Sequences and Series

Arithmetic Sequence: $t_n = t_1 + d(n - 1)$

- t_1 **is the first term**
- *d is the common difference*
- *n is the number of terms*

Arithmetic Series: $S_n = \frac{n(t_1 + t_n)}{2}$ *or* $\frac{n[2t_1 + d(n-1)]}{2}$

- **Used to find the sum of all the terms**

Geometric Sequence: $t_n = t_1 r^{n-1}$

- t_1 **is the first term**
- *r* **is the common ratio**
- *n* **is the number of terms**

Geometric Series: $s_n = \frac{t_1(1 - r^n)}{1 - r}$

- **Used to find the sum of all the terms**

Infinite Geometric Series: $s_\infty = \frac{t_1}{1 - r}$

- **If an infinite geometric series converges ($-1 < r < 1$), then you can determine the sum.**

1. Determine the 20th term: $-9, -3, \ 3, \ 9, \ldots$

2. Determine the sum of the first 7 terms of an arithmetic sequence where: $t_1 = 5$, $t_7 = 17$

3. Find the 10th term: $2, -6,\ 18, ...$

4. Find the sum of the first 12 terms: $3,\ 12,\ 48,\ ...$

5. Find the sum, *if* it exists:

   a) $27,\ -9,\ 3,\ -1, ...$

   b) $4,\ -8,\ 16,\ -32, ...$