

Arithmetic Progression (A.P)

Syllabus.

- Derivation of n^{th} term
- Sum of first n -terms of an A.P
- Their application in solving daily life problems.

Arithmetic progression

- An A.P is a sequence of numbers in which the difference between consecutive terms is constant.
- The constant term is called Common difference (d).

General form of an A.P

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

where a = first term
 d = common difference

$$T_n = a + (n-1)d$$

where n = no. of terms, T_n = n^{th} term.

Key properties.

- If $d > 0$: AP is increasing
 - If $d < 0$: AP is decreasing
 - If $d = 0$: All terms are equal.
- $$d = T_2 - T_1$$

$$\text{Common difference } (d) = 2^{\text{nd}} \text{ term} - 1^{\text{st}} \text{ term}$$

- Any three consecutive terms of an A.P can be written as $a-d, a, a+d$
- Any four = $a-3d, a-d, a+d, a+3d$

☀ Sum of n -terms of an A.P

$$S_n = \frac{n}{2} (a+l), \text{ where } l = \text{last term.}$$

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

☀ n th term from the end of an A.P

$$n\text{th term from the end} = l - (n-1)d$$

☀ finding n th term, when S_n is given.

$$t_n = S_n - S_{n-1}$$

— The end —