Pair of Linear Equations in Two varibles Ex 3.3 Q43

Answer :

The given equations are:

$$\frac{10}{x+y}+\frac{2}{x-y}=4$$

$$\frac{15}{x+y}-\frac{9}{x-y}=-2$$

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

$10u+2v=4 \ldots (i)$

$15u-9v=-2 \ldots (ii)$

Multiply equation (i) by 9 and equation (ii) by 2 and add both equations, we get

$$90u+18v=36$$

$$\underline{30u-18v=-4}$$

$$120u=32$$

$$\Rightarrow u=\frac{32}{120}$$

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

$$10\times\frac{32}{120}+2v=4$$

$$\Rightarrow 2v=\frac{16}{12}$$

$$\Rightarrow v = \frac{8}{12}$$

Then

$$\frac{1}{x+y} = \frac{32}{120}$$

$$\Rightarrow x+y = \frac{120}{32} \quad ...(iii)$$

$$\frac{1}{x-y} = \frac{8}{12}$$

$$\Rightarrow x-y = \frac{12}{8} \quad ...(iv)$$

Add both equations, we get

$$x+y = \frac{120}{32}$$

$$x-y = \frac{12}{8}$$

$$2x = \frac{168}{32}$$

$$\Rightarrow x = \frac{21}{8}$$

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

$$1\times\frac{21}{8}+y=\frac{120}{32}$$

$$\Rightarrow y=\frac{9}{8}$$

Hence the value of $\boxed{x=\frac{21}{8}}$ and $\boxed{y=\frac{9}{8}}$.

Pair of Linear Equations in Two varibles Ex 3.3 Q44

Answer :

The given equations are:

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

$$\frac{1}{2(3x+y)}-\frac{1}{2(3x-y)}=-\frac{1}{8}$$

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

$$u+v=\frac{3}{4}\ \ldots(i)$$

$$\frac{u}{2}-\frac{v}{2}=\frac{1}{8}\ \ldots(ii)$$

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

$$u+v=\frac{3}{4}$$

$$u-v=-\frac{1}{4}$$

$$2u=\frac{1}{2}$$

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

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

$$1\times\frac{1}{4}+v=\frac{3}{4}$$

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

Then

$$\frac{1}{3x+y}=\frac{1}{4} \quad \ldots(iii)$$

$$\Rightarrow 3x+y=4$$

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

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

Add both equations, we get

$$3x+y=4$$

$$\underline{3x-y=2}$$

$$6x=6$$

$$\Rightarrow x=1$$

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

$$3\times 1+y=4$$

$$\Rightarrow y=1$$

Hence the value of $\boxed{x=1}$ and $\boxed{y=1}$

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