Exerise 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.*

Sol. (*iii*) As each linear equation in two variables has infinitely many solutions. Further, for every x there is a corresponding value of y and vice-versa.

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

(*i*) $2x + y = 7$ (*ii*) $\pi x + y = 9$ (*iii*) $x = 4y$.

Sol. (*i*) Consider equation: $2x + y = 7 \Rightarrow y = 7 - 2x$

Let $x = 0$, then $y = 7$. Solution is $x = 0$, $y = 7$

Let $x = 1$, then $y = 5$. Solution is $x = 1, y = 5$

Let $x = 2$, then $y = 3$. Solution is $x = 2, y = 3$

Let $x = 3$, then $y = 1$. Solution is $x = 3, y = 1$.

(*ii*) Consider equation: $\pi x + y = 9 \Rightarrow y = 9 - \pi x$

Let $x = 0$, then $y = 9$. Solution is $x = 0, y = 9$

Let $x = 1$, then $y = 9 - \pi$. Solution is $x = 1, y = 9 - \pi$

Let $x = 2$, then $y = 9 - 2\pi$. Solution is $x = 2, y = 9 - 2\pi$

Let $x = 3$, then $y = 9 - 3\pi$. Solution is $x = 3, y = 9 - 3\pi$.

(*iii*) Consider equation: $x = 4y$.

Let $y = 0$, then $x = 0$. Solution is $x = 0, y = 0$

Let $y = 1$, then $x = 4$. Solution is $x = 4, y = 1$

Let $y = -1$, then $x = -4$. Solution is $x = -4, y = -1$

Let $y = 2$, then $x = 8$. Solution is $x = 8, y = 2$.

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).*

Sol. Consider the equation $x - 2y = 4$ ...(A)

(*i*) For (0, 2), substituting $x = 0, y = 2$ in (A), we get

$0 - 4 = 4 \Rightarrow -4 = 4$, not true.

Hence, (0, 2) is not a solution.

(*ii*) For (2, 0), substituting $x = 2, y = 0$ in (A), we get

$2 - 0 = 4 \Rightarrow 2 = 4$, not true.

Hence, (2, 0) is not a solution.

(*iii*) For (4, 0), substituting $x = 4, y = 0$ in (A), we get

$4 - 0 = 4 \Rightarrow 4 = 4$, true.

Hence, (4, 0) is a solution.

(*iv*) For $(\sqrt{2}, 4\sqrt{2})$, substituting $x = \sqrt{2}, y = 4\sqrt{2}$ in (A), we get

$\sqrt{2} - 8\sqrt{2} = 4 \Rightarrow -7\sqrt{2} = 4$, not true.

Hence, $(\sqrt{2}, 4\sqrt{2})$ is not a solution.

(*v*) For (1, 1), substituting $x = 1, y = 1$ in (A), we get

$$1 - 2 = 4 \Rightarrow -1 = 4, \text{ not true.}$$

Hence, (1, 1) is not a solution.

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

Sol. If $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$, then

$$4 + 3 = k \Rightarrow k = 7.$$