Geometric Series

https://github.com/Nazgand/nazgandMathBook

Mark Andrew Gerads: Nazgand@Gmail.Com

October 1, 2022

Abstract

The goal of this paper is to review Geometric Series.

Consider

$$b * \left(\sum_{k=a}^{n} b^k\right) = \left(\sum_{k=a}^{n} b^k\right) - b^a + b^{n+1} \tag{0.1}$$

Rearranging:

$$\left(\sum_{k=a}^{n} b^k\right) = \frac{b^a + b^{n+1}}{1-b} \tag{0.2}$$

Note if $|b| < 1$ then as $n \to \infty, b^{n+1} \to 0$

$$|b| < 1 \Rightarrow \left(\sum_{k=a}^{\infty} b^k\right) = \frac{b^a}{1-b} \tag{0.3}$$

Note if $|b| > 1$ then as $n \to \infty, \left|b^{n+1}\right| \to \infty$ resulting in a diverging series.