Pair of Linear Equations in Two varibles Ex 3.5 Q34

Answer :

GIVEN:

$$2x-3y=7$$
$$(a+b)x-(a+b-3)y=4a+b$$

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

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

$$\frac{2}{(a+b)}=\frac{3}{(a+b-3)}=\frac{7}{4a+b}$$

Consider the following

$$\frac{3}{(a+b-3)}=\frac{7}{4a+b}$$
$$12a+3b=7(a+b-3)$$
$$12a+3b=7a+7b-21$$
$$5a-4b+21=0\ldots\ldots(1)$$

Again

$$\frac{2}{(a+b)}=\frac{3}{(a+b-3)}$$
$$2(a+b-3)=3(a+b)$$
$$2a+2b-6=3a+3b$$
$$a+b+6=0\ldots\ldots(2)$$

Multiplying eq. (2) by 4 and adding eq. (1)

$$9a+45=0$$
$$a=-5$$

Putting the value of a in eq. (2)

$$-5+b+6=0$$
$$b=-1$$

Hence for $\boxed{a=-5}$ and $\boxed{b=-1}$ the system of equation has infinitely many solution.

Pair of Linear Equations in Two varibles Ex 3.5 Q35

Answer :

GIVEN:

$$2x+3y=9$$
$$(p+q)x+(2p-q)y=3(p+q+1)$$

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

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

$$\frac{2}{(p+q)}=\frac{3}{(2p-q)}=\frac{3}{(p+q+1)}$$
$$\frac{3}{(2p-q)}=\frac{3}{(p+q+1)}$$
$$3(p+q+1)=3(2p-q)$$
$$3p+3q+3=6p-3q$$
$$3p-6q-3=0 \text{ ...... } (1)$$

Again consider

$$\frac{2}{(p+q)}=\frac{3}{(2p-q)}$$
$$3(p+q)=2(2p-q)$$
$$3p+3q=4p-2q$$
$$p-5q=0 \text{ ...... } (2)$$

Multiplying eq. (2) by 3 and subtracting from eq. (1)

$$3p-6q-3-3p+15q=0$$
$$9q=3$$
$$q=\frac{1}{3}$$

Putting the value of q in eq. (2)

$$p-\frac{5}{3}=0$$
$$p=\frac{5}{3}$$

Hence for $\boxed{p=\frac{5}{3}}$ and $\boxed{q=\frac{1}{3}}$ the system of equation has infinitely many solution.

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