

Pair of Linear Equations in Two varibles Ex 3.7 Q13

Answer

Let the numbers are x and y. One of them must be greater than or equal to the other. Let us assume that x is greater than or equal to y.

The difference between the two numbers is 26. Thus, we have x - y = 26

One of the two numbers is three times the other number. Here, we are assuming that x is greater than or equal to y. Thus, we have x = 3y

So, we have two equations

x - y = 26

x = 3y

Here x and y are unknowns. We have to solve the above equations for x and y.

Substituting x = 3y from the second equation in the first equation, we get

3y - y = 2

 $\Rightarrow 2y = 26$

 $\Rightarrow y = \frac{26}{2}$

 $\Rightarrow y = \boxed{13}$

Substituting the value of y in the first equation, we have

x - 13 = 26

 $\Rightarrow x = 13 + 26$

 $\Rightarrow x = \boxed{39}$

Hence, the numbers are 39 and 13.

Pair of Linear Equations in Two varibles Ex 3.7 Q14

Let the digits at units and tens place of the given number be x and y respectively. Thus, the number is 10y + x.

The sum of the two digits of the number is 9. Thus, we have x + y = 9

After interchanging the digits, the number becomes 10x + y.

Also, 9 times the number is equal to twice the number obtained by reversing the order of the digits.

Thus, we have

9(10y + x) = 2(10x + y)

 \Rightarrow 90 y + 9x = 20x + 2y

 $\Rightarrow 20x + 2y - 90y - 9x = 0$

 $\Rightarrow 11x - 88y = 0$

 $\Rightarrow 11(x-8y)=0$

 $\Rightarrow x - 8y = 0$

So, we have the systems of equations

x + y = 9,

x-8y=0

Here x and y are unknowns. We have to solve the above systems of equations for x and y.

Substituting x = 8y from the second equation to the first equation, we get

8y + y = 9

 $\Rightarrow 9y = 9$

 $\Rightarrow y = \frac{9}{9}$

→ v =

Substituting the value of y in the second equation, we have

 $x-8\times1=0$

 $\Rightarrow x - 8 = 0$

 $\Rightarrow x = 8$

Hence, the number is $10 \times 1 + 8 = 18$.

Pair of Linear Equations in Two varibles Ex 3.7 Q15

Answer:

Let the digits at units and tens place of the given number be x and y respectively. Thus, the number is 10y + x.

The difference between the two digits of the number is 3. Thus, we have $x-y=\pm 3$

After interchanging the digits, the number becomes 10x + y.

Seven times the number is equal to four times the number obtained by reversing the order of the

digits. Thus, we have 7(10x + x) = 4(10x + x)

$$7(10y + x) = 4(10x + y)$$

$$\Rightarrow 70y + 7x = 40x + 4y$$

$$\Rightarrow 40x + 4y - 70y - 7x = 0$$

$$\Rightarrow$$
 33 x – 66 y = 0

$$\Rightarrow 33(x-2y) = 0$$

$$\Rightarrow x - 2y = 0$$

So, we have two systems of simultaneous equations

$$x - y = 3$$
,

$$x - 2y = 0$$

$$x - y = -3,$$

$$x - 2y = 0$$

Here x and y are unknowns. We have to solve the above systems of equations for x and y.

(i) First, we solve the system

$$x-y=3$$
,

$$x - 2y = 0$$

Multiplying the first equation by 2 and then subtracting from the second equation, we have

$$(x-2y)-2(x-y)=0-2\times 3$$

$$\Rightarrow x - 2y - 2x + 2y = -6$$

$$\Rightarrow -x = -6$$

$$\Rightarrow x = 6$$

Substituting the value of x in the first equation, we have

$$6 - y = 3$$

$$\Rightarrow y = 6 - 3$$

$$\Rightarrow y = 3$$

Hence, the number is $10 \times 3 + 6 = \boxed{36}$

(ii) Now, we solve the system

$$x - y = -3,$$

$$x-2y=0$$

Multiplying the first equation by 2 and then subtracting from the second equation, we have

$$(x-2y)-2(x-y)=0-(-3\times 2)$$

$$\Rightarrow x - 2y - 2x + 2y = 6$$

$$\Rightarrow -x = 6$$

$$\Rightarrow x = -6$$

Substituting the value of x in the first equation, we have

$$-6-y=-3$$

$$\Rightarrow y = -6 + 3$$

$$\Rightarrow y = -3$$

But, the digits of the number can't be negative. Hence, the second case must be removed.

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