Arithmetic Progressions

- Look at the list of numbers 1, 3, 5, 7………
- Each of the numbers in the list is called a term.
- An arithmetic progression is a list of numbers in which each term is obtained by adding a fixed number to the preceding term except the first term.
- This fixed number is called the common difference of the AP. It can be positive, negative or zero
- The general form of an AP is: a , $a + d$, $a + 2d$, $a + 3d$, . . .
- An AP with finite number of terms is a finite AP. That means the AP has a last term.
- An AP which does not have finite number of terms is an infinite AP. That means the AP does not have a last term. n^{th} term of an AP:

Let $a_1, a_2, a_3,$…… Be an AP whose first term a_1 is a and the common difference is d.

Then,

The **Second** term $a_2 = a + d = a + \mathbf{(2 - 1)}\, d$

The **third** term $a_3 = a_2 + d = (a + d) + d = a + 2d = a + \mathbf{(3 - 1)}\, d$

The **fourth** term $a_4 = a_3 + d = (a + 2d) + d = a + 3d = a + \mathbf{(4 - 1)}\, d$

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Looking at the pattern, we can say that the n^{th} term $a_n = a + (n - 1)$ d.

So, **the n^{th} term a_n of the AP with first term a and common difference d is given by $a_n = a + (n - 1)\, d$.**

Sum on n terms in an AP:

The sum of the first n terms of an AP is given by S = – $(n \quad 1)d$