



Exercise 3C

Question 10:

$$2ax + 3by - (a + 2b) = 0$$

$$3ax + 2by - (2a + b) = 0$$

By cross multiplication, we have

$$\therefore \frac{x}{[3b \times (-(2a + b)) - 2b \times (-(a + 2b))]} = \frac{y}{-(a + 2b) \times 3a - 2a \times (-(2a + b))}$$

$$= \frac{1}{2a \times 2b - 3a \times 3b}$$

$$\therefore \frac{x}{[-6ab - 3b^2 + 2ab + 4b^2]} = \frac{y}{-3a^2 - 6ab + 4a^2 + 2ab} = \frac{1}{4ab - 9ab}$$

$$\Rightarrow \frac{x}{b^2 - 4ab} = \frac{y}{a^2 - 4ab} = \frac{1}{-5ab}$$

$$\Rightarrow \frac{x}{-b(4a - b)} = \frac{y}{-a(4b - a)} = \frac{1}{-5ab}$$

$$\Rightarrow \frac{x}{-b(4a - b)} = \frac{1}{-5ab}, \frac{y}{-a(4b - a)} = \frac{1}{-5ab}$$

$$x = \frac{-b(4a - b)}{-5ab}, y = \frac{-a(4b - a)}{-5ab}$$

$$x = \frac{(4a - b)}{5a}, y = \frac{(4b - a)}{5b} \text{ is the solution}$$

Question 11:

$$\frac{x}{a} - \frac{y}{b} = 0$$

$$ax + by - (a^2 + b^2) = 0$$

By cross multiplication, we have

$$\therefore \frac{x}{\left[\left(-\frac{1}{b}\right) \times (-(a^2 + b^2)) - 0\right]} = \frac{y}{\left[0 - \frac{1}{a} \times (-(a^2 + b^2))\right]} = \frac{1}{\frac{b}{a} + \frac{a}{b}}$$

$$\Rightarrow \frac{x}{\frac{a^2}{b} + \frac{b^2}{b}} = \frac{y}{\frac{a^2}{a} + \frac{b^2}{a}} = \frac{1}{\frac{b^2 + a^2}{ab}}$$

$$\Rightarrow \frac{x}{\left[\frac{(a^2 + b^2)}{b}\right]} = \frac{y}{\left[\frac{(a^2 + b^2)}{a}\right]} = \frac{1}{\left[\frac{(b^2 + a^2)}{ab}\right]}$$

$$\left(\frac{a^2 + b^2}{b}\right) = \frac{1}{\frac{(b^2 + a^2)}{ab}} \text{ and } \left(\frac{a^2 + b^2}{a}\right) = \frac{1}{\left(\frac{b^2 + a^2}{ab}\right)}$$

$$x = \frac{(a^2 + b^2)}{b} \times \frac{ab}{(a^2 + b^2)}, y = \frac{(a^2 + b^2)}{a} \times \frac{ab}{(a^2 + b^2)}$$

\therefore The solution is $x = a, y = b$

Question 12:

$$\frac{x}{a} + \frac{y}{b} - 2 = 0$$

$$ax - by - (a^2 - b^2) = 0$$

By cross multiplication, we have

$$\therefore \frac{x}{\left[\frac{1}{b} \{ -(a^2 - b^2) \} - (-2)(-b) \right]} = \frac{y}{\left[(-2a) - \frac{1}{a} \{ -(a^2 - b^2) \} \right]} = \frac{1}{-\frac{b}{a} - \frac{a}{b}}$$

$$\Rightarrow \frac{x}{\frac{-a^2}{b} + b - 2b} = \frac{y}{\left[-2a + a - \frac{b^2}{a} \right]} = \frac{1}{\frac{-b^2 - a^2}{ab}}$$

$$\Rightarrow \frac{\frac{x}{b}}{-a^2 - b^2} = \frac{\frac{y}{a}}{-a^2 - b^2} = \frac{1}{\frac{-b^2 - a^2}{ab}}$$

$$\Rightarrow \frac{\frac{x}{b}}{-a^2 - b^2} = \frac{1}{\frac{-b^2 - a^2}{ab}}, \quad \frac{\frac{y}{a}}{-a^2 - b^2} = \frac{1}{\frac{-b^2 - a^2}{ab}}$$

$$\therefore x = \frac{-(a^2 + b^2)}{b} \times \frac{ab}{-(b^2 + a^2)} = a$$

$$y = \frac{-(a^2 + b^2)}{a} \times \frac{ab}{-(b^2 + a^2)} = b$$

\therefore the solution is $x = a, y = b$

***** END *****