Q1. 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.

Q2. 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

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

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

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

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

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

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

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

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

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

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

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

$$\pi(1)+y=9 \qquad \Rightarrow y=\frac{9}{\pi}$$

Thus, we get third pair of solution as $\left(1,\frac{9}{\pi}\right)$.

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

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

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 $(0,9)$, $\left(\frac{9}{\pi},0\right)$, $\left(1,\frac{9}{\pi}\right)$ and $\left(\frac{7}{\pi},2\right)$.

(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

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

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

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

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

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

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

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

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

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

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

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 $(24,6)$.

Q3. 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) $\left(\sqrt{2},4\sqrt{2}\right)$

(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

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

$\therefore$ 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

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

$\therefore$ 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

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

$\therefore$ 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

$(\sqrt{2})-2(4\sqrt{2})=-7\sqrt{2}$

$\therefore$ 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 $x-2y=4$.

Q4. 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.

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

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.

*********** END **********