9.3 Geometric Sequences & Series

Geometric Sequence

$$a_n = a_1 \bullet r^{n-1}$$

* r is the common ratio

Find the common ratio for each geometric sequence.

a. 3, 9, 27, 81, 243, . . .

b. 10, 20, 40, 80, . . .

c. $-\frac{1}{4}, \frac{1}{16}, -\frac{1}{64}, \frac{1}{256} \ldots$

Write the first 5 terms of the geometric sequence whose first term is $a_1 = 4$ and whose common ratio is 4.

Find the ninth term of the geometric sequence whose first term is 4 and whose common ratio is 0.5.

Write the formula and find the 10th term of the geometric sequence

$$6, -2, \frac{2}{3}, \ldots$$

The second term of a geometric sequence is -18 and the fifth term is $\frac{2}{3}$

Find the sixth term.

Sum of a Finite Geometric Sequence

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

Find the sum of the following series.

a. 1 - 3 + 9 - 27 + . . . -2187

b. $\sum_{n=1}^{7} 2^{n-1}$

Sum of an Infinite Geometric Sequence

$$S_\infty = \frac{a_1}{1-r}$$

**** $-1 < r < 1$ ****

Find each sum, if possible.

a. $\sum_{n=0}^{\infty} 5\left(\frac{1}{2}\right)^n$

b. $5 + 0.5 + 0.05 + 0.005 + \ldots$

c. $2, 6, 18, 54, 162, \ldots$