

Day 2 notes
**9.2/9.3 Arithmetic and
Geometric Sequences**

1. Arithmetic Sequences

In this section we are going to introduce Arithmetic Sequences. The simplest way to generate an arithmetic sequence is to start with a number a and add to it a fixed constant d , over and over again.

Definition: An arithmetic sequence is a sequence of the form:

The number a is _____ and d is
_____.

The n th term of an arithmetic sequence is given by:

Example 1: Is this sequence an arithmetic sequence? $13, 7, 1, -5, \dots$

If yes, find the common difference, the next three terms, the n th term, and the 300th term of the arithmetic sequence

Example 2: Write the first five terms of the sequence $a_n = -4 + 3n$. Determine whether or not the sequence is arithmetic. If it is, find the common difference.

Example 3: The 11th term of an arithmetic sequence is 52, and the 19th term is 92. Find the 1000th term.

Arithmetic sequence recursive formula:

2. Geometric Sequences

Next, we are going to introduce Geometric Sequences. A geometric sequence is generated when we start with a number a and repeatedly multiply by a fixed nonzero constant r .

Definition: A geometric sequence is a sequence of the form:

The number a is _____ and r is

_____.

The n th term of a geometric sequence is given by:

Example 4: If $a = 3$ and $r = 2$, then we have the geometric sequence:

Example 5: The sequence

$2, -10, 50, -250, 1250, \dots$ is a geometric sequence with $a = 2$ and $r = -5$. Find a_{10} .

Example 6: Find the common ratio, the first term, the n th term, and the eighth term of the geometric sequence $5, 15, 45, 135, \dots$