

NCERT Solutions for Class 8 Maths Chapter 16 Playing with Numbers

Exercise 16.1

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

1.

$$\begin{array}{r} 3 \quad A \\ + 2 \quad 5 \\ \hline B \quad 2 \\ \hline \end{array}$$

Solution:

Say, $A = 7$ and we get,

$$7 + 5 = 12$$

In which one's place is 2.

Therefore, $A = 7$

And putting 2 and carry over 1, we get

$$B = 6$$

Hence **$A = 7$ and $B = 6$**

2.

$$\begin{array}{r} 4 \quad A \\ + 9 \quad 8 \\ \hline CB \quad 3 \\ \hline \end{array}$$

Solution:

If $A = 5$ and we get,

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$8 + 5 = 13$ in which ones place is 3.

Therefore, $A = 5$ and carry over 1 then

$B = 4$ and $C = 1$

Hence, **$A = 5$, $B = 4$ and $C = 1$**

3.

$$\begin{array}{r} 1 \quad A \\ \times \quad A \\ \hline 9 \quad A \\ \hline \end{array}$$

Solution:

On putting $A = 1, 2, 3, 4, 5, 6, 7$ and so on and we get,

$A \times A = 6 \times 6 = 36$ in which ones place is 6.

Therefore, **$A = 6$**

4.

$$\begin{array}{r} A \quad B \\ + 3 \quad 7 \\ \hline 6 \quad A \\ \hline \end{array}$$

Solution:

Here, we observe that $B = 5$ so that $7 + 5 = 12$

Putting 2 at ones place and carry over 1 and $A = 2$, we get

$2 + 3 + 1 = 6$

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Hence **A = 2** and **B = 5**

5.

$$\begin{array}{r} A \quad B \\ \times \quad 3 \\ \hline C \quad A \quad B \\ \hline \end{array}$$

Solution:

Here on putting $B = 0$, we get $0 \times 3 = 0$.

And $A = 5$, then $5 \times 3 = 15$

$A = 5$ and $C = 1$

Hence **A = 5, B = 0 and C = 1**

6.

$$\begin{array}{r} A \quad B \\ \times \quad 5 \\ \hline C \quad A \quad B \\ \hline \end{array}$$

Solution:

On putting $B = 0$, we get $0 \times 5 = 0$ and $A = 5$, then $5 \times 5 = 25$

$A = 5, C = 2$

Hence **A = 5, B = 0 and C = 2**

7.

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$$\begin{array}{r} A \quad B \\ \times \quad 6 \\ \hline B \quad B \quad B \end{array}$$

Solution:

Here product of B and 6 must be same as ones place digit as B.

$$6 \times 1 = 6, 6 \times 2 = 12, 6 \times 3 = 18, 6 \times 4 = 24$$

On putting $B = 4$, we get the ones digit 4 and remaining two B's value should be 44.

$$\text{Therefore, for } 6 \times 7 = 42 + 2 = 44$$

Hence **A = 7 and B = 4**

8.

$$\begin{array}{r} A \quad 1 \\ + 1 \quad B \\ \hline B \quad 0 \end{array}$$

Solution:

On putting $B = 9$, we get $9 + 1 = 10$

Putting 0 at ones place and carry over 1, we get for $A = 7$

$$7 + 1 + 1 = 9$$

Hence, **A = 7 and B = 9**

9.

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$$\begin{array}{r}
 2 \quad A \quad B \\
 + A \quad B \quad 1 \\
 \hline
 B \quad 1 \quad 8 \\
 \hline
 \end{array}$$

Solution:

On putting $B = 7$, we get $7 + 1 = 8$

Now $A = 4$, then $4 + 7 = 11$

Putting 1 at tens place and carry over 1, we get

$$2 + 4 + 1 = 7$$

Hence, **$A = 4$ and $B = 7$**

10.

$$\begin{array}{r}
 1 \quad 2 \quad A \\
 + 6 \quad A \quad B \\
 \hline
 A \quad 0 \quad 9 \\
 \hline
 \end{array}$$

Solution:

Putting $A = 8$ and $B = 1$, we get

$$8 + 1 = 9$$

Now, again we add $2 + 8 = 10$

Tens place digit is '0' and carry over 1. Now $1 + 6 + 1 = 8 = A$

Hence **$A = 8$ and $B = 1$**

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Exercise 16.2

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

Solution:

Suppose 21y5 is a multiple of 9.

Therefore according to the divisibility rule of 9, the sum of all the digits should be a multiple of 9.

That is, $2 + 1 + y + 5 = 8 + y$

Therefore, $8 + y$ is a factor of 9.

This is possible when $8 + y$ is any one of these numbers 0, 9, 18, 27, and so on

However, since y is a single digit number, this sum can be 9 only.

Therefore, the value of y should be 1 only i.e. $8 + y = 8 + 1 = 9$.

2. If 31z5 is a multiple of 9, where z is a digit, what is the value of z? You will find that there are two answers for the last problem. Why is this so?

Solution:

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Since, $31z5$ is a multiple of 9.

Therefore according to the divisibility rule of 9, the sum of all the digits should be a multiple of 9.

$$3 + 1 + z + 5 = 9 + z$$

Therefore, $9 + z$ is a multiple of 9

This is only possible when $9 + z$ is any one of these numbers: 0, 9, 18, 27, and so on.

This implies, $9 + 0 = 9$ and $9 + 9 = 18$

Hence 0 and 9 are two possible answers.

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

(Since $24x$ is a multiple of 3, its sum of digits $6 + x$ is a multiple of 3; so $6 + x$ is one of these numbers: 0, 3, 6, 9, 12, 15, 18, But since x is a digit, it can only be that $6 + x = 6$ or 9 or 12 or 15. Therefore, $x = 0$ or 3 or 6 or 9. Thus, x can have any of four different values.)

Solution: Let's say, $24x$ is a multiple of 3.

Then, according to the divisibility rule of 3, the sum of all the digits should be a multiple of 3.

$$2 + 4 + x = 6 + x$$

So, $6 + x$ is a multiple of 3, and $6 + x$ is one of these numbers: 0, 3, 6, 9, 12, 15, 18 and so on.

Since, x is a digit, the value of x will be either 0 or 3 or 6 or 9, and the sum of the digits can be 6 or 9 or 12 or 15 respectively.

Thus, x can have any of the four different values: 0 or 3 or 6 or 9.

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

Solution: Since $31z5$ is a multiple of 3.

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Therefore according to the divisibility rule of 3, the sum of all the digits should be a multiple of 3.

That is, $3 + 1 + z + 5 = 9 + z$

Therefore, $9 + z$ is a multiple of 3.

This is possible when the value of $9 + z$ is any of the values: 0, 3, 6, 9, 12, 15, and so on.

At $z = 0$, $9 + z = 9 + 0 = 9$

At $z = 3$, $9 + z = 9 + 3 = 12$

At $z = 6$, $9 + z = 9 + 6 = 15$

At $z = 9$, $9 + z = 9 + 9 = 18$

The value of $9 + z$ can be 9 or 12 or 15 or 18.

Hence 0, 3, 6 or 9 are four possible answers for z .