

Exercise 3B

Question 20:

$$\frac{bx}{a} - \frac{ay}{b} + a + b = 0$$
By taking L.C.M, we get
$$\frac{b^2x - a^2y + a^2b + b^2a}{ab} = 0$$

$$b^2x - a^2y = -a^2b - b^2a - - - (1)$$

$$bx - ay = -2ab - - - - (2)$$
Multiplying (1) by 1 and (2) by a
$$b^2x - a^2y = -a^2b - b^2a - - - (3)$$

$$abx - a^2y = -2a^2b - - - (4)$$
Subtracting (3) from (4)
$$(ab - b^2)x = -2a^2b + a^2b + ab^2$$

$$b(a - b)x = -a^2b + ab^2 = -ab(a - b)$$
∴
$$x = \frac{-ab(a - b)}{b(a - b)}$$
∴
$$x = -a$$
Putting x = -a, in (1), we get
$$b^2(-a) - a^2y = -a^2b - b^2a$$

$$-ab^2 - a^2y = -a^2b - b^2a$$

$$-a^2y = -a^2b - b^2a + ab^2$$

$$-a^2y = -a^2b - a^2b - a^2b$$

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

$$\frac{bx + ay}{ab} = 2$$

$$bx + ay = 2ab - - - (1)$$

$$ax - by = (a^2 - b^2) - - - (2)$$
Multiplying (1) by b and (2) by a
$$b^2x + bay = 2ab^2 - - - (3)$$

$$a^2x - bay = a(a^2 - b^2) - - (4)$$
Adding (3) and (4), we get
$$b^2x + a^2x = 2ab^2 + a(a^2 - b^2)$$

$$x(b^2 + a^2) = 2ab^2 + a^3 - ab^2$$

$$x(b^2 + a^2) = ab^2 + a^3$$

$$x(b^2 + a^2) = a(b^2 + a^2)$$

$$x = \frac{a(b^2 + a^2)}{(b^2 + a^2)} = a$$
Putting $x = a$ in (1), we get
$$b \times a + ay = 2ab$$

$$ay = 2ab - ab \Rightarrow ay = ab \text{ or } y = b$$

 $\therefore \text{ solution is } x = a, y = b$

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