Pair of Linear Equations in Two varibles Ex 3.5 Q29

Answer :

GIVEN:

$6x+3y=c-3$

$12x+cy=c$

To find: To determine for what value of c the system of equation has infinitely many solution

We know that the system of equations

$a_1x+b_1y=c_1$

$a_2x+b_2y=c_2$

For infinitely many solution

$$\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$$

Here

$$\frac{6}{12}=\frac{3}{c}=\frac{c-3}{c}$$

Consider the following

$$\frac{6}{12}=\frac{3}{c}$$

$$c=\frac{12\times 3}{6}$$

$$c=6$$

Now consider the following for c

$$\frac{3}{c}=\frac{c-3}{c}$$

$$3c=c(c-3)$$

$$3c=c^2-3c$$

$$6c=c^2$$

$$6c=c^2$$

$$c=0,6$$

But it is given that $c\neq 0$. Hence $c=6$

Hence for $\boxed{c=6}$ the system of equation have infinitely many solutions.

Pair of Linear Equations in Two varibles Ex 3.5 Q30

Answer :

GIVEN:

$2x + ky = 1$

$3x - 5y = 7$

To find: To determine for what value of k the system of equation has

(1) Unique solution

(2) No solution

(3) Infinitely many solution

We know that the system of equations

$a_1x + b_1y = c_1$

$a_2x + b_2y = c_2$

(1) For Unique solution

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

Here,

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

$$k \neq \frac{-10}{3}$$

Hence for $\boxed{k \neq \frac{-10}{3}}$ the system of equation has unique solution

(2) For no solution

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

Here,

$$\frac{2}{3} = \frac{k}{-5} \neq \frac{1}{7}$$

$$\frac{2}{3} = \frac{k}{-5} \quad \text{and} \quad \frac{k}{-5} \neq \frac{1}{7}$$

$$k = \frac{-10}{3} \quad \text{and} \quad k \neq \frac{-5}{7}$$

Hence for $\boxed{k = \frac{-10}{3}}$ the system of equation has no solution

(3) For infinitely many solution

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Here,

$$\frac{2}{3} = \frac{k}{-5} \neq \frac{1}{7}$$

$$\Rightarrow \quad k = \frac{-10}{3}$$

But since here $\frac{k}{-5} \neq \frac{1}{7} \left(\text{as } k = \frac{-10}{3} \right)$

Hence the system does not have infinitely many solutions.

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