

CHAPTER 16

Playing with Numbers

Letters for digits or Cryptarithms:

- A ‘Cryptarithms’ is a kind of mathematical puzzle in which the digits of a number are represented by letters of the alphabet or other symbols such that no two letters or symbols represent the same numeral in a puzzle.
- The art of creating and solving cryptarithms is called ‘Cryptarithmic’.
- Cryptarithmic is also known as verbal arithmetic or letter arithmetic.

Conventions to be followed in building cryptarithms:

- Each letter represents a different digit throughout the puzzle.
- No number can begin with zero, that is we cannot have numbers such as 045 or 0056.
- When the letters are replaced with numerals, the arithmetical operation carried out should be correct.
- A good puzzle must have a single solution.

Points to remember while solving cryptarithms:

- When two numbers are added, the total is always less than or equal to 18.
- Try to locate the 0’s, 1’s and 9’s.

- You may not get the numbers in the first attempt. Find the possibilities and tryout the digits.

Ex.

- (i) Find the unknown values in the following.

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

- (ii)

$$\begin{array}{r} 5 6 A \\ + 4 A 3 \\ \hline 1 0 4 0 \end{array}$$

Sol.

- (i) The sum is a 3 digit number, the sum of A and C should be greater than or equal to 10.

$$B + 7 = A \Rightarrow (B, A) \text{ can be,}$$

(4, 1) or (5, 2) or (6, 3) or (7, 4) or (8, 5) or (9, 6)

If $B = 4$ and $A = 1$, then $C = 9$. The other pairs will not satisfy the sum. Therefore, the sum is $14 + 97 = 111$.

Hence, the values are $A = 1$, $B = 4$ and $C = 9$.

- (ii) Here, we have to find the value of letter 'A'.

In one's column: $A + 3 = 0$.

i.e. One's digit is '0'. So, value of 'A' should be '7'. So, the puzzle can be solved as given below.

$$\begin{array}{r} 56\textcircled{7} \\ + 4\textcircled{7}3 \\ \hline 1040 \end{array}$$

