Geometric Interpretation of the Geometric Series

This presentation provides a geometric interpretation of the geometric series

$$\sum_{n=1}^{\infty} ar^{n-1} = \frac{a}{1 - r}, \quad r \neq 1.$$
Geometric Interpretation of the Geometric Series

By construction, $0 < r < 1$.

The height, $h$, is given by

$$h = a + ar + ar^2 + \ldots$$

$$= \sum_{n=1}^{\infty} ar^{n-1}$$

Moreover, by similar triangles

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

or

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