Geometric Series

https://github.com/Nazgand/nazgandMathBook

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Abstract

The goal of this paper is to review Geometric Series.

Consider

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