

A geometric series refers to the sum (or total) of all of the terms in a geometric sequence.

Calculating the sum of a geometric series is not very intuitive. However, there is a sneaky way to do it:

Ex. Calculate:

$$S = 10 + 30 + 900 + 2700 + 8100 + \dots + 295240 + 885720$$

We can determine the sum of a geometric series: $S_n = \frac{a(r^n - 1)}{r - 1} \rightarrow S_n = \frac{ar^n - a}{r - 1} \rightarrow S_n = \frac{t_{n+1} - a}{r - 1}$

(subtract the first term from "the term after the last" and divide by the common ratio minus one)

Ex. Determine the sum of the first 19 terms in the geometric series $5, -15, 45, -135 + \dots$

Ex. Determine the sum of the geometric series $7, 14, 28, 56, \dots + 7340032$

Ex. Determine the number of terms in the series $6 + 24 + 96 + 384 + \dots$ with a sum of 33554430.