NCERT SOLUTIONS

CLASS - 8TH

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Class : 8th
Subject : Maths
Chapter : 16
Chapter Name : Playing with Numbers

Exercise 16.1

Q1 Find the values of the letters in the following and give reasons for the steps involved.

$$\begin{array}{r} 3A \\ +25 \\ \hline B2 \\ \hline \end{array}$$

Answer. The addition Of A and 5 is giving 2 i.e., a number whose ones digit is 2. This is possible only when digit A is 7. In that case, the addition of A (7) and 5 will give 12 and thus, 1 will be the carry for the next step. In the next Step, 1+3+2=6 Therefore, the addition is as follows.

$$\begin{array}{r} 37 \\ +25 \\ \hline 62 \\ \end{array}$$

Clearly, B is 6.
Hence, A and B are 7 and 6 respectively.

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Q2 Find the values of the letters in the following and give reasons for the steps involved.

Answer. The addition of A and 8 is giving 3 i.e., a number whose ones digit is 3. This is possible only when digit A is 5. In that case, the addition of A and 8 will give 13 and thus, 1 will be the carry for the next step. In the next step, $1 + 4 + 9 = 14$
Therefore, the addition is as follows.

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

Clearly, B and C are 4 and 1 respectively.
Hence, A, B, and C are 5, 4, and 1 respectively.

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Q3 Find the values of the letters in the following and give reasons for the steps involved

Answer. The multiplication of A With A itself gives a number whose ones digit iS A again. This happens only when A = 1, 5, or 6.
If A = 1, then the multiplication Will be 11 x 11. However. here the tens digit given as 9.
Therefore, A = 1 is not possible. Similarly, if A = 5, then the multiplication be 15 x 5 = 75. Thus. A = 5 is also not possible.
If we take A = 6, then 16 x 6 = 96. Therefore. A should be 6.
The multiplication is as follows:

$$\begin{array}{r} 16 \\ \times \quad 6 \\ \hline 96 \end{array}$$

Hence the value of A is 6.

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Q4 Find the values of the letters in the following and give reasons for the steps involved

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

Answer. The addition Of A and 3 is giving 6. There can be two cases.
(1) First step is not producing a carry
In that case, A comes to be 3 as 3 + 3 = 6. Considering the first step in which the addition of B and 7 is giving A (i.e.,3), B should be a number such that the units digit of this addition comes to be 3. It is possible only when 3 = 6. In this case, A = 6 + 7 = 13. However, A is a single digit number. Hence, it is not possible.
(2) First Step is producing a carry In that case, A comes to be 2 as 1 + 2 + 3 — 6. Considering the first step in which
the addition of B and 7 is giving A (i.e., 2), a should be a number such that the units digit of this addition comes to be 2. It is possible only when a — 5 and 5 + 7 = 12.

$$\begin{array}{r} 2\ 5 \\ +\ 3\ 7 \\ \hline 6\ 2 \end{array}$$

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

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Q5 Find the values of the letters in the following and give reasons for the steps involved.

$$\begin{array}{r} AB \\ \times \quad 3 \\ \hline CAB \\ \hline \end{array}$$

Answer. The multiplication of 3 and B gives a number whose ones digit is B again.
Hence, B must be O or 5.
Let a is 5.

Multiplication of first step = 3 x 5 — 15
1 will be a carry for the next step.
h ave, 3 x A + 1 = CA
This is not possible for any value of A.
Hence, B must be O only. If B O, then there will be no carry for the next step.
We should obtain, 3 x A — CA
That is, the one's digit of 3 x A should be A. This is possible when A = 5 or 0.
However, A cannot be 0 as AB is a two-digit number.
Therefore, A must be 5 only. The multiplication is as follows.

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

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

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Q6 Find the values of the letters in the following and give reasons for the steps involved.

$$\begin{array}{r} AB \\ \times \quad 5 \\ \hline CAB \end{array}$$

Answer. The multiplication of 3 and 5 is giving a number whose ones digit is B again. This is possible when B 5 Or B O only.
In case of 3 = 5, the product, B x 5 =5 x 5 =25
2 will be a carry for the next Step.
We have, 5 x A + 2 = CA, which is possible for A = 2 or 7
The multiplication is as follows.

$$\begin{array}{r} 25 \\ \times 5 \\ \hline 125 \end{array} \qquad \begin{array}{r} 75 \\ \times \quad 5 \\ \hline 375 \end{array}$$

If B=0
$B \times 5 = B \Rightarrow 0 \times 5 = 0$
There will not be any carry in this step.
In the next step, 5 x A = CA
It can happen only when A = 5 or A = 0
However, A cannot be 0 as AB is a two-digit number. Hence, A can be 5 only. The multiplication is as follows.

$$\begin{array}{r} 50 \\ \times \quad 5 \\ \hline 250 \end{array}$$

Hence, there are 3 possible values of A, B, and C.
(i) 5, O, and 2 respectively
(ii) 2, 5, and 1 respectively
(iii) 7, 5, and 3 respectively

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Q7 Find the values of the letters in the following and give reasons for the steps involved.

$$\begin{array}{r} AB \\ \times \quad 6 \\ \hline BBB \\ \hline \end{array}$$

Answer. The multiplication of 6 and B gives a number whose one's digit is B again.
It is possible only when B = 0, 2, 4, 6, or 8
If B = 0 then the product will be 0. Therefore, this value of B is not possible.
If B = 2, then B x 6 = 12 and 1 will be a carry for the next step.
6A+ 1 = BB = 22 6A => 21 and hence, any integer value of A is not possible.
If B=6 , then B x 6 =36 and 3 will be a carry for the next Step.
6A=3 =BB = 66 =>6A = 63 and hence, any integer value of A is not possible.
, then B x 6 48 and 4 will be a carry for the next step.
6A+4 = BB= 6A=> 84 and hence, A = 14. However, A is a single digit number. Therefore, this value of A is not possible.
If B = 4 , then B x 6 = 24 and 2 will be a carry for the next step.
6A+2 = BB=> 6A = 42 and hence, A =7
The multiplication is as follows.

$$\begin{array}{r} 74 \\ \times \quad 6 \\ \hline 444 \end{array}$$

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

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Q8 Find the values Of the letters in the following and give reasons for the steps involved.

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

Answer. The addition of 1 and B is giving 0 i.e., a number whose ones digits is 0. This is possible only when digit B is 9. In that case, the addition of 1 and B will give 10 and thus, 1 will be the carry for the next step. In the next step,
$1 + A + 1 = B$
Clearly , A is 7 as $1 + 7 + 1 = 9 = B$
Therefore, the addition is as follows.

$$\begin{array}{r} 7 \quad 1 \\ + \quad 1 \quad 9 \\ \hline 90 \end{array}$$

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

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Q9 Find the values of the letters in the following and give reasons for the steps involved.

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

Answer. The addition of B and 1 is giving 8 i.e., a number whose ones digits is 8. This is possible only when digit B is 7. In that case, the addition of B and 1 will give 8. In the next step,
A+B=1;
Clearly, A is 4.
4 + 7 = 11 and 1 will be a carry for the next step. In the next step,
1+2+A=B
1+2+4=7
Therefore, the addition is as follows.

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

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

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Q10 Find the values of letters in the following and give reasons for the steps involved.

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

Answer. The addition of A and 3 is giving 9 i.e., a number whose ones digits is 9. The sum can be 9 only as the sum of two single digit numbers cannot be 19. Therefore, there will not be any carry in this step.
In the next step, 2 + A = 0
It is possible only when A = 8
2 + 8 = 10 and 1 will be the carry for the next step.
Clearly, A is 8. We know that the addition of A and B is giving 9. As A is 8, therefore,
Therefore, the addition is as follows.

$$\begin{array}{r} 128 \\ +\ 681 \\ \hline 809 \end{array}$$

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Exercise 16.2

Q1 If 21y5 is a multiple of 9, where y is a digit, what is the value of y?

Answer. 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.
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, y should be 1 only.

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Q2 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?

Answer. 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.
This is possible when 9 + z is any one of these numbers 0, 9, 18, 27, and so on .
However, since z is a single digit number, this sum can be either 9 or 18. Therefore, z should be either 0 or 9.

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Q3 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.)

Answer. Since 24x is a multiple of 3, the sum of its digits is a multiple of 3. Sum of digits of 24x 2 +4 + 6 + x Hence, 6 + x is a multiple of 3.
This is possible when 6 + x is any one of these numbers 0, 3, 6, 9, and so on
Since x is a single digit number, the sum of the digits can be 6 or 9 or 12 or 15 and thus, the value of x comes to O or 3 or 6 or 9 respectively.
Thus, x can have its value as any of the four different values O, 3, 6, or 9.

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Q4 If 31z5 is a multiple of 3, where z is a digit, what might be the values of z

Answer. Since 31z5 is a multiple of 3, the sum of its digits will be a multiple of 3.
That is, 3+1 + z + 5 = 9 + z is a multiple of 3.
This is possible when 9 + z is any one of 0, 3, 6, 9, 12, 15, 18, and so on
Since z is a single digit number, the value of 9 + z can only be 9 or 12 or 15 or 18 and thus, the value of x comes to O or 3 or 6 or 9 respectively.
Thus, z can have its value as any one of the four different values 0, 3, 6, or 9.