Pair of Linear Equations in Two varibles Ex 3.5 Q13

Answer :

GIVEN:

$$2x-3y=7$$
$$(k+2)x-(2k+1)y=3(2k-1)$$

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

$$\frac{2}{k+2}=\frac{-3}{-(2k+1)}=\frac{7}{3(2k-1)}$$

Consider the following

$$\frac{2}{k+2}=\frac{-3}{-(2k+1)}$$
$$2(2k+1)=3(k+2)$$
$$4k+2=3k+6$$
$$4k-3k=6-2$$
$$k=4$$

Now consider the following

$$\frac{2}{k+2} \quad \frac{-3}{-(2k+1)}=\frac{7}{3(2k-1)}$$
$$-3\times3(2k-1)=-7(2k+1)$$
$$18k-9=14k+7$$
$$18k-14k=9+7$$
$$4k=16$$
$$\Rightarrow \quad k=4$$

Hence for $\boxed{k=4}$ the system of equation have infinitely many solutions.

Pair of Linear Equations in Two varibles Ex 3.5 Q14

Answer :

GIVEN:

$$2x+3y=2$$
$$(k+2)x+(2x+1)y=2(k-1)$$

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,

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

Consider the following for k

$$\frac{2}{k+2}=\frac{3}{(2k+1)}$$
$$2(2k+1)=3(k+2)$$
$$4k+2=3k+6$$
$$4k-3k=6-2$$
$$\Rightarrow \quad k=4$$

Now consider the following

$$\frac{3}{(2k+1)}=\frac{2}{2(k-1)}$$
$$3\times 2(k-1)=2(2k+1)$$
$$6k-6=4k+2$$
$$6k-4k=6+2$$
$$2k=8$$
$$\Rightarrow \quad k=4$$

Hence for $\boxed{k=4}$ the system of equation have infinitely many solutions.

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