therefore a = \frac{-4}{2}$

$\therefore a = -2$

Solution 3:

We know that infinitely many lines can pass through a given point.
So, we can give equations of many lines passing through the given point (2, 3).
Equation of four such lines with 3 elements of the solution set of each of line:
Line 1: x + y = 5

x	0	3	2
y	5	2	3

Now, we plot the points (0, 5), (3, 2) and (2, 3).

Draw the line passing through them.

Line 2: x – y = -1

x	0	-2	2
y	1	-1	3

Now, we plot the points (0, 1), (-2, -1) and (2, 3).

Draw the line passing through them.

Line 3: 3x + 2y = 12

x	0	4	2
y	6	0	3

Now, we plot the points (0, 6), (4, 0) and (2, 3).

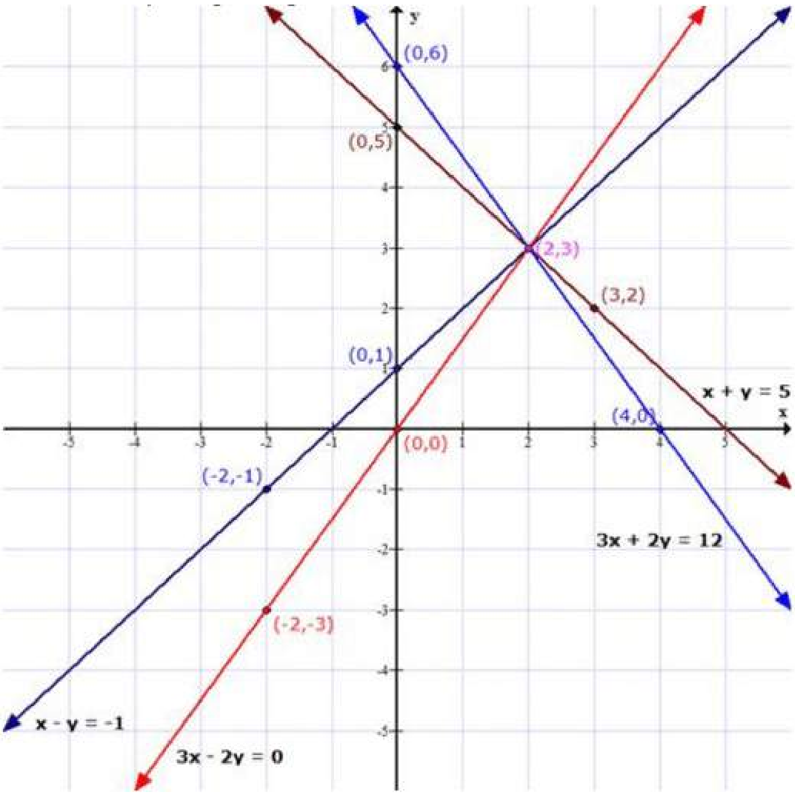
Draw the line passing through them.

Line 4: 3x – 2y = 0

x	0	-2	2
y	0	-3	3

Now, we plot the points (0, 0), (-2, -3) and (2, 3).

Draw the line passing through them.



The table below gives the points of intersection of each line with the co-ordinate axes.

Line	Point of intersection with the X-axis	Point of intersection with the Y-axis
Line 1: x + y = 5	(5, 0)	(0, 5)
Line 2: x – y = -1	(-1, 0)	(0, 1)
Line 3: 3x + 2y = 12	(4, 0)	(0, 6)
Line 4: 3x – 2y = 0	(0, 0)	(0, 0)

Solution 4(1):

Given equation, $F = \left(\frac{9}{5}\right)C + 32$

$\therefore \left(\frac{9}{5}\right)C = F - 32$

$\therefore C = \frac{5}{9}(F - 32)$

For $F = 5 \Rightarrow C = \frac{5}{9}(5 - 32) = \frac{5}{9} \times (-27) = -15$

For $F = 50 \Rightarrow C = \frac{5}{9}(50 - 32) = \frac{5}{9} \times 18 = 10$

For $F = 140 \Rightarrow C = \frac{5}{9}(140 - 32) = \frac{5}{9} \times 108 = 60$

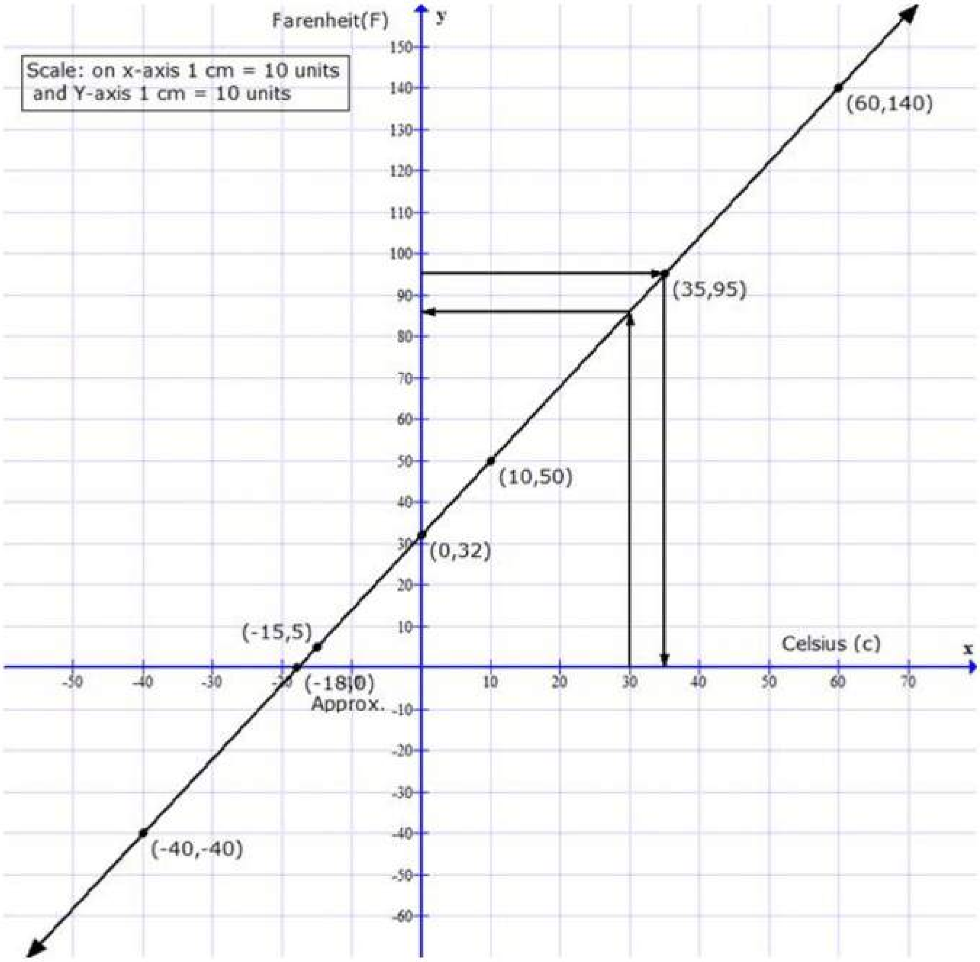
Hence, three elements of the solution set of $F = \left(\frac{9}{5}\right)C + 32$ are as below:

$(-15, 5), (10, 50), (60, 140)$

To draw the graph of $F = \left(\frac{9}{5}\right)C + 32$, take Celsius (C) on the x-axis and Fahrenheit (F) on the y-axis.

Now, plot the points $(-15, 5)$, $(10, 50)$ and $(60, 140)$.

Draw the line passing through them which is the graph of equation $F = \left(\frac{9}{5}\right)C + 32$.



Solution 4(2):

Temperature = 30°C ⇒ the x-coordinate of the point is 30.

Now, the point on the graph of $F = \left(\frac{9}{5}\right)C + 32$ having x-coordinarte 30

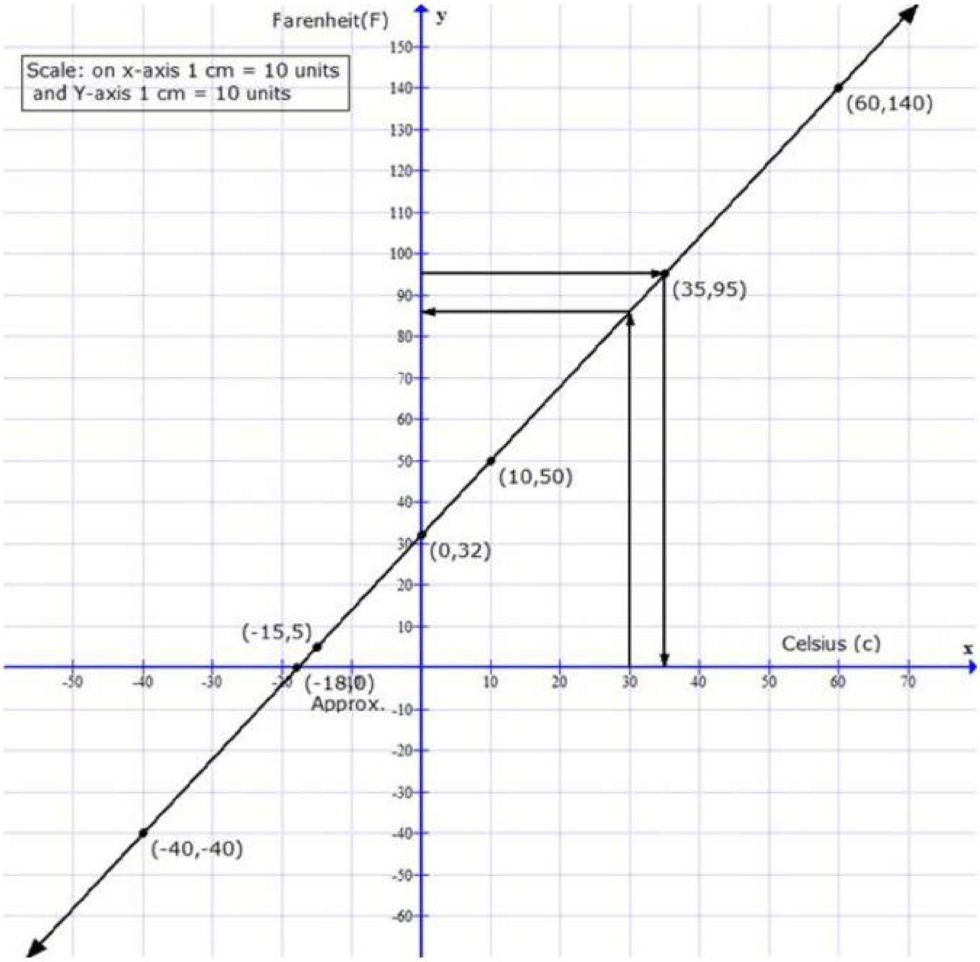
has y-coordinate as 86. [Refer Graph 4(1)]

From the equation $F = \left(\frac{9}{5}\right)C + 32$,

For $C = 30$, $F = \left(\frac{9}{5}\right)30 + 32 = 54 + 32 = 86$.

Thus, if the temperature is 30°C, on the Fahrenheit scale it is 86°F.

Solution 4(3):



Solution 4(4):

From the graph [Refer Graph of 4(1)], it is observed that,
if the temperature is 0° C then in the Fahrenheit scale it is 32°F
And, if the temperature is 0°F, in the Celsius scale it is – 18° C approximately.

From $F = \left(\frac{9}{5}\right)C + 32$,

For C = 0, we have

$F = \left(\frac{9}{5}\right)0 + 32 = 0 + 32 = 32$

For F = 0, we have

$0 = \left(\frac{9}{5}\right)C + 32$

$\therefore -32 = \left(\frac{9}{5}\right) C$

$\therefore C = -32 \times \frac{5}{9}$

$\therefore C = -\frac{160}{9}$

$\therefore C = -17\frac{7}{9} \approx -18$

Solution 4(5):

Yes, there is a temperature which is numerically the same in both Fahrenheit and Celsius.

From the graph of $F = \left(\frac{9}{5}\right) C + 32$, line passes through the point $(-40, -40)$ which means $-40°C = -40°F$.

From the equation,

For F = C, we have

$C = \left(\frac{9}{5}\right)C + 32$

$\therefore -32 = \frac{9}{5}C - C$

$\therefore -32 = \frac{4}{5}C$

$\therefore C = -32 \times \frac{5}{4}$

$\therefore C = -40$

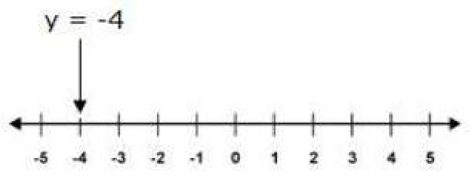
Thus, -40 is the temperature which is numerically the same in both, Fahrenheit and Celsius.

Exercise 5.4:.

Solution 1(1):

The given equation is y = -4.

When y = -4 is taken as an equation in one variable, geometric representation is the point on the number line corresponding to -4 as shown below.

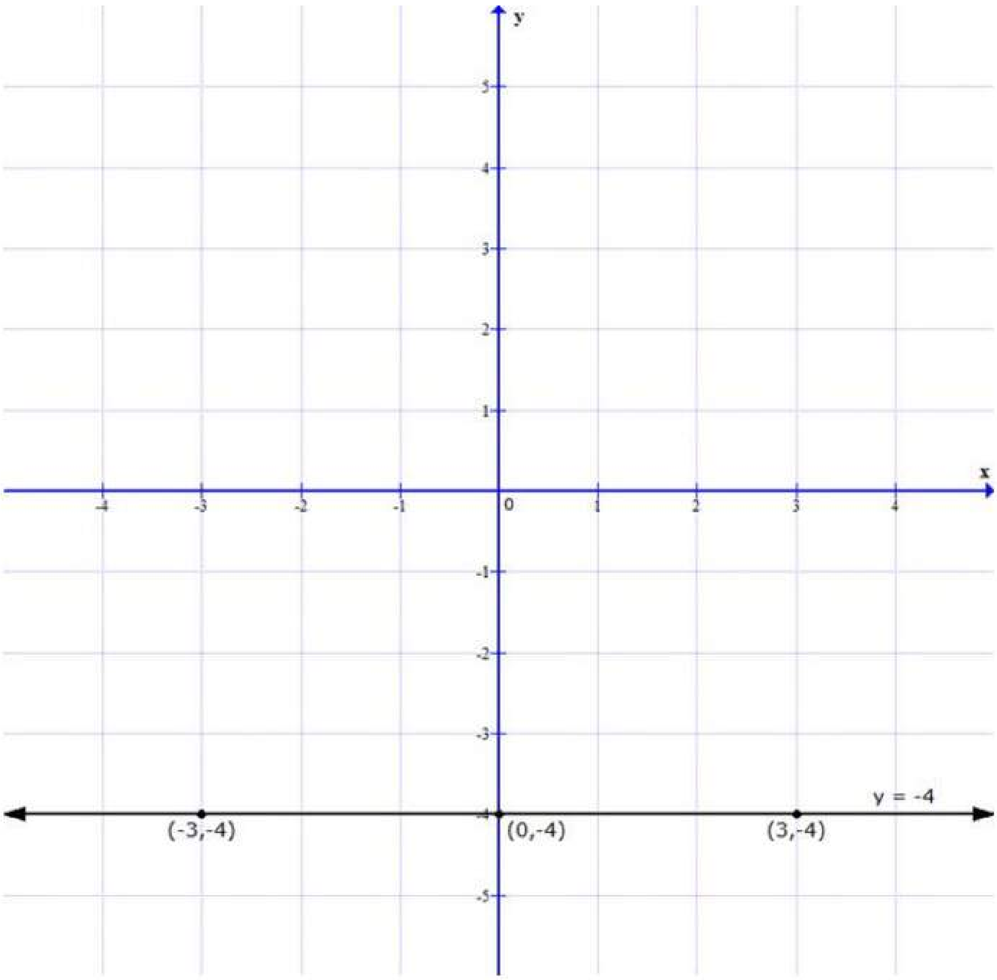


Let y = -4 be an equation in two variables where x is absent in the equation.

So, for any value of x, the value of y is always -4.

Therefore, (-3, -4), (0, -4) and (3, -4) are three elements of the solution set of y = -4.

Now, plot the points (-3, -4), (0, -4) and (3, -4) and draw the line passing through them.



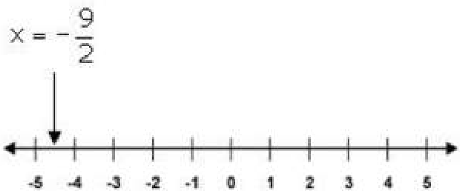
Solution 1(2):

The given equation is $2x + 9 = 0$.

$\therefore 2x = -9$

$\therefore x = -\frac{9}{2}$

If $x = -\frac{9}{2}$ is taken as an equation in one variable, the geometric representation is the point on the number line corresponding to $x = -\frac{9}{2}$ as shown below.



Take $x = -\frac{9}{2}$ as an equation in two variables.

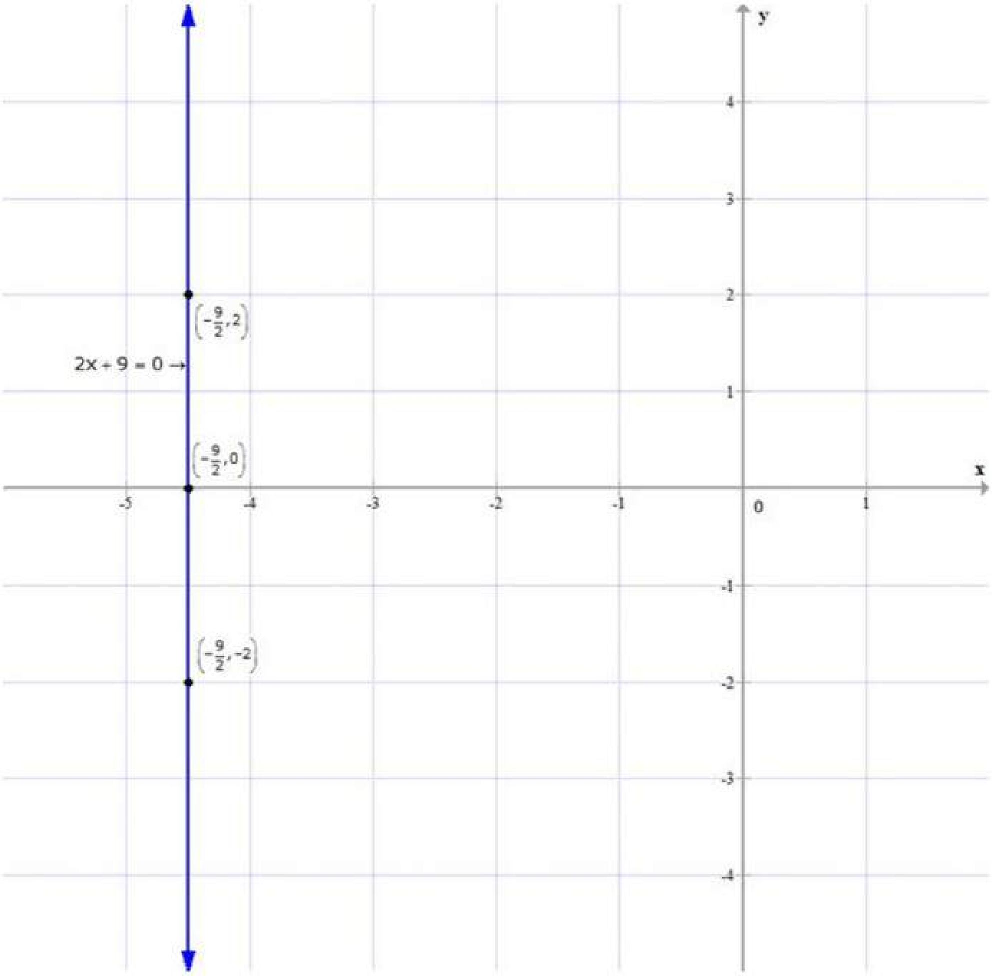
The value of y is absent in the equation.

So, for any value of y, the value of x is always $-\frac{9}{2}$.

Thus, $\left(-\frac{9}{2}, -2\right)$, $\left(-\frac{9}{2}, 0\right)$ and $\left(-\frac{9}{2}, 2\right)$ are three elements of the solution set of $2x + 9 = 0$.

Now, plot the points $\left(-\frac{9}{2}, -2\right)$, $\left(-\frac{9}{2}, 0\right)$ and $\left(-\frac{9}{2}, 2\right)$.

Draw the line passing through them.



Solution 2(1):

The given equation is 3y = 6

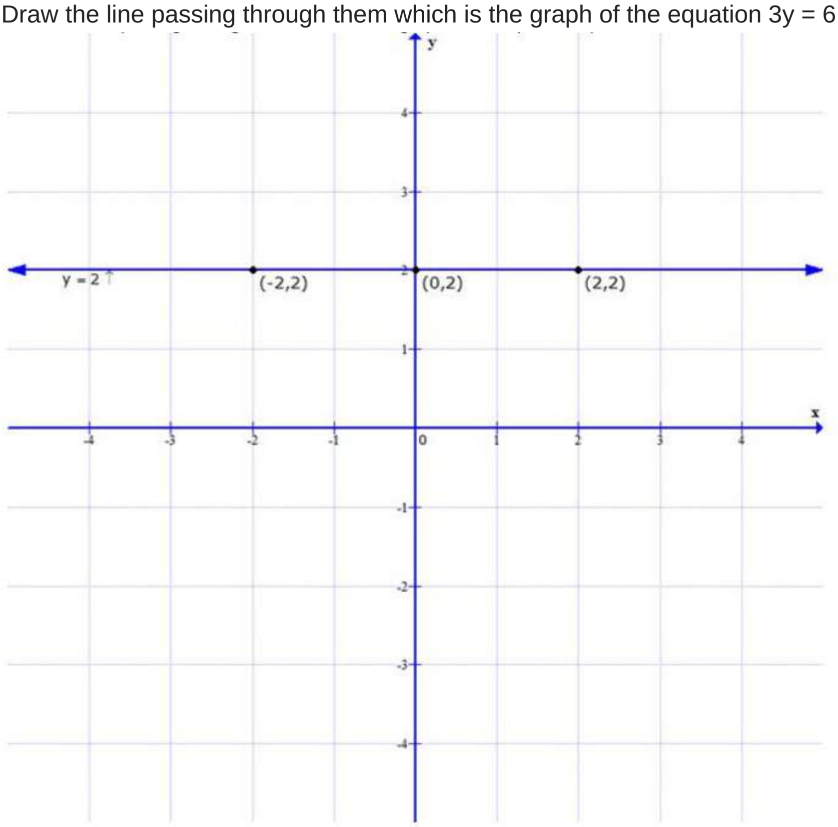
∴ y = 2

But, x is absent in the equation.

Three elements of the solution set of 3y = 6 are (-2, 2), (0, 2) and (2, 2).

Now, plot the points (-2, 2), (0, 2) and (2, 2).

Draw the line passing through them which is the graph of the equation 3y = 6.

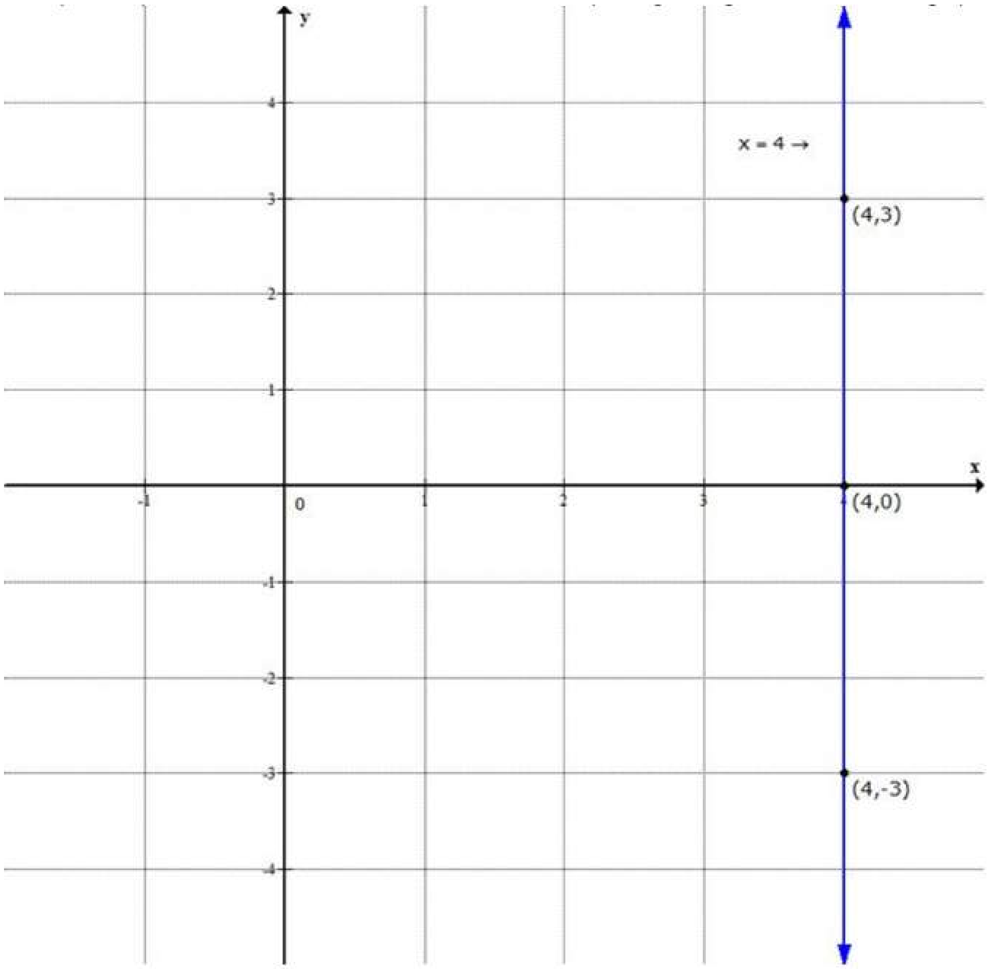


Solution 2(2):

The given equation is x = 4.

But, y is absent in the equation.Three elements of the solution set of x = 4 are (4, -3), (4, 0) and (4, 3).

Now, plot the points (4, -3), (4, 0) and (4, 3) and draw the line passing through them which is the graph of the equation x = 4.



Solution 2(3):

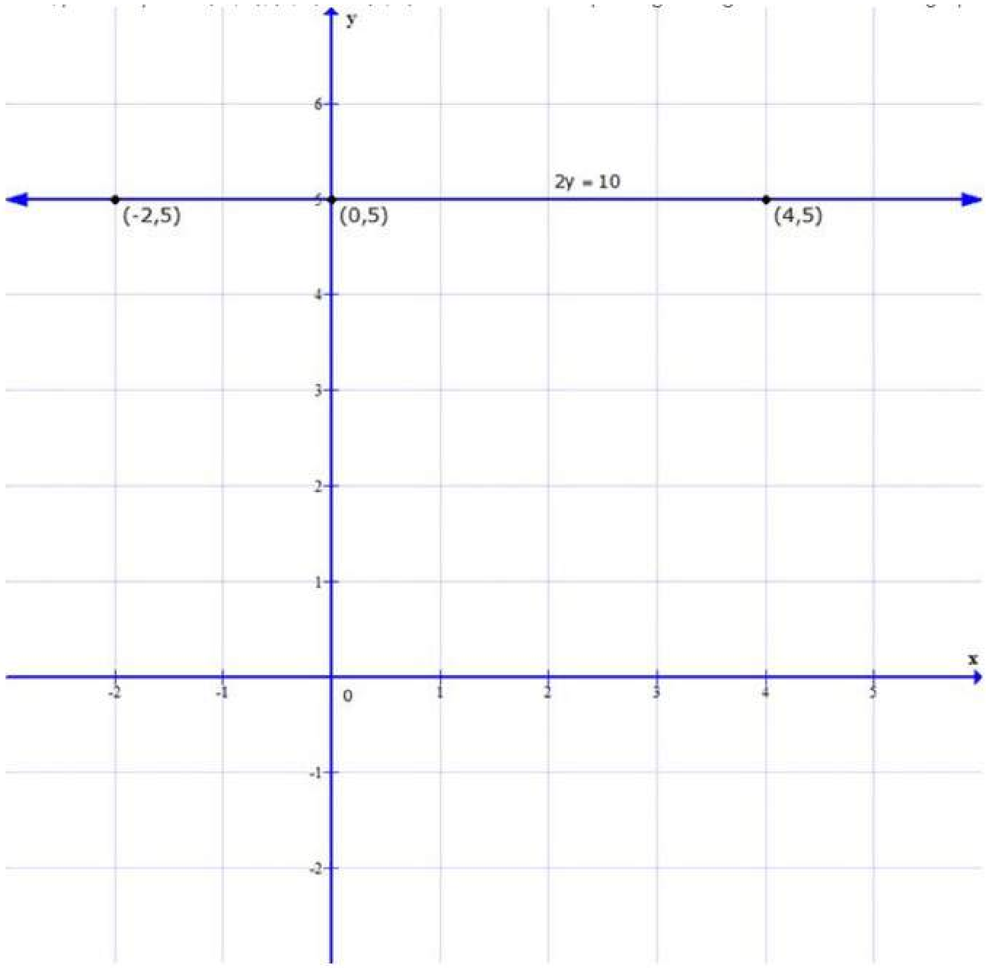
2y = 10

∴ y = 5

But, x is absent in the equation.

Three elements of the solution set of 2y =10 are (-2, 5), (0, 5) and (4, 5).

Now, plot the points (-2, 5), (0, 5) and (4, 5) and draw the line passing through them which is the graph of the equation 2y = 10.



Solution 2(4):

5x + 10 = 0

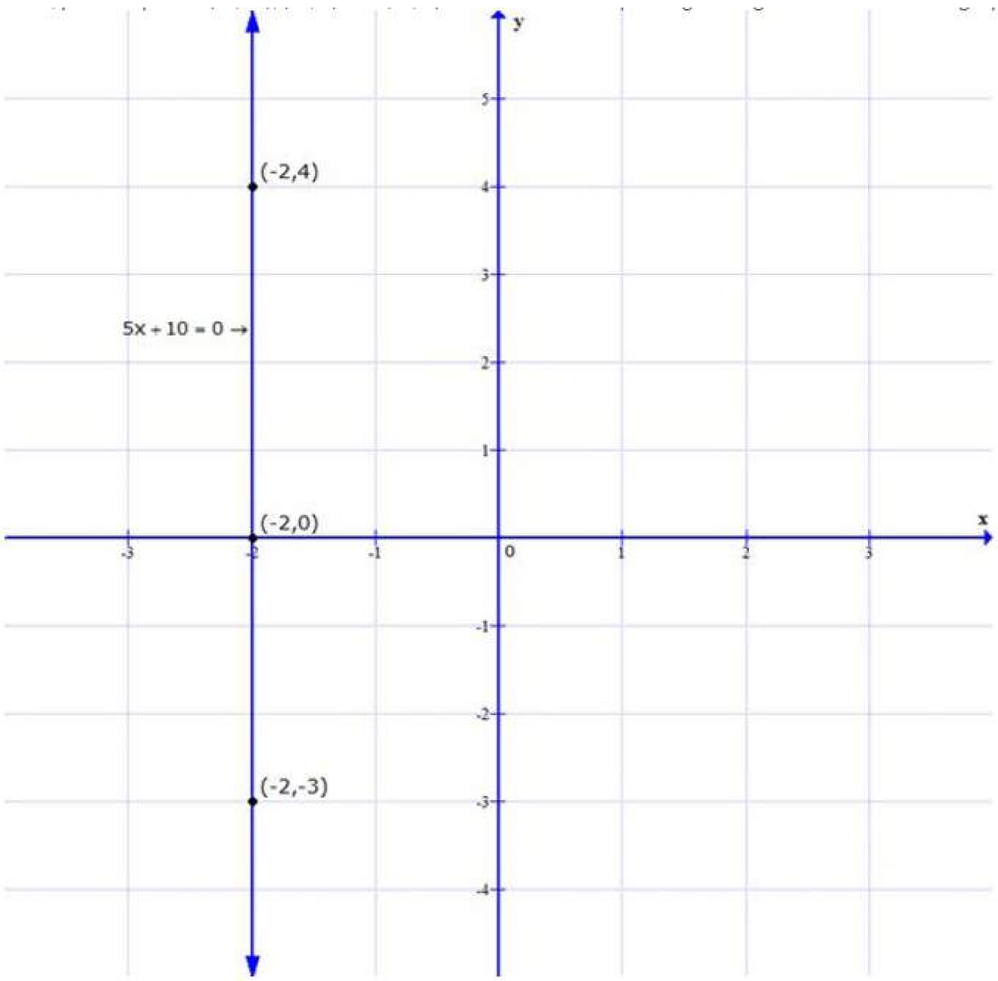
∴ 5x = -10

∴ x = -2

But, y is absent in the equation.

Three elements of the solution set of 5x + 10 = 0 are (-2, -3), (-2, 0) and (-2, 4).

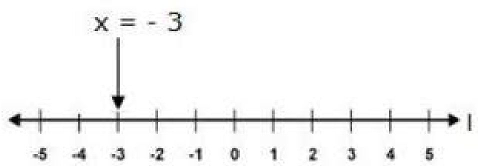
Now, plot the points (-2, -3), (-2, 0) and (-2, 4) and draw the line passing through them which is the graph of the equation 5x + 10 = 0.



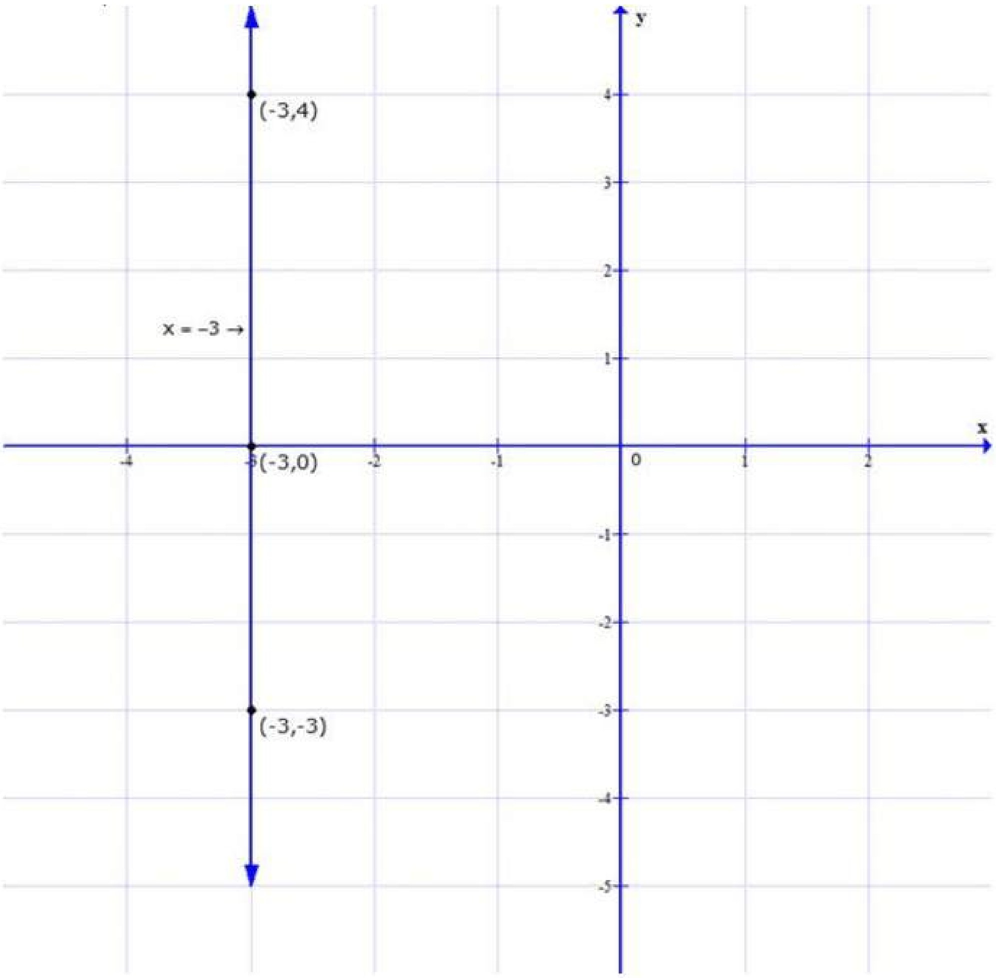
Solution 3(1):

The given equation is 2x + 1 = x – 2.
∴ 2x – x = – 2 – 1
∴ x = -3

- The solution of 2x + 1 = x – 2 is represented on the number line l as shown below:



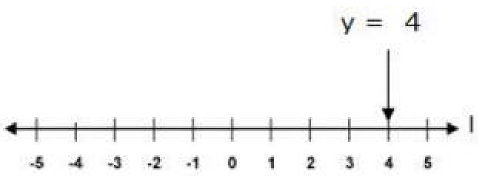
- To represent the solution of 2x + 1 = x – 2 in the Cartesian plane, take the equation x = -3 as linear equation in two variables.
  But, y is absent in the equation.
  Three elements of the solution set of 2x + 1 = x -2 are (-3, -3), (-3, 0) and (-3, 4).
  Now, plot the points (-3, -3), (-3, 0) and (-3, 4) and draw the line passing through them which is the graph of the equation 2x + 1 = x – 2 in the Cartesian plane.



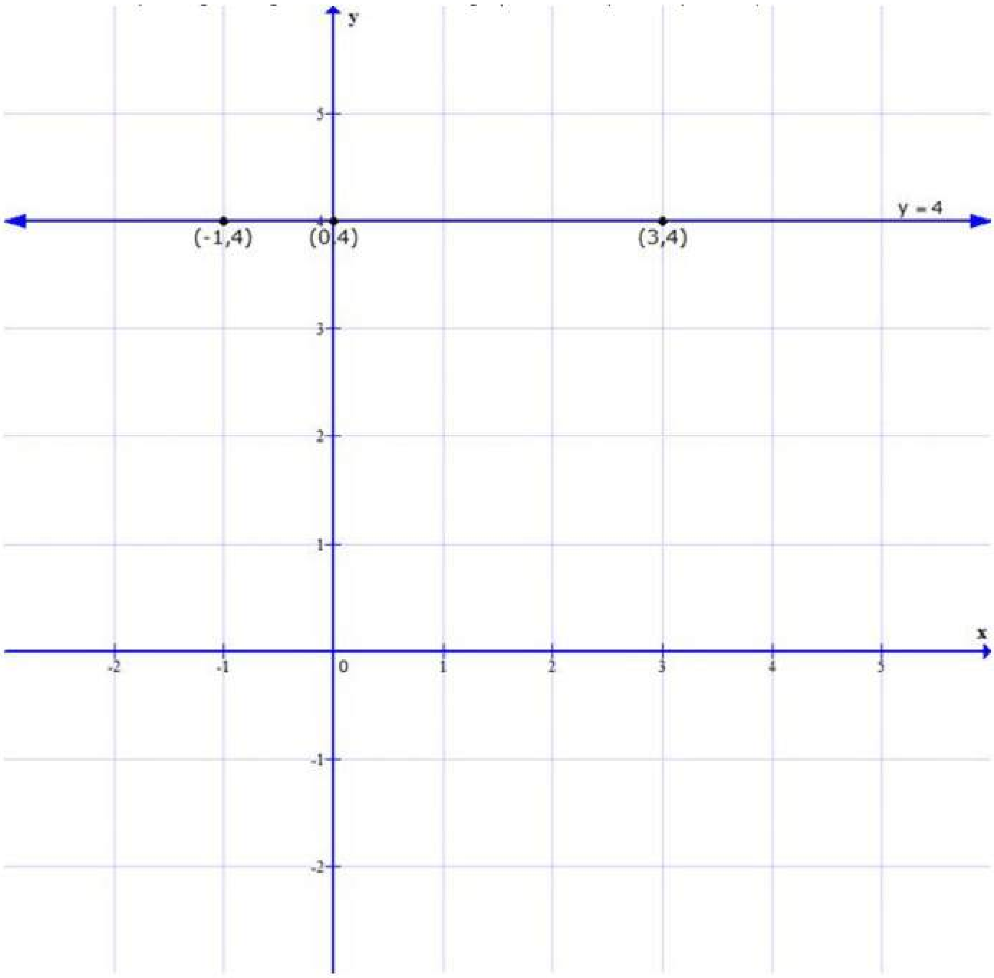
Solution 3(2):

The given equation is y – 1 = 2y – 5.
∴ y – 2y = -5 + 1
∴ -y = -4
∴ y = 4

- The solution of y – 1 = 2y – 5 is represented on the number line l as shown below :



- To represent the solution of y – 1 = 2y – 5 in the Cartesian plane, we take the equation y = 4 as linear equation in two variables.
  But, x is absent in the equation.
  Three elements of the solution set of y – 1 = 2y – 5 are (-1, 4), (0, 4) and (3, 4).
  Now, plot the points (-1, 4), (0, 4) and (3, 4).
  Draw the line passing through them which is the graph of the equation y – 1 = 2y – 5.



Solution 4:

The equation of the line is y = x + 1.

For x = 0 ⇒ y = 0 + 1 = 1

For x = -2 ⇒ y = -2 + 1 = -1

For x = 2 ⇒ y = 2 + 1 = 3

Hence, three elements of the solution set of y = x + 1 are (0, 1), (-2, -1) and (2, 3).

Now, plot the points (0, 1), (-2, -1) and (2, 3).

Draw the line passing through them which is the graph of the equation y = x + 1.

The equation of the line is x + y – 3 = 0.

∴ y = 3 – x

For x = -1, y = 3 – (-1) = 3 + 1 = -4

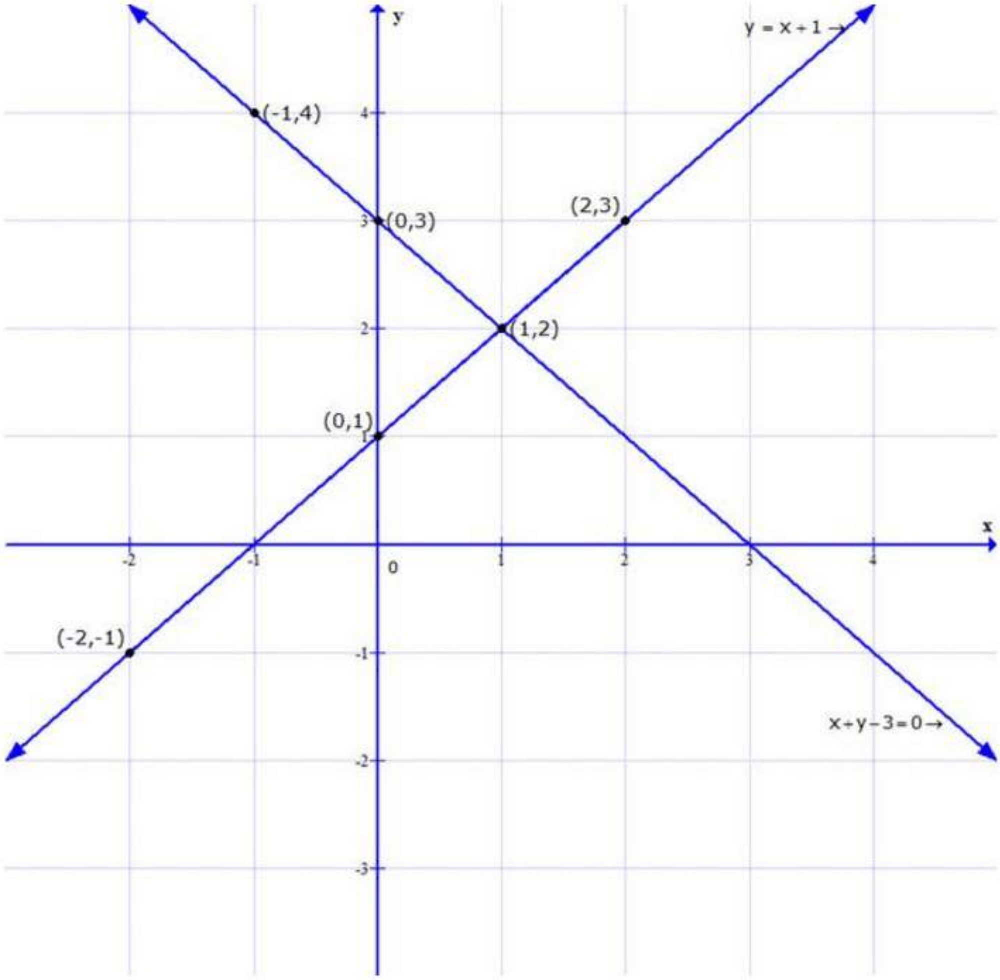
For x = 0, y = 3 – 0 = 3

For x = 1, y = 3 – 1 = 2

Hence, three elements of the solution set of x + y – 3 can be given as (-1, -4), (0, 3) and (1, 2).

Now, plot the points (-1, -4), (0, 3) and (1, 2).

Draw the line passing through them which is the graph of the equation x + y – 3 = 0.



The lines representing y = x + 1 and x + y – 3 = 0 intersect each other at point (1, 2).