



### Pair of Linear Equations in Two variables Ex 3.8 Q11

**Answer :**

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

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  $\frac{1}{2}$ . Thus, we have

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

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

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

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  $\boxed{\frac{5}{7}}$ .

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