Pair of Linear Equations in Two varibles Ex 3.8 Q11

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 denominator of the fraction is 12. Thus, we have

$x + y = 12$

$\Rightarrow x + y - 12 = 0$

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

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

$\Rightarrow 2x = y + 3$

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

So, we have two equations

$x + y - 12 = 0$

$2x - y - 3 = 0$

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

By using cross-multiplication, we have

$$\frac{x}{1 \times (-3) - (-1) \times (-12)} = \frac{-y}{1 \times (-3) - 2 \times (-12)} = \frac{1}{1 \times (-1) - 2 \times 1}$$

$$\Rightarrow \frac{x}{-3 - 12} = \frac{-y}{-3 + 24} = \frac{1}{-1 - 2}$$

$$\Rightarrow \frac{x}{-15} = \frac{-y}{21} = \frac{1}{-3}$$

$$\Rightarrow \frac{x}{15} = \frac{y}{21} = \frac{1}{3}$$

$$\Rightarrow x = \frac{15}{3}, y = \frac{21}{3}$$

$$\Rightarrow x = 5, y = 7$$

Hence, the fraction is $\boxed{\dfrac{5}{7}}$.

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