Exercise 3B

Question 20:

$$\frac{bx}{a} - \frac{ay}{b} + a + b = 0$$

By taking L.C.M, we get

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

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

$$bx - ay = -2ab \quad ---(2)$$

Multiplying (1) by 1 and (2) by a

$$b^2x - a^2y = -a^2b - b^2a \quad ---(3)$$

$$abx - a^2y = -2a^2b \quad ---(4)$$

Subtracting (3) from (4)

$$\left(ab - b^2\right)x = -2a^2b + a^2b + ab^2$$

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

$$\therefore \quad x = \frac{-ab(a-b)}{b(a-b)}$$

$$x = -a$$

Putting x = -a, in (1), we get

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

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

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

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

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

Question 21:

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

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

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

$$ax-by=\left(a^2-b^2\right)---(2)$$

Multiplying (1) by b and (2) by a

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

$$a^2x-bay=a\left(a^2-b^2\right)--(4)$$

Adding (3) and (4), we get

$$b^2x+a^2x=2ab^2+a\left(a^2-b^2\right)$$

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

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

$$x\left(b^2+a^2\right)=a\left(b^2+a^2\right)$$

$$x=\frac{a\left(b^2+a^2\right)}{\left(b^2+a^2\right)}=a$$

Putting x= a in (1), we get

$$b\times a+ay=2ab$$

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

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

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