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

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

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

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

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

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

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

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

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

$u + v - 7 = 0$

$2u + 3v - 17 = 0$

By cross multiplication, we have

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

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

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

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

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

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

Hence the solution is

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

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