



### Exercise 3D

Question 8:

$$8x + 5y - 9 = 0$$

$$kx + 10y - 15 = 0$$

These equations are of the form

$$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$$

where,  $a_1 = 8, b_1 = 5, c_1 = -9$  and

$$a_2 = k, b_2 = 10, c_2 = -15$$

For no solution, we must have  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$$\text{Now, } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\Rightarrow \frac{8}{k} = \frac{5}{10} \neq \frac{-9}{-15}$$

$$\Rightarrow \frac{8}{k} = \frac{1}{2} \neq \frac{3}{5}$$

$$\Rightarrow \frac{8}{k} = \frac{1}{2} \text{ and } \frac{8}{k} \neq \frac{3}{5}$$

$$\Rightarrow k = 16 \text{ and } k \neq \frac{40}{3}$$

Clearly,  $k = 16$  also satisfies the condition

$$k \neq \frac{40}{3}$$

Hence, the given system will have no solution when  $k = 16$ .

Question 9:

$$kx + 3y - 3 = 0 \text{ ---(1)}$$

$$12x + ky - 6 = 0 \text{ ---(2)}$$

$$a_1 = k, b_1 = 3, c_1 = -3$$

$$a_2 = 12, b_2 = k, c_2 = -6$$

These equations are of the form

$$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$$

for no solution, we must have  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$$\text{Now, } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\Rightarrow \frac{k}{12} = \frac{3}{k} \neq \frac{-3}{-6}$$

$$\Rightarrow \frac{k}{12} = \frac{3}{k} \text{ and } \frac{3}{k} \neq \frac{1}{2}$$

$$k^2 = 36 \text{ and } k \neq 6$$

Hence,  $k = -6$

Hence, the given system will have no solution when  $k = -6$

Question 10:

$$3x + y - 1 = 0$$

$$(2k - 1)x + (k - 1)y - (2k + 1) = 0$$

These equations are of the form

$$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$$

where,  $a_1 = 3, b_1 = 1, c_1 = -1$

$$a_2 = (2k - 1), b_2 = (k - 1), c_2 = -(2k + 1)$$

For no solution, we must have  $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$$\text{Now, } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{3}{2k - 1} = \frac{1}{k - 1} \neq \frac{-1}{-(2k + 1)}$$

$$\Rightarrow \frac{3}{2k - 1} = \frac{1}{k - 1} \text{ and } \frac{1}{k - 1} \neq \frac{1}{2k + 1}$$

$$3k - 3 = 2k - 1 \text{ and } (2k + 1) \neq (k - 1)$$

$$k = 2 \text{ and } k \neq -2$$

Thus,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2} \text{ hold when } k = 2$$

Hence the given equation has no solution when  $k = 2$

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