

CBSE Class 9 Mathematics
NCERT Solutions
CHAPTER 4
Linear Equations in Two Variables(Ex. 4.2)

1. Which one of the following options is true, and why?

$y = 3x + 5$ has

- (i) a unique solution,
- (ii) only two solutions,
- (iii) infinitely many solutions

Ans. We need to the number of solutions of the linear equation $y = 3x + 5$.

We know that any linear equation has infinitely many solutions.

Justification:

If $x = 0$ then $y = 3 \times 0 + 5 = 5$

If $x = 1$ then $y = 3 \times 1 + 5 = 8$

If $x = -2$ then $y = 3 \times (-2) + 5 = -1$

Similarly, we can find infinite many solutions by putting the values of x . so correct answer is

(iii)

2. Write four solutions for each of the following equations:

(i) $2x + y = 7$

(ii) $\pi x + y = 9$

(iii) $x = 4y$

Ans. $2x + y = 7$

We know that any linear equation has infinitely many solutions.

Let us put $x = 0$ in the linear equation $2x + y = 7$, to get

$$2(0) + y = 7 \Rightarrow y = 7.$$

Thus, we get first pair of solution as $(0, 7)$.

Let us put $x = 2$ in the linear equation $2x + y = 7$, to get

$$2(2) + y = 7 \Rightarrow y + 4 = 7 \Rightarrow y = 3.$$

Thus, we get second pair of solution as $(2, 3)$.

Let us put $x = 4$ in the linear equation $2x + y = 7$, to get

$$2(4) + y = 7 \Rightarrow y + 8 = 7 \Rightarrow y = -1.$$

Thus, we get third pair of solution as $(4, -1)$.

Let us put $x = 6$ in the linear equation $2x + y = 7$, to get

$$2(6) + y = 7 \Rightarrow y + 12 = 7 \Rightarrow y = -5.$$

Thus, we get fourth pair of solution as $(6, -5)$.

Therefore, we can conclude that four solutions for the linear equation $2x + y = 7$ are $(0, 7), (2, 3), (4, -1)$ and $(6, -5)$.

(ii) $\pi x + y = 9$

We know that any linear equation has infinitely many solutions.

Let us put $x = 0$ in the linear equation $\pi x + y = 9$, to get

$$\pi(0) + y = 9 \Rightarrow y = 9$$

Thus, we get first pair of solution as $(0, 9)$.

Let us put $y = 0$ in the linear equation $\pi x + y = 9$, to get

$$\pi x + (0) = 9 \quad \Rightarrow x = \frac{9}{\pi}.$$

Thus, we get second pair of solution as $\left(\frac{9}{\pi}, 0\right)$.

Let us put $x = 1$ in the linear equation $\pi x + y = 9$, to get

$$\pi(1) + y = 9 \Rightarrow y = 9 - \pi$$

Thus, we get third pair of solution as $(1, 9 - \pi)$

Let us put $y = 2$ in the linear equation $\pi x + y = 9$, to get

$$\pi x + 2 = 9 \quad \Rightarrow \pi x = 7 \Rightarrow x = \frac{7}{\pi}$$

Thus, we get fourth pair of solution as $\left(\frac{7}{\pi}, 2\right)$.

Therefore, we can conclude that four solutions for the linear equation $\pi x + y = 9$ are $(0, 9), \left(\frac{9}{\pi}, 0\right), (1, 9 - \pi), \left(\frac{7}{\pi}, 2\right)$.

(iii) $x = 4y$

We know that any linear equation has infinitely many solutions.

Let us put $y = 0$ in the linear equation $x = 4y$, to get

$$x = 4(0) \quad \Rightarrow x = 0$$

Thus, we get first pair of solution as $(0, 0)$.

Let us put $y = 2$ in the linear equation $x = 4y$, to get

$$x = 4(2) \quad \Rightarrow \quad x = 8$$

Thus, we get second pair of solution as $(8, 2)$.

Let us put $y = 4$ in the linear equation $x = 4y$, to get

$$x = 4(4) \quad \Rightarrow \quad x = 16$$

Thus, we get third pair of solution as $(16, 4)$.

Let us put $y = 6$ in the linear equation $x = 4y$, to get

$$x = 4(6) \quad \Rightarrow \quad x = 24$$

Thus, we get fourth pair of solution as $(24, 6)$.

Therefore, we can conclude that four solutions for the linear equation $x = 4y$ are $(0, 0)$, $(8, 2)$, $(16, 4)$ and $(24, 6)$.

3. Check which of the following are solutions of the equation $x - 2y = 4$ and which are not:

(i) $(0, 2)$

(ii) $(2, 0)$

(iii) $(4, 0)$

(iv) $(\sqrt{2}, 4\sqrt{2})$

(v) $(1, 1)$

Ans. (i) $(0, 2)$

We need to put $x = 0$ and $y = 2$ in the L.H.S. of linear equation $x - 2y = 4$, to get

$$(0) - 2(2) = -4$$

∴ L.H.S. \neq R.H.S.

Therefore, we can conclude that $(0, 2)$ is not a solution of the linear equation $x - 2y = 4$.

(ii) $(2, 0)$

We need to put $x = 2$ and $y = 0$ in the L.H.S. of linear equation $x - 2y = 4$, to get

$$(2) - 2(0) = 2$$

∴ L.H.S. \neq R.H.S.

Therefore, we can conclude that $(2, 0)$ is not a solution of the linear equation $x - 2y = 4$.

(iii) $(4, 0)$

We need to put $x = 4$ and $y = 0$ in the linear equation $x - 2y = 4$, to get

$$(4) - 2(0) = 4$$

∴ L.H.S. = R.H.S.

Therefore, we can conclude that $(4, 0)$ is a solution of the linear equation $x - 2y = 4$.

(iv) $(\sqrt{2}, 4\sqrt{2})$

We need to put $x = \sqrt{2}$ and $y = 4\sqrt{2}$ in the linear equation $x - 2y = 4$, to get

$$(\sqrt{2}) - 2(4\sqrt{2}) = -7\sqrt{2}, L.H.S = -7\sqrt{2}, R.H.S = 4$$

∴ L.H.S. \neq R.H.S.

Therefore, we can conclude that $(\sqrt{2}, 4\sqrt{2})$ is not a solution of the linear equation $x - 2y = 4$.

(v) $(1, 1)$

We need to put $x = 1$ and $y = 1$ in the linear equation $x - 2y = 4$, to get

$$(1) - 2(1) = -1$$

\therefore L.H.S. \neq R.H.S.

Therefore, we can conclude that $(1, 1)$ is not a solution of the linear equation $x - 2y = 4$.

4. Find the value of k , if $x = 2, y = 1$ is a solution of the equation $2x + 3y = k$.

Ans. We know that, if $x = 2$ and $y = 1$ is a solution of the linear equation $2x + 3y = k$, then on substituting the respective values of x and y in the linear equation $2x + 3y = k$, the LHS and RHS of the given linear equation will not be effected.

$$\therefore 2(2) + 3(1) = k \Rightarrow k = 4 + 3 \Rightarrow k = 7$$

Therefore, we can conclude that the value of k , for which the linear equation $2x + 3y = k$ has $x = 2$ and $y = 1$ as one of its solutions is 7.