Geometric Series

2, 4, 8, 16, 32,.....

$-\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}, -\frac{1}{32}, ...$

Find the n^{th} term: $a_n = a_1 \bullet r^{n-1}$

a_1 : 1st term

r : common ratio

n : term

Sum of a finite geometric sequence with n terms:

$$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$$

Sum of an infinite geometric sequence:

$$S = \frac{a_1}{1-r} \text{ if } |r| < 1$$

1. Write the first 5 terms of each geometric sequence.

a) $a_1 = 6$

$r = -\frac{1}{4}$

b) $a_1 = 6$

$a_{k+1} = 2a_k + 1$

2. Find the 10th term of each geometric sequence.

a) $9,\ -6,\ 4,\ -\frac{8}{3}, \ldots\ldots$

b) $\frac{1}{8},\ \frac{1}{4},\ \frac{1}{2},\ 1,\ 2,\ldots..$

3. Write an expression for the n^{th} term of the geometric sequence.

a) $a_1 = 60$

$r = \frac{1}{3}$

$n = 10$

b) $a_3 = \frac{4}{3}$

$r = -\frac{1}{9}$

$n = 6$

4. Find the sum of the finite geometric sequence.

$$\sum_{i=1}^{8} 2^{n-1}$$

5. Use summation notation to express the sum.

a) $4+12+36+\cdots\cdots+8,748$

b) $2-\frac{1}{2}+\frac{1}{8}-\frac{1}{32}+\cdots\cdots+\frac{1}{2,048}$

6. Find the sum of the infinite geometric series.

a) $\sum_{n=0}^{\infty}\left(\frac{1}{10}\right)^{n}$

b) $8+6+\frac{9}{2}+\frac{27}{8}+\cdots\cdots$