1.5 Infinite Geometric Series

Try:

Given $t_1 = 3, r = 0.5$ find S_n for:

a.) the first 5 terms

b.) the first 10 terms

c.) the first 100 terms

Try:

Given $t_1 = 3, r = 2$ find S_n for:

a.) the first 5 terms

b.) the first 10 terms

c.) the first 100 terms

Divergent Series:

A series with an infinite number of terms, which the sequence does not approach a fixed value.

$|r| > 1$

Convergent Series:

A series with an infinite number of terms, which the sequence approaches a fixed value.

The Sum is equal:

$$S = \frac{t_1}{1-r}, -1 < r < 1$$

Example 1:

Find the sum of the following if it exists:

a.) $1 + \frac{1}{5} + \frac{1}{25} + \cdots$

b.) $3 - 6 + 12 - \cdots$

Try:

c.) $t_1 = 3, r = \frac{1}{4}$ find the infinite sum

Example 2:

Determine the ratio given $t_1 = 6$ and the infinite geometric sum, $S = 9$.

Example 3:

A new oil well produces 9000 L of oil in the first month. Its production is known to be dropping by 12% each month

a) What is the total production in the first year?

b) Determine the total production of the well.