

Ex 3.6 Question 1

$$1 \text{ (vii) } \frac{10}{x+y} + \frac{2}{x-y} = 4$$

$$\frac{15}{x+y} - \frac{5}{x-y} = -2$$

Let $\frac{1}{x+y} = a, \frac{1}{x-y} = b$
in both the eqns

$$10a + 2b = 4 \dots \text{ (i) } \times 5$$

$$15a - 5b = -2 \dots \text{ (ii) } \times 2$$

$$\text{(i) } \times 5 + \text{(ii) } \times 2$$

$$50a + 10b = 20$$

$$30a - 10b = -4$$

$$80a = 16$$

$$\Rightarrow a = \frac{16}{80} = \frac{1}{5}$$

Sub (i)

$$10 \times \frac{1}{5} + 2b = 4$$

$$2 + 2b = 4$$

$$\Rightarrow 2b = 4 - 2$$

$$\Rightarrow b = \frac{2}{2} = 1$$

$$a = \frac{1}{5}$$

$$b = 1$$

$$\frac{1}{x+y} = \frac{1}{5}$$

$$\frac{1}{x-y} = 1$$

$$\Rightarrow x+y = 5 \dots \text{ (iii) } \quad \Rightarrow x-y = 1 \dots \text{ (iv) }$$

$$\text{(iii) } + \text{(iv)}$$

$$x+y = 5$$

$$x-y = 1$$

$$2x = 6$$

$$\Rightarrow x = 3$$

Put in eqn (iii)

$$3+y = 5$$

$$y = 2$$

$$1 \text{ (viii) } \frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$$

$$\frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = -\frac{1}{8}$$

Let $\frac{1}{3x+y} = a, \frac{1}{3x-y} = b$
in both equations

$$a + b = \frac{3}{4} \dots \text{ (i) }$$

$$\frac{a}{2} - \frac{b}{2} = -\frac{1}{8}$$

$$\text{(x2)} \quad a - b = -\frac{1}{4} \dots \text{ (ii) }$$

$$\text{(i) } + \text{(ii)}$$

$$a + b = \frac{3}{4}$$

$$a - b = -\frac{1}{4}$$

$$2a = \frac{2}{4} = \frac{1}{2}$$

$$\Rightarrow a = \frac{1}{4}$$

Sub (ii)

$$\frac{1}{4} - b = -\frac{1}{4}$$

$$\Rightarrow b = \frac{1}{4} + \frac{1}{4}$$

$$= \frac{2}{4} = \frac{1}{2}$$

$$a = \frac{1}{4}$$

$$b = \frac{1}{2}$$

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

$$\frac{1}{3x-y} = \frac{1}{2}$$

$$\Rightarrow 3x+y = 4 \dots \text{ (iii) } \quad \Rightarrow 3x-y = 2 \dots \text{ (iv) }$$

$$\text{(iii) } + \text{(iv)}$$

$$3x+y = 4$$

$$3x-y = 2$$

$$6x = 6$$

$$\Rightarrow x = 1$$

Sub (iii)

$$3+y = 4$$

$$y = 1$$

$$\therefore x = 1, y = 1$$