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. 3 A

\+ 2 5

B 2

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,

3 7

\+ 2 5

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6 2

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

2. 4 A

\+ 9 8

C B 3

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,

4 5

+ 9 8

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1 4 3

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

3. 1 A

× A

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9 A

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.

5 0

$\times$ 3

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1 5 0

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

6. A B

$\times$ 5

C A B

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:

2 5 7 5

$\times$ 5 $\times$ 5

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1 2 5 3 7 5

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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:

5 0

$\times$ 5

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2 5 0

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. A B

$\times$ 6

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

× 6

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4 4 4

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

8. A 1

+ 1 B

B 0

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,

$1 + A + 1 = 9$

$A = 9 - 1 - 1$

$A = 7$

Therefore, the addition is as follows

7 1

+1 9

---

9 0

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

9. 2 A B

+ A B 1

B 1 8

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

2 4 7

+4 7 1

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7 1 8

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

10. 1 2 A

+ 6 A B

A 0 9

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.

Sum of digits of 21y5 = 2 + 1 + y + 5

= 8 + y

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.

Sum of digits of 31z5 = 3 + 1 + z + 5

= 9 + z

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.

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.

Sum of digits of 31z5 = 3 + 1 + z + 5

= 9 + z

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

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