

Some Commonly-Used Summation Formulae

Polynomial Series

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4}$$

$$\sum_{i=1}^n i^4 = \frac{n(2n+1)(n+1)(3n^2+3n-1)}{30}$$

$$\sum_{i=1}^n i^5 = \frac{n^2(2n^2+2n-1)(n+1)^2}{12}$$

Geometric Series

$$\sum_{i=0}^n a^i = \frac{a^{n+1} - 1}{a - 1} \quad \text{for } a \neq 1$$