Arithmetic Progression(AP):-

- The difference between any two consecutive terms of an A.P. is always constant. That constant value is called the common difference.
- If there are finite numbers of terms in an A.P. then it is called Finite Arithmetic Progression. If there are infinitely many terms in an A.P. then it is called Infinite Arithmetic Progression.
- The common difference of an A.P. can be positive, negative or zero.
- An Arithmetic progression having a common difference of zero is called a constant arithmetic progression
- In a finite A.P. whose first term is *a* and last term *l*, then the number of terms in the A.P. is given by $l=a+(n-1)d$ gives $n = \left(\frac{l-a}{d}\right) + 1$

In an Arithmetic Progression

- If every term is added or subtracted by a constant, then the resulting sequence is also an A.P.
- If every term is multiplied or divided by a non-zero number, then the resulting sequence is also an A.P.
- If the sum of three consecutive terms of an A.P. is given, then they can be taken as $a - d$, a and $a + d$. Here the common difference is d.

- If the sum of four consecutive terms of an A.P. is given then, they can be taken as *a -3d, a-d, a+d* and *a* + 3d. Here common difference is 2*d*.
- If the first term *a*, and the last term *l* (n^{th} term) are given then $S_n = \frac{n}{2}[2a + (n-1)d] = \frac{n}{2}[a + a + (n-1)d]$ since, $l=a+(n-1)d$ we have $S_n = \frac{n}{2}[a + l]$
- If we consider the ratio of successive terms of the G.P. then we have $\frac{t_2}{t_1} = \frac{ar}{a} = r, \frac{t_3}{t_2} = \frac{ar^2}{a} = r, \frac{t_4}{t_3} = \frac{ar^3}{ar^2} = r, \frac{t_5}{t_4} = \frac{ar^4}{ar^3} = r$ Thus, the ratio between any two consecutive terms of the Geometric Progression is always constant and that constant is the common ratio of the given Progression.
- When the product of three consecutive terms of a G.P. are given, we can take the three terms as $\frac{a}{r}, a, ar$.
- When the products of four consecutive terms are given for a G.P. then we can take the four terms $\frac{a}{r^3}, \frac{a}{r}, ar, ar^3$.
- When each term of a Geometric Progression is multiplied or divided by a non– zero constant then the resulting sequence is also a Geometric Progression.
- The sum of first *n* natural numbers are also called Triangular Numbers because they form triangle shapes
- The sum of squares of first *n* natural numbers is also called Square Pyramidal Numbers because they form pyramid shapes with square base.