

Sequences and Series – (Finite) Geometric Series and Sigma Notation (W/ Calc)

Specific Series # 2 – (Finite) Geometric Series

- **geometric series** → the indicated _____

where it's represented by the following formula: $S_n = \frac{a_1(1 - r^n)}{(1 - r)}$

\swarrow \downarrow \searrow
 _____ _____ _____

* Reminder – Don't forget to put _____ around any "r" that is a _____ or a _____

Example 1: Find S_n for each geometric series described.

a.) $a_1 = 8$, $r = -3$, $n = 7$	b.) $a_1 = -6$, $a_5 = 96$, $r = 2$	c.) $81 + 27 + 9 + \dots$ to 10 terms
d.) $a_8 = -458,752$ and $r = -4$	e.) $a_1 = 1,280$ and $a_9 = 5$	f.) $4 + 24 + 144 + \dots + 31,104$

Example 2: Find the indicated part of a (finite) geometric series given the series sum and other info.

Given: $S_8 = 39,360$ and $r = 3$ Find: a_1	Given: $S_n = -16,383$, $r = 4$, $a_1 = -3$ Find: n
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Sigma Notation (By Calculator Method)

TI-8x Calculator (old operating system)	TI-8x Calculator (new operating system)
1.) 2 nd STAT (LIST) – highlight MATH and press # 5 which should say sum (2.) 2 nd STAT (LIST) – highlight OPS and press # 5 which should say seq (3.) Then type in the following: a.) sequence written in terms of “x” , b.) x , lower limit # , upper limit #) c.) ENTER 1 time 4.) number shown on the screen is the “answer” 5.) write your FINAL ANSWER as... S _n = final answer , fill in “n” and “answer” * To figure out “n” = upper – lower + 1	1.) 2 nd STAT (LIST) – highlight MATH and press # 5 which should say sum (2.) 2 nd STAT (LIST) – highlight OPS and press # 5 which should say seq (3.) Then fill out the following information: a.) Variable: x b.) Start: lower limit # ; End: upper limit # c.) ENTER 4 times 4.) number shown on the screen is the “answer” 5.) write your FINAL ANSWER as... S _n = final answer , fill in “n” and “answer” * To figure out “n” = upper – lower + 1
No matter which “system” (old or new) must show the calculator screen to represent your “work”! Example: $\sum_{k=4}^{23} 4k^2 - 5 \rightarrow$ Calc Steps/Screen: sum (seq (4x² – 5, x, 4, 23) → S₂₀ = 17,140	

Example 3: Find the sum of the given geometric finite series using the three methods learned.
 All 3 methods should be the SAME EXACT ANSWER.
 Make sure to write your answer as S_n = sum where you fill in “n” and the series’ sum.

$$\text{Given geometric finite series} \rightarrow \sum_{n=4}^7 2(3)^{n-1}$$

Method # 1 – Sigma Notation By Hand	Method # 2 – Geometric Finite Series Formula	Method # 3 – Sigma Notation By Calculator