

Day 6 Notes

8.2 Arithmetic 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. Partial Sums of Arithmetic Sequences

PARTIAL SUMS OF AN ARITHMETIC SEQUENCE

For the arithmetic sequence given by $a_n = a + (n - 1)d$, the **n th partial sum**

$$S_n = a + (a + d) + (a + 2d) + (a + 3d) + \cdots + [a + (n - 1)d]$$

is given by either of the following formulas.

$$1. S_n = \frac{n}{2}[2a + (n - 1)d] \quad 2. S_n = n\left(\frac{a + a_n}{2}\right)$$

Example 4: a) Find the sum of the first 100 numbers.

b) Find the sum of the first 50 odd numbers.

c) Sum the first 25 terms of the sequence $3, -1, -5, -9, \dots$