Pair of Linear Equations in Two varibles Ex 3.8 Q7

Answer :

Let the numerator and denominator of the fraction be x and y respectively. Then the fraction is $\dfrac{x}{y}$

The sum of the numerator and the denominator of the fraction is 18. Thus, we have

$x + y = 18$

$\Rightarrow x + y - 18 = 0$

If the denominator is increased by 2, the fraction reduces to $\dfrac{1}{3}$. Thus, we have

$\dfrac{x}{y+2} = \dfrac{1}{3}$

$\Rightarrow 3x = y + 2$

$\Rightarrow 3x - y - 2 = 0$

So, we have two equations

$x + y - 18 = 0$

$3x - y - 2 = 0$

Here x and y are unknowns. We have to solve the above equations for x and y.

By using cross-multiplication, we have

$$\dfrac{x}{1 \times (-2) - (-1) \times (-18)} = \dfrac{-y}{1 \times (-2) - 3 \times (-18)} = \dfrac{1}{1 \times (-1) - 3 \times 1}$$

$$\Rightarrow \dfrac{x}{-2 - 18} = \dfrac{-y}{-2 + 54} = \dfrac{1}{-1 - 3}$$

$$\Rightarrow \dfrac{x}{-20} = \dfrac{-y}{52} = \dfrac{1}{-4}$$

$$\Rightarrow \dfrac{x}{20} = \dfrac{y}{52} = \dfrac{1}{4}$$

$$\Rightarrow x = \dfrac{20}{4}, y = \dfrac{52}{4}$$

$$\Rightarrow x = 5, y = 13$$

Hence, the fraction is $\boxed{\dfrac{5}{13}}$.

Pair of Linear Equations in Two varibles Ex 3.8 Q8

Answer :

Let the numerator and denominator of the fraction be x and y respectively. Then the fraction is $\dfrac{x}{y}$

If 2 is added to the numerator of the fraction, it reduces to $\dfrac{1}{2}$. Thus, we have

$\dfrac{x+2}{y} = \dfrac{1}{2}$

$\Rightarrow 2(x + 2) = y$

$\Rightarrow 2x + 4 = y$

$\Rightarrow 2x - y + 4 = 0$

If 1 is subtracted from the denominator, the fraction reduces to $\dfrac{1}{3}$. Thus, we have

$\dfrac{x}{y-1} = \dfrac{1}{3}$

$\Rightarrow 3x = y - 1$

$\Rightarrow 3x - y + 1 = 0$

So, we have two equations

$2x - y + 4 = 0$

$3x - y + 1 = 0$

Here x and y are unknowns. We have to solve the above equations for x and y.

By using cross-multiplication, we have

$$\frac{x}{(-1)\times 1-(-1)\times 4}=\frac{-y}{2\times 1-3\times 4}=\frac{1}{2\times(-1)-3\times(-1)}$$

$$\Rightarrow \frac{x}{-1+4}=\frac{-y}{2-12}=\frac{1}{-2+3}$$

$$\Rightarrow \frac{x}{3}=\frac{-y}{-10}=\frac{1}{1}$$

$$\Rightarrow \frac{x}{3}=\frac{y}{10}=1$$

$$\Rightarrow x=3, y=10$$

Hence, the fraction is $\boxed{\dfrac{3}{10}}$.

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