

Exercise 16.1

Question 1:

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

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

Answer 1:

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

$7 + 5 = 12$ in which ones place is 2.

$\therefore A = 7$

And putting 2 and carry over 1, we get

$B = 6$

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

Question 2:

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

$$\begin{array}{r} 4 \ A \\ + \ 9 \ 8 \\ \hline C \ B \ 3 \end{array}$$

Answer 2:

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

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

$\therefore A = 5$

And putting 3 and carry over 1, we get

$B = 4$ and $C = 1$

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

Question 3:

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

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

Answer 3:

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.

$\therefore A = 6$

Hence, $A = 6$

Question 4:

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

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

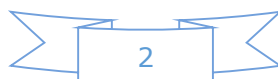
Answer 4:

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

$2 + 3 + 1 = 6$

Hence, $A = 2$ and $B = 5$



Question 5:

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

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

Answer 5:

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

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

$\Rightarrow A = 5$ and $C = 1$

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

Question 6:

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

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

Answer 6:

On putting $B = 0$, we get

$0 \times 5 = 0$ and $A = 5$, then $5 \times 5 = 25$

$\Rightarrow A = 5$, $C = 2$

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

Question 7:

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

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

Answer 7:

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.

$$\therefore \quad \text{For } 6 \times 7 = 42 + 2 = 44$$

Hence, A = 7 and B = 4

Question 8:

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

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

Answer 8:

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

Putting 0 at ones place and carry over 1, we get

For A = 7

$$\Rightarrow 7 + 1 + 1 = 9$$

Hence, A = 7 and B = 9



Question 9:

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

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

Answer 9:

On putting $B = 7$,

$$\Rightarrow 7 + 1 = 8$$

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 $B = 7$

Question 10:

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

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

Answer 10:

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.

$$\text{Now } 1 + 6 + 1 = 8 = A$$

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

Exercise 16.2

Question 1:

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

Answer 1:

Since $21y5$ 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.

$$\therefore 2+1+y+5=8+y$$

$$\Rightarrow 8+y=9$$

$$\Rightarrow y=1$$

Question 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?

Answer 2:

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.

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

$$\Rightarrow 9+z=9$$

$$\Rightarrow z=0$$

$$\text{If } 3+1+z+5=9+z$$

$$\Rightarrow 9+z=18$$

$$\Rightarrow z=9$$

Hence, 0 and 9 are two possible answers.

Question 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.)

Answer 3:

Since $24x$ is a multiple of 3.

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

$$\therefore 2 + 4 + x = 6 + x$$

Since x is a digit.

$$\Rightarrow 6 + x = 6 \quad \Rightarrow \quad x = 0$$

$$\Rightarrow 6 + x = 9 \quad \Rightarrow \quad x = 3$$

$$\Rightarrow 6 + x = 12 \quad \Rightarrow \quad x = 6$$

$$\Rightarrow 6 + x = 15 \quad \Rightarrow \quad x = 9$$

Thus, x can have any of four different values.

Question 4:

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

Answer 4:

Since $31z5$ is a multiple of 3.

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

Since z is a digit.

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

$$\Rightarrow 9 + z = 9 \quad \Rightarrow \quad z = 0$$

$$\text{If } 3 + 1 + z + 5 = 9 + z$$

$$\Rightarrow 9 + z = 12 \quad \Rightarrow \quad z = 3$$

$$\text{If } 3 + 1 + z + 5 = 9 + z$$

$$\Rightarrow 9 + z = 15 \quad \Rightarrow \quad z = 6$$

$$\text{If } 3 + 1 + z + 5 = 9 + z$$

$$\Rightarrow 9 + z = 18 \quad \Rightarrow \quad z = 9$$

Hence, 0, 3, 6 and 9 are four possible answers.