

CHAPTER 05

Arithmetic Progressions

Introduction:

In our earlier classes, we have come across various number patterns. Some of them are given as follows:

- I. 1, 4, 7, 10,.....
- II. 20, 15, 10
- III. $\sqrt{3}$, $2\sqrt{3}$, $3\sqrt{3}$, $4\sqrt{3}$

In (I), successor number is obtained by adding '3' to the previous number.

In (II), successor number is obtained by subtracting '5' from the previous number.

In (III), successor number is obtained by adding $\sqrt{3}$ to the previous number.

Such patterns are also called sequence. In each of the above sequence, the next number can be obtained by some particular rule. A sequence is a succession of numbers or terms formed according to some rule.

The numbers occurring in the sequence are called its terms. The terms of a sequence can be denoted by

$$a_1, a_2, a_3, \dots \text{ etc.}$$

Where a_1 is called first term, a_2 second term, a_3 third term and so on.

The n^{th} term of a sequence is denoted by a_n .

Example:

For sequence,

$$1, 4, 9, 16, 25, \dots$$

$$a_1 = 1 = 1^2$$

$$a_2 = 4 = 2^2$$

$$a_3 = 9 = 3^2$$

$$a_4 = 16 = 4^2$$

$$a_5 = 25 = 5^2$$

.....

.....

$$a_n = \dots n^2$$