Pair of Linear Equations in Two varibles Ex 3.8 Q9

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 4 more than twice the numerator. Thus, we have

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

If the numerator and denominator are increased by 3, they are in the ratio 2:3. Thus, we have

$$x+3:y+3=2:3$$
$$\Rightarrow \frac{x+3}{y+3}=\frac{2}{3}$$
$$\Rightarrow 3(x+3)=2(y+3)$$
$$\Rightarrow 3x+9=2y+6$$
$$\Rightarrow 3x-2y+3=0$$

So, we have two equations

$$x-y+4=0$$
$$3x-2y+3=0$$

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

By using cross-multiplication, we have

$$\frac{x}{(-1)\times 3-(-2)\times 4}=\frac{-y}{1\times 3-3\times 4}=\frac{1}{1\times(-2)-3\times(-1)}$$
$$\Rightarrow \frac{x}{-3+8}=\frac{-y}{3-12}=\frac{1}{-2+3}$$
$$\Rightarrow \frac{x}{5}=\frac{-y}{-9}=\frac{1}{1}$$
$$\Rightarrow \frac{x}{5}=\frac{y}{9}=1$$
$$\Rightarrow x=5, y=9$$

Hence, the fraction is $\boxed{\frac{5}{9}}$.

Pair of Linear Equations in Two varibles Ex 3.8 Q10

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 3 less than twice the denominator. Thus, we have

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

If the numerator and denominator are decreased by 1, the numerator becomes half the denominator. Thus, we have

$$x-1=\frac{1}{2}(y-1)$$
$$\Rightarrow \frac{x-1}{y-1}=\frac{1}{2}$$
$$\Rightarrow 2(x-1)=y-1$$
$$\Rightarrow 2x-2=y-1$$
$$\Rightarrow 2x-y-1=0$$

So, we have two equations

$$x-y+3=0$$
$$2x-y-5=0$$

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

By using cross-multiplication, we have

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

$$\Rightarrow \frac{x}{1+3}=\frac{-y}{-1-6}=\frac{1}{-1+2}$$

$$\Rightarrow \frac{x}{4}=\frac{-y}{-7}=\frac{1}{1}$$

$$\Rightarrow \frac{x}{4}=\frac{y}{7}=1$$

$$\Rightarrow x=4, y=7$$

Hence, the fraction is $\boxed{\frac{4}{7}}$.

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