



Exercise 3D

Question 1:

$$3x + 5y - 12 = 0, 5x + 3y - 4 = 0$$

$$a_1 = 3 \quad b_1 = 5 \quad c_1 = -12$$

$$a_2 = 5 \quad b_2 = 3 \quad c_2 = -4$$

$$\text{Thus, } \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \quad \left(\frac{3}{5} \neq \frac{5}{3} \right)$$

Hence, the given system of equations has a unique solution

The given equations are

$$3x + 5y = 12 \quad \text{---(1)}$$

$$5x + 3y = 4 \quad \text{---(2)}$$

Multiplying (1) by 3 and (2) by 5, we get

$$9x + 15y = 36 \quad \text{---(3)}$$

$$25x + 15y = 20 \quad \text{---(4)}$$

Subtracting (3) from (4), we get

$$16x = -16 \Rightarrow x = \frac{-16}{16} = -1$$

Putting $x = -1$, in (3), we get

$$9 \times (-1) + 15y = 36$$

$$-9 + 15y = 36$$

$$15y = 36 + 9 \Rightarrow y = \frac{45}{15} = 3$$

\therefore the solution is $x = -1, y = 3$

Question 2:

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

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

$$2x + 3y - 18 = 0 \text{ --- (1)}$$

$$x - 2y - 2 = 0 \text{ --- (2)}$$

$$a_1 = 2, b_1 = 3, c_1 = -18$$

$$a_2 = 1, b_2 = -2, c_2 = -2$$

$$\text{Thus, } \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \Rightarrow \frac{2}{1} \neq \frac{3}{-2}$$

Hence, the given system of equations has unique solution

The given equations are

$$2x + 3y = 18 \text{ --- (1)}$$

$$x - 2y = 2 \text{ --- (2)}$$

Multiplying (1) by 2 and (2) by 3

$$4x + 6y = 36 \text{ --- (3)}$$

$$3x - 6y = 6 \text{ --- (4)}$$

Adding (3) and (4) we get

$$7x = 42 \Rightarrow x = 6$$

Putting $x = 6$ in (1), we get

$$2 \times 6 + 3y = 18 \Rightarrow 3y = 18 - 12$$

$$3y = 6$$

$$y = \frac{6}{3} = 2$$

\therefore solution is $x = 6, y = 2$

***** END *****