

Sequences and Series – (Infinite) Geometric Series

Specific Series # 3 – (Infinite) Geometric Series

- **infinite geometric series** → the indicated _____

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

▪ (Formula) MUST meet TWO conditions:

1.) series must be an infinite geometric series (duh, obviously!)

** 2.) _____ **

Note – if the series does NOT meet the two conditions → write _____ (does not exist for answer)

Example 1: Find the sum (if it exists) of each infinite geometric series.

a.) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125} + \dots$ → $r =$ _____ then $S =$ _____ (work) so $S =$ _____ (answer)

b.) $0.5 + 1.5 + 4.5 + 13.5 + \dots$ → $r =$ _____ then $S =$ _____ (work) so $S =$ _____ (answer)

Example 2: Use the infinite geometric series formula to complete each problem.

a.) The sum of an infinite geometric series is 81, and its common ratio is $\frac{2}{3}$. What is the first term?	b.) The first term in an infinite geometric series is -8 , and its sum is $-\frac{40}{3}$. What is common ratio?	c.) Find the sum for: $\sum_{n=1}^{\infty} 5 \left(\frac{1}{2} \right)^{n-1}$
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– _____ are considered infinite geometric series

Ex: $\frac{2}{3} =$ _____ or _____ → write it as a series = _____

Example 3: Express each repeating decimal as a fraction (use formula – no typing in calculator...!)

a.) $0.888888\dots$ → _____	b.) $1.\overline{42}$ → _____
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