



Pair of Linear Equations in Two variables Ex 3.3 Q23

**Answer :**

The given equations are:

$$\frac{6}{x+y} = \frac{7}{x-y} + 3$$

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

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

$$6u = 7v + 3 \dots (i)$$

$$\frac{u}{2} = \frac{v}{3} \dots (ii)$$

Multiply equation (ii) by 12 and subtract (ii) from (i), we get

$$6u = 7v + 3$$

$$\underline{6u = 4v}$$

$$0 = 3v + 3$$

$$\Rightarrow v = -1$$

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

$$\Rightarrow 6u = 7 \times -1 + 3$$

$$\Rightarrow 6u = -4$$

$$\Rightarrow u = -\frac{2}{3}$$

Then

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

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

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

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

Add both equations, we get

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

$$x-y = -1$$

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

$$\Rightarrow x = -\frac{5}{4}$$

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

$$6 \times 2 + 6y = 5 \times 2y$$

$$\Rightarrow 12 = 4y$$

$$\Rightarrow y = 3$$

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

**Answer :**

The given equations are:

$$\frac{xy}{x+y} = \frac{6}{5}$$

$$6x + 6y = 5xy \quad \dots(i)$$

$$\frac{xy}{y-x} = 6$$

$$6y - 6x = xy \quad \dots(ii)$$

Add both equations, we get

$$6x + 6y = 5xy$$

$$\underline{6y - 6x = xy}$$

$$12y = 6xy$$

$$\Rightarrow x = 2$$

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

$$22 \times -\frac{1}{11} + 15v = 5$$

$$\Rightarrow 15v = 3$$

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

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

**Answer :**

The given equations are:

$$\frac{22}{x+y} + \frac{15}{x-y} = 5$$

$$\frac{55}{x+y} + \frac{45}{x-y} = 14$$

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

$$22u + 15v = 5 \dots (i)$$

$$55u + 45v = 14 \dots (ii)$$

Multiply equation (i) by 3 and subtracting (ii) from (i), we get

$$66u + 45v = 15$$

$$\underline{55u + 45v = 14}$$

$$11u = 1$$

$$\Rightarrow u = \frac{1}{11}$$

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

$$22 \times -\frac{1}{11} + 15v = 5$$

$$\Rightarrow 15v = 3$$

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

Then

$$\frac{1}{x+y} = \frac{1}{11}$$

$$\Rightarrow x+y=11$$

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

$$\Rightarrow x-y=5$$

Add both equations, we get

$$x+y=11$$

$$\underline{x-y=5}$$

$$2x=16$$

$$\Rightarrow x=8$$

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

$$8-y=5$$

$$\Rightarrow -y=-3$$

$$\Rightarrow y=3$$

Hence the value of  $\boxed{x=8}$  and  $\boxed{y=3}$ .

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