

Summations

Gauss' Summation

$$\sum_{i=0}^n i = \frac{n(n+1)}{2}.$$

Infinite Geometric Series

$$\sum_{i=0}^{\infty} x^i = \frac{1}{1-x}.$$

Finite Geometric Series

$$\sum_{i=0}^n x^i = \frac{1-x^{n+1}}{1-x}.$$

A few more useful formulas, more can be found on the [slides from lecture 2](#)

logs

$$x^{\log_x n} = n$$

$$a^{\log_x n} = n^{\log_x a}$$