CHAPTER 06

Progressions

Synopsis:

General form of an Arithmetic Progression (A.P):

An A.P can be written as,

a, a + d, a + 2d, a + 3d, ... is called general form of an A.P.

Where, a = First term

d = Common difference (Fixed number)

Note:

- The first term of an A.P by a_1, second term by a_2, ..., n^{th} term by a_n. Then, A.P becomes $a_1, a_2, \ldots\ldots a_n$.

(And)

$$a_2 - a_1 = a_3 - a_2 = \ldots\ldots\ldots\ldots = a_n - a_{n-1} = d$$

- 'd' can be negative, positive or zero.
- To find the common difference 'd' between two consecutive terms, always subtract the preceding term from the succeeding term even if the succeeding term is smaller.

Example: 6, 3, 0, -3 .....

- If a, b and c are any three consecutive terms of an A.P, then $b - a = c - b \Rightarrow 2b = a + c$
- If the common difference of an A.P is zero. i.e. d = 0, then each term of the A.P will be same as the first term of the A.P.

  Example: 3, 3, 3, 3, 3,.....

- In the list of numbers $a_1, a_2, a_3, \ldots$ if the differences $a_2 - a_1$, $a_3 - a_2$, $a_4 - a_3$, ... Gives the same value.

  i.e. If $a_{k+1} - a_k$ is the same for different values of k, then the given list of numbers are in an A.P.