

# CBSE Class 10 Maths Notes Chapter 5 Arithmetic Progressions

## SEQUENCE:

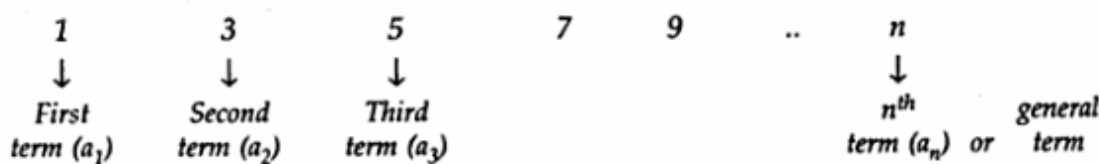
A sequence is an arrangement of numbers in a definite order and according to some rule.

**Example:** 1, 3, 5, 7, 9, ... is a sequence where each successive item is 2 greater than the preceding term and 1, 4, 9, 16, 25, ... is a sequence where each term is the square of successive natural numbers.

## TERMS :

The various numbers occurring in a sequence are called 'terms'. Since the order of a sequence is fixed, therefore the terms are known by the position they occupy in the sequence.

**Example:** If the sequence is defined as



## ARITHMETIC PROGRESSION (A.P.):

An Arithmetic progression is a special case of a sequence, where the difference between a term and its preceding term is always constant, known as common difference, i.e.,  $d$ . The arithmetic progression is abbreviated as A.P.

The general form of an A.P. is

$\therefore a, a + d, a + 2d, \dots$  For example, 1, 9, 11, 13.., Here the common difference is 2. Hence it is an A.P.

In an A.P. with first term  $a$  and common difference  $d$ , the  $n$ th term (or the general term) is given by .

$$a_n = a + (n - 1)d.$$

...where [ $a$  = first term,  $d$  = common difference,  $n$  = term number

**Example:** To find seventh term put  $n = 7$

$$\therefore a_7 = a + (7 - 1)d \text{ or } a_7 = a + 6d$$

The sum of the first  $n$  terms of an A.P. is given by

$$S_n = \frac{n}{2}[2a + (n - 1)d] \text{ or } \frac{n}{2}[a + 1]$$

where,  $1$  is the last term of the finite AP.

If  $a, b, c$  are in A.P. then  $b = \frac{a+c}{2}$  and  $b$  is called the arithmetic mean of  $a$  and  $c$ .