Exercise 16.1

Question 1:

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

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

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.

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

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 x A = 6 x 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 x 3 = 0.

And A = 5, then 5 x 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 x 5 = 0 and A = 5, then 5 x 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 x 1 = 6, 6 x 2 = 12, 6 x 3 = 18, 6 x 4 = 24

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

$\therefore$ For 6 x 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.

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.

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

$\Rightarrow \quad 8+y=9$

$\Rightarrow \quad y=1$

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.

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

$\Rightarrow \quad 9+z=9$

$\Rightarrow \quad z=0$

If $\quad 3+1+z+5=9+z$

$\Rightarrow \quad 9+z=18$

$\Rightarrow \quad z=9$

Hence, 0 and 9 are two possible answers.

Question 3:

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

(Since 24*x* 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.

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

Since x is a digit.

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

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

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

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

Thus, x can have any of four different values.

Question 4:

If 31*z*5 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.

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

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

If $\quad 3+1+z+5=9+z$

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

If $\quad 3+1+z+5=9+z$

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

If $\quad 3+1+z+5=9+z$

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

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