Pair of Linear Equations in Two varibles Ex 3.3 Q28

Answer :

The given equations are:

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

$$\frac{5}{4(x+2y)} - \frac{3}{5(3x-2y)} = \frac{61}{60}$$

Let $\dfrac{1}{x+2y} = u$ and $\dfrac{1}{3x-2y} = v$ then equations are

$$\frac{1}{2}u + \frac{5}{3}v = -\frac{3}{2} \quad \ldots (i)$$

$$\frac{5}{4}u - \frac{3}{5}v = \frac{61}{60} \quad \ldots (ii)$$

Multiply equation (i) by $\dfrac{3}{5}$ and equation (ii) by $\dfrac{5}{3}$ add both equations, we get

$$\frac{3}{10}u + v = -\frac{9}{10}$$

$$\frac{25}{12}u - v = \frac{61}{36}$$

$$\overline{\frac{143}{60}u = \frac{143}{180}}$$

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

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

$$\frac{1}{2} \times \frac{1}{3} + \frac{5}{3}v = -\frac{3}{2}$$

$$\Rightarrow \frac{5}{3}v = -\frac{10}{6}$$

$$\Rightarrow v = -1$$

Then

$$\frac{1}{x+2y} = \frac{1}{3} \quad ...(iii)$$

$$\Rightarrow x + 2y = 3$$

$$\frac{1}{3x-2y} = -1 \quad ...(iv)$$

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

Add both equations, we get

$$x + 2y = 3$$
$$\underline{3x - 2y = -1}$$
$$4x = 2$$

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

Put the value of x in equation (iii) we get

$$\frac{1}{2} + 2y = 3$$

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

$$\Rightarrow y = \frac{5}{4}$$

Hence the value of $\boxed{x = \frac{1}{2}}$ and $\boxed{y = \frac{5}{4}}$.

Pair of Linear Equations in Two varibles Ex 3.3 Q29

Answer :

The given equations are:

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

$$\frac{10}{x+1} + \frac{2}{y-1} = \frac{5}{2}$$

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

$$5u - 2v = \frac{1}{2} \quad \dots (i)$$

$$10u + 2v = \frac{5}{2} \quad \dots (ii)$$

Add both equations, we get

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

$$\underline{10u + 2v = \frac{5}{2}}$$

$$15u = 3$$

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

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

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

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

$$\Rightarrow v = \frac{1}{4}$$

Then

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

$$\Rightarrow x + 1 = 5$$

$$\Rightarrow x = 4$$

$$\frac{1}{y-1} = \frac{1}{4}$$

$$\Rightarrow y - 1 = 4$$

$$\Rightarrow y = 5$$

Hence the value of $\boxed{x = 4}$ and $\boxed{y = 5}$.

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