



### Exercise 3D

Question 14:

$$x - 2y - 3 = 0$$

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

These equations are of the form of

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

$$\text{where, } a_1 = 1, b_1 = -2, c_1 = -3$$

$$a_2 = 3, b_2 = k, c_2 = -1$$

for unique solution

$$\text{Thus, } \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$$\text{Now, } \frac{1}{3} \neq \frac{-2}{k}, k \neq -6$$

Thus, for all real value of  $k$  other than  $-6$ , the given system of equations will have a unique solution

Question 15:

$$kx + 3y - (k - 3) = 0$$

$$12x + ky - k = 0$$

These equations are of the form

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

$$\text{where } a_1 = k, b_1 = 3, c_1 = -(k - 3)$$

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

For unique solution, we have

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$$\frac{k}{12} \neq \frac{3}{k}$$

$$\Rightarrow k^2 \neq 36 \Rightarrow k \neq \pm 6$$

Thus, for all real value of  $k$  other than  $\pm 6$ , the given system of equations will have a unique solution

Question 16:

$$4x - 5y - k = 0, 2x - 3y - 12 = 0$$

These equations are of the form

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

where,  $a_1 = 4, b_1 = -5, c_1 = -k$

$$a_2 = 2, b_2 = -3, c_2 = -12$$

For unique solution, we must have

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$$\frac{4}{2} \neq \frac{-5}{-3}$$

$$2 \neq \frac{5}{3} \Rightarrow 6 \neq 5$$

Thus, for all real value of  $k$  the given system of equations will have a unique solution

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