



Pair of Linear Equations in Two variables Ex 3.3 Q26

**Answer :**

The given equations are:

$$\frac{5}{x+y} - \frac{2}{x-y} = -1$$

$$\frac{15}{x+y} + \frac{7}{x-y} = 10$$

Let  $\frac{1}{x+y} = u$  and  $\frac{1}{x-y} = v$  then equations are

$$5u - 2v = -1 \dots (i)$$

$$15u + 7v = 10 \dots (ii)$$

Multiply equation (i) by 7 and equation (ii) by 2 and add both equations, we get

$$35u - 14v = -7$$

$$30u + 14v = 20$$

$$65u = 13$$

$$\Rightarrow u = \frac{1}{5}$$

Put the value of  $u$  in equation (i), we get

$$5 \times \frac{1}{5} - 2v = -1$$

$$\Rightarrow -2v = -2$$

$$\Rightarrow v = 1$$

Then

$$\frac{1}{x+y} = \frac{1}{5}$$

$$\Rightarrow x+y=5$$

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

$$\Rightarrow x-y=1$$

Add both equations, we get

$$x+y=5$$

$$\underline{x-y=1}$$

$$2x=6$$

$$\Rightarrow x=3$$

Put the value of  $x$  in first equation, we get

$$3+y=5$$

$$\Rightarrow y=2$$

$$\Rightarrow y=2$$

Hence the value of  $\boxed{x=3}$  and  $\boxed{y=2}$ .

**Answer :**

The given equations are:

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

$$\frac{9}{x+y} - \frac{4}{x-y} = 1$$

Let  $\frac{1}{x+y} = u$  and  $\frac{1}{x-y} = v$  then equations are

$$3u + 2v = 2 \dots (i)$$

$$9u - 4v = 1 \dots (ii)$$

Multiply equation (i) by 2 and add both equations, we get

$$6u + 4v = 4$$

$$9u - 4v = 1$$

$$15u = 5$$

$$\Rightarrow u = \frac{1}{3}$$

Put the value of  $u$  in equation (i), we get

$$3 \times \frac{1}{3} + 2v = 2$$

$$\Rightarrow 2v = 1$$

$$\Rightarrow v = \frac{1}{2}$$

Then

$$\frac{1}{x+y} = \frac{1}{3}$$

$$\Rightarrow x+y=3$$

$$\frac{1}{x-y} = \frac{1}{2}$$

$$\Rightarrow x-y=2$$

Add both equations, we get

$$x+y=3$$

$$\underline{x-y=2}$$

$$2x=5$$

$$\Rightarrow x = \frac{5}{2}$$

Put the value of  $x$  in first equation, we get

$$\frac{5}{2} + y = 3$$

$$\Rightarrow y = \frac{1}{2}$$

Hence the value of  $\boxed{x = \frac{5}{2}}$  and  $\boxed{y = \frac{1}{2}}$ .

\*\*\*\*\* END \*\*\*\*\*