Sequences and Series

(i) nth term of an A.P. (Arithmetical Progression) T_n is given by
$T_n = a + (n - 1)\, d$, where a = first term, d = common difference

(ii) Sum of n terms of an A.P is given by

$S_n = \frac{n}{2}(2a + (n-1)\, d)$

or $S_n = \frac{n}{2}(a + a + (n-1)d)$

$= \frac{n}{2}(a + l)$, where l = last term = $a + (n-1)\, d$.

(iii) nth term of G.P (Geometrical progression) is given by
$T_n = ar^{n-1}$, where a = first term, r = common ratio

(iv) Sum of n terms of G.P is given by

$S_n = \frac{a(1-r^n)}{1-r}$ or $\frac{a(r^n-1)}{r-1}$, $r \neq 1$

(v) Sum of infinite G.P is given by

$S_\infty = \frac{a}{1-r}$, where a = first term, r = common ratio

(vi) $1 + 2 + 3 + \ldots\ldots\ldots\ldots + n = \Sigma n = \frac{n(n+1)}{2}$

(vii) $1^2 + 2^2 + 3^2 + \ldots\ldots\ldots\ldots + n^2 = \Sigma n^2 = \frac{n(n+1)(2n+1)}{6}$

(viii) $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots\ldots + n^3 = \Sigma n^3 = \left(\frac{n(n+1)}{2}\right)^2$