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Chapter

Arithmetic Progression

Key Points

1. **Sequence**: A set of numbers arranged in some definite order and formed according to some rules is called a sequence.
2. **Arithmetic Progression**: A sequence in which the difference of each term from its succeeding term is constant throughout, is called an arithmetic sequence or arithmetic progression (A.P.).

   In other words A.P. is squence $a_1, a_2, a_3, \ldots\ldots\ldots, a_n$ such that $a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = \ldots\ldots\ldots a_n - a_{n-1} = d$ and so on.
3. **General Term**: If 'a' is the first term and 'd' is common difference in an A.P., then nth term (general term) is given by $\boldsymbol{a_n = a + (n-1)d.}$
4. **Sum of n Terms of an A.P**. : If 'a' is the first term and 'd' is the common difference of an A.P., then sum of first n terms is given by

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

   If 'a' is the first term & 'l' is the last/nth term of a finite A.P., then the sum is given by

$$S_n = \frac{n}{2}\{a + l\}$$

5. (i) If a_n is given, then common difference $d = a_n - a_{n-1}$

(ii) If $\mathbf{S_n}$ is given, then nth term is given by $\boldsymbol{a_n = S_n - S_n - 1}$

(iii) If a, b, c are in A.P., then $2b = a + c$

(iv) If a sequence has n terms, its rth term from the end = $(n-r+1)^{th}$ term from the beginning.

(v) Difference of mth and n^{th} term of an A.P. = $(m - n)d$.