

## (1) Arithmetic progression (A.P.)

→ common diff. between two consecutive numbers.

ex:  $a, a+d, a+2d, a+3d, \dots$

Here first number =  $a$

common diff. =  $d$ .

→  $n^{\text{th}}$  term ( $T_n$ ) =  $a + (n-1)d$ .

→ sum of  $n$  terms ( $S_n$ ) =  $\frac{n}{2} [2a + (n-1)d]$

→  $\parallel \parallel \parallel = \frac{n}{2} (a + l)$ ;  $l$  is last term.

(1)  $(1+2+3+4+\dots+n) = \left\{ n \cdot \frac{(n+1)}{2} \right\}$

(2)  $(1^2+2^2+3^2+\dots+n^2) = \left[ \frac{n \cdot (n+1) \cdot (2n+1)}{6} \right]$

(3)  $(1^3+2^3+3^3+\dots+n^3) = \left[ \frac{n^2 \cdot (n+1)^2}{4} \right]$

⇒ Geometric Progression.

→ common ratio.

→ common ratio.

ex.  $a, ar, ar^2, ar^3, \dots$

$a$  = First term

$r$  = common ratio.

→  $n^{\text{th}}$  term =  $a r^{n-1}$

→ sum of  $n$  terms = 
$$\begin{cases} \frac{a(1-r^n)}{(1-r)} & ; \text{ if } r < 1 \\ \frac{a(r^n-1)}{(r-1)} & ; \text{ if } r > 1 \end{cases}$$

ex Find natural no. between 17 and 80 which is divisible by 6?

→  $18, 24, 30, \dots, 78$

$T_n = 78 \Rightarrow a + (n-1)d = 78$

$18 + (n-1)6 = 78 \Rightarrow n-1 = \frac{60}{6} \Rightarrow n=11$

ex <sup>sum of</sup> even numbers less than 75

→  $2 + 4 + 6 + \dots + 74$

A.P.  $a=2, d=2$   
 $l=74, n=37$   $\left\{ \begin{array}{l} R.S = \frac{n}{2} (a+l) \\ = \frac{37}{2} (2+74) \end{array} \right.$

$$= \frac{37}{2} \cdot 76 \Rightarrow 37 \cdot 38$$

$$= 37(40-2)$$

$$= 1480 - 74$$

$$= 1406 //$$

Ex Find Sum  $(2 + 2^2 + 2^3 + 2^4 \dots 2^{10})$

G.P  $a = 2$  ,  $r = \frac{2^2}{2} = \frac{4}{2} = 2 > 1$

$$\text{Req. sum} = \frac{a(r^n - 1)}{(r - 1)} = \frac{2(2^{10} - 1)}{(2 - 1)} = 2(1023) = 2046 //$$