



Exercise 3C

Question 13:

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

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

By cross multiplication we have

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

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

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

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

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

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

The solution is $x = a^2$, $y = b^2$

Question 14:

$$\frac{1}{x} + \frac{1}{y} - 7 = 0$$

$$\frac{2}{x} + \frac{3}{y} - 17 = 0$$

Taking

$$\frac{1}{x} = u \text{ and } \frac{1}{y} = v$$

$$u + v - 7 = 0$$

$$2u + 3v - 17 = 0$$

By cross multiplication, we have

$$\therefore \frac{u}{[1 \times (-17) - 3 \times (-7)]} = \frac{v}{[(-7) \times 2 - 1 \times (-17)]} = \frac{1}{3 - 2}$$

$$\Rightarrow \frac{u}{-17 + 21} = \frac{v}{-14 + 17} = \frac{1}{1}$$

$$\Rightarrow \frac{u}{4} = \frac{v}{3} = \frac{1}{1}$$

$$\Rightarrow \frac{u}{4} = 1, \frac{v}{3} = 1$$

$$\Rightarrow u = 4, v = 3$$

$$\Rightarrow \frac{1}{x} = 4, \frac{1}{y} = 3$$

Hence the solution is

$$x = \frac{1}{4}, y = \frac{1}{3}$$

***** END *****