Pair of Linear Equations in Two varibles Ex 3.5 Q31

Answer :

GIVEN:

$x + 2y + 7 = 0$

$2x + ky + 14 = 0$

To find: To determine for what value of k the system of equation will represents coincident lines

We know that the system of equations

$a_1 x + b_1 y = c_1$

$a_2 x + b_2 y = c_2$

For the system of equation to represent coincident lines we have the following relation

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

Here,

$$\frac{1}{2} = \frac{2}{k} = \frac{7}{14}$$

$$\frac{1}{2} = \frac{2}{k} \quad \text{and} \quad \frac{2}{k} = \frac{7}{14}$$

$$k = 4 \quad \text{and} \quad k = 4$$

Hence for $\boxed{k = 4}$ the system of equation represents coincident lines

Pair of Linear Equations in Two varibles Ex 3.5 Q32

Answer :

GIVEN:

$ax + by = c$

$lx + my = n$

To find: To determine the condition for the system of equation to have a unique equation

We know that the system of equations

$a_1 x + b_1 y = c_1$

$a_2 x + b_2 y = c_2$

For unique solution

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

Here

$$\frac{a}{l} \neq \frac{b}{m}$$

$$am \neq bl$$

Hence for $\boxed{am \neq bl}$ the system of equation have unique solution.

Pair of Linear Equations in Two varibles Ex 3.5 Q33

Answer :

GIVEN:

$$(2a-1)x+3y-5=0$$
$$3x+(b-1)y-2=0$$

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

$$\frac{(2a-1)}{3}=\frac{3}{(b-1)}=\frac{5}{2}$$

$$\frac{3}{(b-1)}=\frac{5}{2}$$
$$6=5(b-1)$$
$$6=5b-5$$
$$b=\frac{11}{5}$$

Again consider

$$\frac{(2a-1)}{3}=\frac{3}{(b-1)}$$
$$(2a-1)(b-1)=9$$
$$(2a-1)\left(\frac{11}{5}-1\right)=9 \quad [\text{subsituting the value of } b]$$
$$(2a-1)\left(\frac{11-5}{5}\right)=9$$
$$(2a-1)\left(\frac{6}{5}\right)=9$$
$$(2a-1)=9\left(\frac{5}{6}\right)$$
$$(2a-1)=\left(\frac{15}{2}\right)$$
$$2a=\frac{15}{2}+1$$
$$2a=\frac{15+2}{2}$$
$$2a=\frac{17}{2}$$
$$a=\frac{17}{4}$$

Hence for $\boxed{a=\frac{17}{4}}$ and $\boxed{b=\frac{11}{5}}$ the system of equation has infinitely many solution.

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