

CBSE NCERT Solutions for Class 8 Mathematics Chapter 16

Back of Chapter Questions

EXERCISE 16.1

1. Find the values of the letters in each of the following and give reasons for the steps involved

$$1.3A$$

$$+ 25$$

$$B2$$

Solution:

We can see that addition of A and 5 is 2 which means addition of A and 5 is a number whose one's digit is 2. This is possible when A is 7. In that case, the addition of A and 5 will give 12. Thus, we get a carry 1 for the next step.

In next step,

$$1 + 3 + 2 = 6$$

Therefore, the addition is as follows,

$$37$$

$$+ 25$$

$$62$$

Hence, the values of A and B are 7 and 6 respectively.

2. $4A$

$$+ 98$$

$$CB3$$

Solution:

We can see that addition of A and 8 is 3 which means addition of A and 8 is a number whose one's digit is 3. This is possible when A is 5. In that case, the addition of A and 8 will give 13. Thus, we get a carry 1 for the next step.

In next step,

$$1 + 4 + 9 = 14$$

Therefore, the addition is as follows,

$$\begin{array}{r} 45 \\ + 98 \\ \hline 143 \end{array}$$

Hence, the values of A, B and C are 5, 4 and 1 respectively.

3.
$$\begin{array}{r} 1A \\ \times A \\ \hline \end{array}$$

$$\begin{array}{r} 9A \\ \hline \end{array}$$

Solution:

We can see that multiplication of A and A is a number whose one's digit is A again.

So, the possible values of A are 0, 1, 5, 6

If $A = 0$, then the product will be zero. Therefore, this value of A is not possible.

If $A = 1$, then $A \times A = 1 \times 1 = 1$

In next step,

$$1 \times A = 9$$

But, 1×1 is not equal to 9.

So, A cannot be 1

If $A = 5$, then $A \times A = 5 \times 5 = 25$ and 2 will be a carry for next step.

In next step,

$$1 \times A + 2 = 9$$

Which gives $A = 7$ which is not possible as we have already assumed A as 5

So, A cannot be 5.

If $A = 6$, then $A \times A = 6 \times 6 = 36$ and 3 will be a carry for next step.

In next step,

$$1 \times A + 3 = 9$$

Which gives $A = 6$.

Hence, the possible value of A is 6.

4. A B

$$+ 3 7$$

$$6 A$$

Solution:

The addition of A and 3 is 6. There can be 2 cases.

Case 1

When first step is not producing a carry.

In this case, A should be equal to 3 as $3 + 3 = 6$. Consider the first step in which addition of B and 7 is A, B should be a number such that unit digit of addition of B and 7 is 3. It is possible only when $B = 6$. But when $B = 6$, first step is producing 1 as a carry. So, A cannot be equal to 3.

Case 2:

When first step is producing a carry.

In this case, A should be equal to 2 as $1 + 2 + 3 = 6$. Consider the first step in which addition of B and 7 is A, B should be a number such that unit digit of addition of B and 7 is 2. It is possible only when $B = 5$.

So, the addition is as follows:

$$2 5$$

$$+ 3 7$$

$$6 2$$

Hence, the values of A and B are 2 and 5 respectively.

5. A B

$$\times 3$$

$$C A B$$

Solution:

We can see that multiplication of B and 3 is a number whose one's digit is B again.

So, the possible values of B are 0 & 5

If $B = 5$, then $B \times 3 = 5 \times 3$.

$$B \times 3 = 15$$

1 will be a carry for next step.

In next step,

$$3A + 1 = CA.$$

This is not possible for any value of A.

Hence, B must be 0 only.

If $B = 0$, then $0 \times 3 = 0$

In next step,

$$3A = CA$$

i.e., the ones digit of $3 \times A$ should be A.

It is possible only when A is 0 or 5.

But A cannot be equal to 0 and AB is a two-digit number.

Therefore, A must be 5 only. The multiplication is as follows.

$$\begin{array}{r} 50 \\ \times 3 \\ \hline 150 \\ \hline \end{array}$$

Hence, the values of A, B and C are 5, 0 and 1 respectively.

6. AB

$$\times 5$$

CAB

Solution:

We can see that the multiplication of B and 5 is a number whose one's digit is B again. So, the possible values of B are 0 and 5.

If $B = 5$, then $B \times 5 = 5 \times 5$

$B \times 5 = 25$

2 will be a carry for next step.

In next step,

$5A + 2 = CA$.

Hence the possible values of A are 2 or 7. The multiplication is as follows:

$$\begin{array}{r} 2575 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 125375 \\ \hline \end{array}$$

If $B = 0$, then $B \times 5 = 0 \times 5$

$B \times 5 = 0$

In next step, $5 \times A = CA$

Hence, the possible values of A are 0 and 5.

But, A cannot be equal to 0 as AB is a two-digit number.

Hence, A can be 5 only.

The multiplication is as follows:

$$\begin{array}{r} 50 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 250 \\ \hline \end{array}$$

Hence, there are three possible values of A, B and C

- (i) 5, 0 and 2 respectively.
- (ii) 2, 5 and 1 respectively
- (iii) 7, 5 and 3 respectively

7. $\begin{array}{r} AB \\ \times 6 \\ \hline \end{array}$

B B B

Solution:

We can see that multiplication 6 and B is a number whose ones digit is B again. So, the possible values of B are 0, 2, 4, 6 & 8.

If B = 0, then the product will be 0. Therefore, this value of B is not possible.

If B = 2, then $B \times 6 = 12$ and 1 will be a carry for the next step.

In next step,

$$6A + 1 = BB$$

$$6A + 1 = 22$$

$$6A = 21$$

Hence, any integer value of A is not possible. So B cannot be 2.

If B = 6, then $B \times 6 = 36$ and 3 will be a carry for the next step.

In next step,

$$6A + 3 = BB$$

$$6A + 3 = 66$$

$$6A = 63$$

Hence, any integer value of A is not possible. So B cannot be 6.

If B = 8, then $B \times 6 = 48$ and 4 will be a carry for the next step.

In next step,

$$6A + 4 = BB$$

$$6A + 4 = 88$$

$$6A = 84$$

Hence, any integer value of A is not possible. So B cannot be 8.

If B = 4, then $B \times 6 = 24$ and 2 will be a carry for the next step.

In next step,

$$6A + 2 = BB$$

$$6A + 2 = 44$$

$$6A = 42$$

Hence, A = 7.

The multiplication is as follows

7 4

$$\begin{array}{r} \times 6 \\ \hline 444 \\ \hline \end{array}$$

Hence, the possible values of A and B are 7 and 4 respectively.

8.

$$\begin{array}{r} A1 \\ + 1B \\ \hline B0 \\ \hline \end{array}$$

Solution:

We can see that addition of 1 and B is 0 which means that addition of 1 and B is a number whose one's digit is 0. This is possible only when digit B is 9.

In this case, addition of 1 and B is 10 and thus, 1 will be the carry for the next step.

In next step,

$$\begin{aligned} 1 + A + 1 &= 9 \\ A &= 9 - 1 - 1 \\ A &= 7 \end{aligned}$$

Therefore, the addition is as follows

$$\begin{array}{r} 71 \\ + 19 \\ \hline 90 \\ \hline \end{array}$$

Hence, the possible values of A and B are 7 and 9 respectively.

9.

$$\begin{array}{r} 2AB \\ + AB1 \\ \hline B18 \\ \hline \end{array}$$

Solution:

We can see that addition of B and 1 is 8 which means that addition of B and 1 is a number whose one's digit is 8. This is possible only when digit B is 7.

In next step,

$$A + B = 1$$

Clearly, A is equal to 4.

$4 + 7 = 11$ and 1 will be a carry for the next step.

In next step,

$$1 + 2 + A = B$$

$$1 + 2 + 4 = 7$$

Therefore, the addition is as follows

$$\begin{array}{r} 247 \\ +471 \\ \hline 718 \end{array}$$

The possible values of A and B are 4 and 7 respectively.

10.

$$\begin{array}{r} 12A \\ +6AB \\ \hline A09 \end{array}$$

Solution:

We can see that addition of A and B is 9 which means addition of A and B is a number whose one's digit is 9. But, the sum of two single digit numbers cannot be 19 so the sum can be 9 only. Therefore, there will not be any carry in this step.

In next step, $2 + A = 0$

It is possible only when $A = 8$.

$2 + 8 = 10$ and we get a carry 1 for the next step.

$$1 + 1 + 6 = A$$

Which gives $A = 8$

Also, $A + B = 9$

$$8 + B = 9$$

Which gives $B = 1$

Hence, the values of A and B are 8 and 1 respectively.

EXERCISE 16.2

1. If $21y5$ is a multiple of 9, where y is a digit, what is the value of y ?

Solution:

If a number is a multiple of 9, then the sum of its digits will be divisible by 9.

$$\begin{aligned}\text{Sum of digits of } 21y5 &= 2 + 1 + y + 5 \\ &= 8 + y\end{aligned}$$

Hence, $8 + y$ should be a multiple of 9.

So, possible value of y is 1.

2. If $31z5$ is a multiple of 9, where z is a digit, what is the value of z ?

Solution:

If a number is a multiple of 9, then the sum of its digits will be divisible by 9.

$$\begin{aligned}\text{Sum of digits of } 31z5 &= 3 + 1 + z + 5 \\ &= 9 + z\end{aligned}$$

Hence, $9 + z$ should be a multiple of 9.

So, possible values of z are 0 and 9.

3. If $24x$ is a multiple of 3, where x is a digit, what is the value of x ?

Solution:

If a number is a multiple of 3, then the sum of its digits will be divisible by 3.

$$\text{Sum of digits of } 24x = 6 + x$$

Hence, $6 + x$ should be a multiple of 3.

So, the possible values of x are 0, 3, 6, 9.

4. If $31z5$ is a multiple of 3, where z is a digit, what might be the values of z ?

Solution:

If a number is a multiple of 3, then the sum of its digits will be divisible by 3.

$$\begin{aligned}\text{Sum of digits of } 31z5 &= 3 + 1 + z + 5 \\ &= 9 + z\end{aligned}$$

Hence, $9 + z$ should be a multiple of 3.

So, the possible values of z are 0, 3, 6, 9.