CHAPTER 16

Playing with Numbers

Illustrations:

Q1. Write in the regular form

(i) (100 x 6) + (10 x 0) + (1 x 5)

(ii) (100 x 5) + (10 x 7) + (1 x 7)

Sol.

The regular forms of the given numbers are

(i) (100 x 6) + (10 x 0) + (1 x 5) = 605

(ii) (100 x 5) + (10 x 7) + (1 x 7) = 577

Q2. If the first and last digits of a 3 – digit number differ by 2. Find the difference between the number and that obtained by reversing its digits.

Sol.

For |(a – c)| = n, then the difference is 99n

For |(a – c)| = 2, then the difference is 99 x 2 = 198

Q3. Write the following numbers in expanded form and then do the same for the number you get by reversing the digits.

(i) 87 (ii) 778

Sol.

(i) ab = 87 = (8 x 10) + (7 x 1)

ba = 78 = (7 x 10) + (8 x 1)

(ii) abc = 778 = (7 x 100) + (7 x 10) + (8 x 1)

cba = 877 = (8 x 100) + (7 x 10) + (7 x 1)

Q4. Find the unknown values in the following.

(i)

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

(ii)

$$\begin{array}{r|l} & C\ D \\ \hline 4 & 3\ A\ B \\ & 2\ D \\ \hline & 3\ B \\ & 3\ B \\ \hline & 0 \\ \hline \end{array}$$

Sol.

(i) 5 x C gives C, the value of 'C' has to be '0' or '5'.

If C = 0, the next product $B \times 5 \neq 5$. So, c has to be 5. So that there is a carry-over of 2.

B x 5 + 2 = B $\Rightarrow$ B can be 2. A has to be 1 as there are only 3 digits in the product. D can be 6, 7, 8 or 9. D = 6 means that the carry – over was 1.

If D = 7, 8 or 9, we will not get the same value for B in both the places.

Therefore, the solution is 125 x 5 = 625

The values are A = 1, B = 2, C = 5 and D = 6

(ii) From the given division 3A – 2D = 3.

Therefore, A < D as only then there will be no need to borrow.

4 x C = 24 or 28. If 4 x C = 24, then C = 6 and D = 4

But ‘D’ cannot be ‘4’ as 4 x D = 3B. 4 x 4 = 16, which is not 3B.

So, 4 x C must be 28, which means C = 7

4 x 8 and 4 x 9 will give 32 and 36 respectively.

Let D be 8. Then A = 1 and the division is satisfied. The values are A = 1, B = 2, C = 7 and D = 8.

Q5.

Solve the following cryptarithm.


```
  A  B
x    4
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C  A  B
-------
```

Sol.

We have,

```
  A  B
x    4
-------
C  A  B
-------
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This means, 4 x B is a number whose units digit is B. Clearly, there is no such digit. Hence, the given cryptarithm has no solution.

Q6.

If 31Z5 is a multiple of 3. Where Z is a digit, what might be the values of Z?

Sol.

As the given number 31Z5 is a multiple of 3, the sum of its digits should also be a multiple of 3.

$\therefore 3 + 1 + Z + 5$ is a multiple of 3.

$\Rightarrow Z + 9$ is a multiple of 3.

Now, for Z to be a single digit number.

$Z + 9 = 9, 12, 15, 18$

Hence, Z = 0 (or) 3 (or) 6 (or) 9.