Arithmetic Progressions

- **Sequence:** Numbers arranged in a definite order according to definite rule are said to be in a sequence.

- **Term:** Each number of a sequence is called a term.

- **n^{th} term:** The term occurring at the n^{th} place of a sequence is called its n"1 term, usually denoted by t_n.

- **Progressions:** Sequences that follow a definite pattern are called progressions.

- **Arithmetic progressions:** sequence in which each term differs from its preceding term by a fixed number (constant) is called an arithmetic progression, denoted as A.P.

- **Common Difference:** The fixed number by which any two successive terms of an A.P. differ is called the common difference of A.P. denoted by 'd'. So, $d = t_n - t_{n-1}$.
  An A.P. of 'n' terms with first term 'a' and common difference 'd' is a, a +d,...a +(n- 1)d.

- **Arithmetic series:** A series obtained by adding the terms of an A.P. is called an arithmetic series.

- **The general term (n^{th} term) of an A.P.:** If the first term of an A.P. is 'a' and the common

- difference is 'd', then its n111 term is given by $t_n = a + (n-1)d$.

- **The general term from the end of an A.P.:** If 'a' is the first term, 'd' the common difference and 'l' the last term of a given A.P., then its n^{th} term from the end is $l - (n-1)d$.

- **Selection of term of an A.P.:** Terms of an A.P. must be selected in such a way, that on taking the sum of the terms, one unknown is eliminated automatically.
  (a)To select three terms of an A.P. with common difference 'd', choose a - d, a, a + d.
  (b) To select four terms of an A.P. with common difference 2d, choose a - 3d, a - d, a + d, a + 3d.

- (c) To select five terms of an A.P. with common difference d, choose a - 2d, a - d, a, a + d, a + 2d.
  (d) To select six terms of an A.P. with common difference 2d, choose $a-5d,\ a-3d$, $a-d,\ a,\ a+d,\ a+3d,\ a+5d$

- **The sum to 'n' terms of an A.P.:** The sum of first 'n' terms of an A.P. is given by $S=\frac{n}{2}[2a+(n-1)d]$, where 'a' is the first term and 'd' is the common difference.

- **Arithmetic Mean:** If a, A and b are in A.P., then A is said to be the arithmetic mean (A.M.) between a and b. The arithmetic mean between two numbers 'a' and 'b' is given by $(a+b)/2$.