

Geometric Interpretation of the Geometric Series

This presentation provides a geometric interpretation of the geometric series

$$\sum_{n=1}^{\infty} ar^{n-1} = \frac{a}{1-r}, \quad r \neq 1.$$

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By construction, $0 < r < 1$.

The height, h , is given by

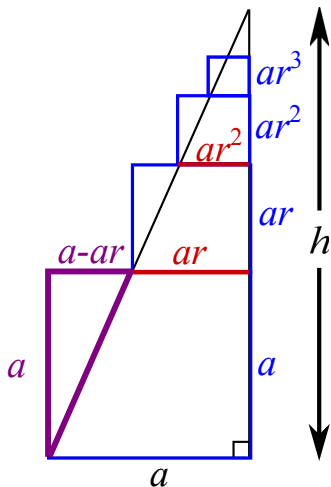
$$\begin{aligned} h &= a + ar + ar^2 + \dots \\ &= \sum_{n=1}^{\infty} ar^{n-1} \end{aligned}$$

Moreover, by similar triangles

$$\frac{h}{a} = \frac{a}{a - ar}$$

or

$$h = \frac{a}{1 - r}$$



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Conclusions

- ▶ The geometric series

$$\sum_{n=1}^{\infty} ar^{n-1} = h = \frac{a}{1-r}, \quad r \neq 1.$$

is equal to the height, h , of a right angled triangle with base a .

- ▶ The expression for the height, $a/(1-r)$, can be derived by using similar triangles.