



Revision Notes
Class - 10 Maths
Chapter 5 - Arithmetic Progression

Definition of Arithmetic Progression

- An arithmetic progression is a sequence of numbers, obtained by **adding** a fixed number to the preceding term starting from the first term such that the difference between each consecutive term remains the same.
- Each of the numbers in the list is called a term and the fixed number is called the common difference of the AP which can be any integer.

For example: 2,5,8,11.... having common difference of 3.

General term of an AP

1. The general form of an AP is:

$$a, a + d, a + 2d, a + 3d, \dots, a + (n - 1)d$$

2. An AP with finite number of terms is called a **finite** AP having $a + (n - 1)d$ as the last term. An AP which neither has a finite number of terms nor has a last term is called an **infinite** AP.

For example:

a) Finite AP: 1,3,5,7,.....,25

b) Infinite AP: 2,4,6,8..... ∞



3. The n^{th} term of the AP: $a_n = a + (n - 1)d$, where a is the **first** term of the sequence and d is the common difference.

The **Second** term: $a_2 = a + (2 - 1)d = a + d$

Similarly, the **third** term $a_3 = a + (3 - 1)d = a + 2d$

The **fourth** term $a_4 = a + (4 - 1)d = a + 3d$ and so on till the last term.

Example 1:

An AP has a first term 3, common difference 4. Find the third and fifth term of the AP.

Solution:

$$a = 3, d = 4$$

$$a_3 = 3 + (3 - 1)4$$

$$a_3 = 11$$

Similarly,

$$a_5 = 3 + (5 - 1)4$$

$$a_5 = 19$$

4. n^{th} term of an AP from the end: $t_n = L - (n - 1)d$, where L is the last term of the AP.

Example 2:

An AP has a common difference 2 and last term 24. Find the fourth term of the AP from the end.

**Solution:**

$$d = 2, L = 24$$

$$t_4 = 24 - (4 - 1)2$$

$$t_4 = 18$$

Sum of the terms of an AP

1. Sum of n terms of an AP if first term and common difference is given:

$$S = \frac{n}{2}(2a + (n - 1)d)$$

2. Sum of n terms of an AP if first term and last term l is given:

$$S = \frac{n}{2}(a + l)$$

Example 3:

Find the sum of first 10 terms of the AP 1, 4, 7, 10, ..., 34.

Solution:

$$S = \frac{10}{2}(2 \times 1 + (10 - 1)3)$$

$$= 5(2 + 27)$$

$$= 5 \times 29$$

$$= 145$$