

Sequence and Series

Arithmetic Progression (A.P)

Geometric Progression (G.P)

Special Series

In an A.P. difference of a term from its preceding term is constant, called common difference (d)

In a G.P. ratio of a term to its preceding term is a non zero constant, called common ratio (r)

If a, b, c are three consecutive terms of an A.P., then, $b-a=c-b=d$
 $2b=a+c$, b is called Arithmetic mean (A.M.) & $b=(a+c)/2$

n^{th} term is
 $T_n=a+(n-1)d$

Sum of n terms is
 $S_n=\frac{n}{2} \{2a+(n-1)d\}$

If l is last term then n^{th} term from end is $l-(n-1)d$

$$(1+2+3+\dots+n) = \frac{1}{2}n(n+1) = \sum_{k=1}^n k$$

$$(1^2+2^2+3^2+\dots+n^2) = \frac{1}{6}n(n+1)(2n+1) = \sum_{k=1}^n k^2$$

$$(1^3+2^3+3^3+\dots+n^3) = \left\{\frac{1}{2}n(n+1)\right\}^2 = \sum_{k=1}^n k^3$$

If a, b, c are three consecutive terms of a G.P., then, $b/a=c/b=r$
 $b^2=ac$, b is called Geometric Mean (G.M.) & $b=\pm\sqrt{ac}$

n^{th} term is
 $T_n=ar^{(n-1)}$

Sum of n terms is
 $S_n=\frac{a(1-r^n)}{(1-r)}, r<1$
 $=\frac{a(r^n-1)}{r-1}, r>1$

If l is last term then n^{th} term from end is $\frac{l}{r^{(n-1)}}$

Sum of an infinite GP series is $\frac{a}{(1-r)}, |r|<1$

Between same pair of positive no.s $AM>GM$