

Identities

Nothing written on this page will be graded.

Summations

$$\begin{aligned} \sum_{i=0}^{\infty} x^i &= \frac{1}{1-x} \text{ for } |x| < 1 \\ \sum_{i=0}^{n-1} &= \sum_{i=1}^n = n \\ \sum_{i=0}^n i &= 0 + \sum_{i=1}^n i = \frac{n(n+1)}{2} \\ \sum_{i=1}^n i^2 &= \frac{n(n+1)(2n+1)}{6} = \frac{n^3}{3} + \frac{n^2}{2} + \frac{n}{6} \\ \sum_{i=0}^n i^3 &= \left(\frac{n(n+1)}{2} \right)^2 = \frac{n^4}{4} + \frac{n^3}{2} + \frac{n^2}{4} \\ \sum_{i=0}^{n-1} x^i &= \frac{1-x^n}{1-x} \\ \sum_{i=0}^{n-1} \frac{1}{2^i} &= 2 - \frac{1}{2^{n-1}} \end{aligned}$$

Logs

$$\begin{aligned} x^{\log_x(n)} &= n \\ a^{\log_b(c)} &= c^{\log_b(a)} \\ \log_b(a) &= \frac{\log_d(a)}{\log_d(b)} \end{aligned}$$