



Pair of Linear Equations in Two variables 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

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

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

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

$$90u + 18v = 36$$

$$30u - 18v = -4$$

$$120u = 32$$

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

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

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

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

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

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

Add both equations, we get

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

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

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

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

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 variables 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

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

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

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

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

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

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

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

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  $\boxed{y=1}$

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