Pair of Linear Equations in Two varibles Ex 3.5 Q17

Answer :

GIVEN:

$$2x+(k-2)y=k$$
$$6x+(2k-1)y=2k+5$$

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

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

Here,

$$\frac{2}{6}=\frac{(k-2)}{(2k-1)}=\frac{k}{2k+5}$$

Consider the following relation to find k

$$\frac{2}{6}=\frac{(k-2)}{(2k-1)}$$
$$2(2k-1)=6(k-2)$$
$$4k-2=6k-12$$
$$6k-4k=12-2$$
$$2k=10$$
$$k=5$$

Now again consider the following

$$\frac{(k-2)}{(2k-1)}=\frac{k}{2k+5}$$
$$(2k+5)(k-2)=k(2k-1)$$
$$2k^2-4k+5k-10=2k^2-k$$
$$2k^2-4k+5k-10=2k^2-k$$
$$2k=10$$
$$k=5$$

Hence for $\boxed{k=5}$ the system of equation have infinitely many solutions

Pair of Linear Equations in Two varibles Ex 3.5 Q18

Answer :

GIVEN:

$$2x+3y=7$$
$$(k+1)x+(2k-1)y=4k+1$$

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

$$\frac{2}{(k+1)}=\frac{3}{2(k-1)}=\frac{7}{4k+1}$$

$$\frac{2}{(k+1)}=\frac{3}{2(k-1)}$$
$$2\times(2k-1)=3(k+1)$$
$$4k-2=3k+3$$
$$4k-3k=2+3$$
$$k=5$$

Now again consider the following to find k

$$\frac{3}{2(k-1)}=\frac{7}{4k+1}$$
$$3(4k+1)=7\times 2(k-1)$$
$$12k+3=14k-14$$
$$14+3=14k-12k$$
$$k=5$$

Hence for $\boxed{k=5}$ the system of equation have infinitely many solutions

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