Pair of Linear Equations in Two varibles Ex 3.7 Q9

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 number is 3 more than 4 times the sum of the two digits. Thus, we have

$$10y+x=4(x+y)+3$$
$$\Rightarrow 10y+x=4x+4y+3$$
$$\Rightarrow 4x+4y-10y-x=-3$$
$$\Rightarrow 3x-6y=-3$$
$$\Rightarrow 3(x-2y)=-3$$
$$\Rightarrow x-2y=-\frac{3}{3}$$
$$\Rightarrow x-2y=-1$$

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

If 18 is added to the number, the digits are reversed. Thus, we have

$$(10y+x)+18=10x+y$$
$$\Rightarrow 10x+y-10y-x=18$$
$$\Rightarrow 9x-9y=18$$
$$\Rightarrow 9(x-y)=18$$
$$\Rightarrow x-y=\frac{18}{9}$$
$$\Rightarrow x-y=2$$

So, we have the systems of equations

$$x-2y=-1,$$
$$x-y=2$$

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

Subtracting the first equation from the second, we have

$$(x-y)-(x-2y)=2-(-1)$$
$$\Rightarrow x-y-x+2y=3$$
$$\Rightarrow y=3$$

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

$$x-2\times 3=-1$$
$$\Rightarrow x-6=-1$$
$$\Rightarrow x=-1+6$$
$$\Rightarrow x=5$$

Hence, the number is $10\times 3+5=\boxed{35}$.

Pair of Linear Equations in Two varibles Ex 3.7 Q10

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 number is 4 more than 6 times the sum of the two digits. Thus, we have

$$10y+x=6(x+y)+4$$
$$\Rightarrow 10y+x=6x+6y+4$$
$$\Rightarrow 6x+6y-10y-x=-4$$
$$\Rightarrow 5x-4y=-4$$

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

If 18 is subtracted from the number, the digits are reversed. Thus, we have

$$(10y+x)-18=10x+y$$
$$\Rightarrow 10x+y-10y-x=-18$$
$$\Rightarrow 9x-9y=-18$$
$$\Rightarrow 9(x-y)=-18$$
$$\Rightarrow x-y=-\frac{18}{9}$$
$$\Rightarrow x-y=-2$$

So, we have the systems of equations

$5x-4y=-4,$

$x-y=-2$

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

Multiplying the second equation by 5 and then subtracting from the first, we have

$(5x-4y)-(5x-5y)=-4-(-2\times 5)$

$\Rightarrow 5x-4y-5x+5y=-4+10$

$\Rightarrow y=6$

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

$x-6=-2$

$\Rightarrow x=6-2$

$\Rightarrow x=4$

Hence, the number is $10\times 6+4=\boxed{64}$.

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