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

$3y-y=26$

$\Rightarrow 2y=26$

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

$\Rightarrow y=\boxed{13}$

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

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 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

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

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

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

$\Rightarrow 11x-88y=0$

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

$\Rightarrow x-8y=0$

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

$8y+y=9$

$\Rightarrow 9y=9$

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

$\Rightarrow y=1$

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

$x-8\times 1=0$

$\Rightarrow x-8=0$

$\Rightarrow x=8$

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

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

$$7(10y+x)=4(10x+y)$$
$$\Rightarrow 70y+7x=40x+4y$$
$$\Rightarrow 40x+4y-70y-7x=0$$
$$\Rightarrow 33x-66y=0$$
$$\Rightarrow 33(x-2y)=0$$
$$\Rightarrow x-2y=0$$

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.

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