Pair of Linear Equations in Two varibles Ex 3.8 Q5

Answer :

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

If the numerator is multiplied by 2 and the denominator is reduced by 5, the fraction becomes $\dfrac{6}{5}$.

Thus, we have

$$\dfrac{2x}{y-5} = \dfrac{6}{5}$$
$$\Rightarrow 10x = 6(y-5)$$
$$\Rightarrow 10x = 6y - 30$$
$$\Rightarrow 10x - 6y + 30 = 0$$
$$\Rightarrow 2(5x - 3y + 15) = 0$$
$$\Rightarrow 5x - 3y + 15 = 0$$

If the denominator is doubled and the numerator is increased by 8, the fraction becomes $\dfrac{2}{5}$. Thus, we have

$$\dfrac{x+8}{2y} = \dfrac{2}{5}$$
$$\Rightarrow 5(x+8) = 4y$$
$$\Rightarrow 5x + 40 = 4y$$
$$\Rightarrow 5x - 4y + 40 = 0$$

So, we have two equations

$$5x - 3y + 15 = 0$$
$$5x - 4y + 40 = 0$$

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

By using cross-multiplication, we have

$$\dfrac{x}{(-3)\times 40 - (-4)\times 15} = \dfrac{-y}{5\times 40 - 5\times 15} = \dfrac{1}{5\times(-4) - 5\times(-3)}$$

$$\Rightarrow \dfrac{x}{-120+60} = \dfrac{-y}{200-75} = \dfrac{1}{-20+15}$$

$$\Rightarrow \dfrac{x}{-60} = \dfrac{-y}{125} = \dfrac{1}{-5}$$

$$\Rightarrow \dfrac{x}{60} = \dfrac{y}{125} = \dfrac{1}{5}$$

$$\Rightarrow x = \dfrac{60}{5}, y = \dfrac{125}{5}$$

$$\Rightarrow x = 12, y = 25$$

Hence, the fraction is $\boxed{\dfrac{12}{25}}$.

Pair of Linear Equations in Two varibles Ex 3.8 Q6

Answer :

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

If 3 is added to the denominator and 2 is subtracted from the numerator, the fraction becomes $\dfrac{1}{4}$.

Thus, we have

$$\dfrac{x-2}{y+3} = \dfrac{1}{4}$$

$$\Rightarrow 4(x-2) = y+3$$

$$\Rightarrow 4x - 8 = y + 3$$

$$\Rightarrow 4x - y - 11 = 0$$

If 6 is added to the numerator and the denominator is multiplied by 3, the fraction becomes $\dfrac{2}{3}$. Thus, we have

$$\dfrac{x+6}{3y} = \dfrac{2}{3}$$

$$\Rightarrow 3(x+6) = 6y$$

$$\Rightarrow 3x + 18 = 6y$$

$$\Rightarrow 3x - 6y + 18 = 0$$

$$\Rightarrow 3(x - 2y + 6) = 0$$

$$\Rightarrow x - 2y + 6 = 0$$

So, we have two equations

$$4x - y - 11 = 0$$

$$x - 2y + 6 = 0$$

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

By using cross-multiplication, we have

$$\dfrac{x}{(-1) \times 6 - (-2) \times (-11)} = \dfrac{-y}{4 \times 6 - 1 \times (-11)} = \dfrac{1}{4 \times (-2) - 1 \times (-1)}$$

$$\Rightarrow \dfrac{x}{-6-22} = \dfrac{-y}{24+11} = \dfrac{1}{-8+1}$$

$$\Rightarrow \dfrac{x}{-28} = \dfrac{-y}{35} = \dfrac{1}{-7}$$

$$\Rightarrow \dfrac{x}{28} = \dfrac{y}{35} = \dfrac{1}{7}$$

$$\Rightarrow x = \dfrac{28}{7}, y = \dfrac{35}{7}$$

$$\Rightarrow x = 4, y = 5$$

Hence, the fraction is $\boxed{\dfrac{4}{5}}$.

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