

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 9-4 Arithmetic Series

### Objective

Students will define, arithmetic series and find their sums.

### State Standards

**A2. F.BF. A.1a** Write a function that describes a relationship between two quantities.

**A2. F.BF.A.2** Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations.

**A2. F.LE.A.1** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.

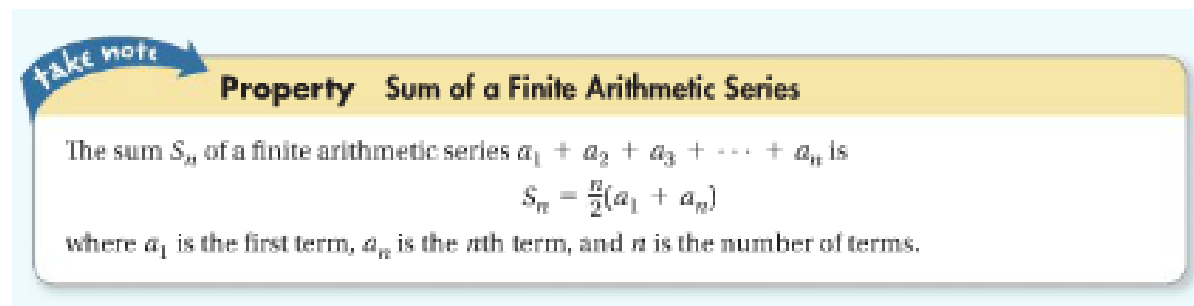
### Key Concepts

\_\_\_\_\_ - the indicated sum of the terms of a sequence

\_\_\_\_\_ - has a first and last term

\_\_\_\_\_ - continues without end

\_\_\_\_\_ - a series whose terms form an arithmetic sequence.



**take note**

**Property Sum of a Finite Arithmetic Series**

The sum  $S_n$  of a finite arithmetic series  $a_1 + a_2 + a_3 + \dots + a_n$  is

$$S_n = \frac{n}{2}(a_1 + a_n)$$

where  $a_1$  is the first term,  $a_n$  is the  $n$ th term, and  $n$  is the number of terms.

### Examples

1. (I do) Find the sum of the finite arithmetic series  $7 + 8 + 9 + 10 + \dots + 15$
2. (I do) What is the sum of the even numbers from 2 to 100?
3. (We do) What is summation notation for the series  $7 + 11 + 15 + \dots + 207$ ?

4. (We do) Expand and find the sum of  $\sum_{n=0}^4 3n + 1$
  
5. (We do) What is the sum of the series  $\sum_{n=1}^5 2n - 1$ ?
  
  
  
  
  
  
  
  
  
  
6. (They do) Use the calculator to determine the sum of the series  $\sum_{n=1}^{20} n^3 - 10n^2$ ?
  
  
  
  
  
  
  
  
  
  
7. (They do) A student has taken three math tests so far this semester. His scores for the first three tests were 75, 79 and 83.
  - a. Suppose his test scores continue to improve at the same rate. What will be his grade on the sixth and final test?
  
  
  
  
  
  
  
  
  
  
  - b. What will be his total score for all six tests?

**You do Practice 9-4: Complete your assignment on a separate sheet of paper. Show all work.**

1. Use  $S_n$  to find the sum of each finite arithmetic series.
  - a.  $4 + 7 + 10 + 13 + 16 + 19 + 22$
  - b.  $10 + 20 + 30 + \dots + 110 + 120$
2. Write each arithmetic series in summation notation.
  - a.  $3 + 6 + 9 + 12 + 15 + 18 + 21$
  - b.  $1 + 5 + 9 + \dots + 41 + 45$
3. What is the difference between an arithmetic sequence and an arithmetic series?
4. Is it possible to have more than one arithmetic series with four terms whose sum is 44? Explain.
5. A student writes the arithmetic series  $3 + 8 + 13 + \dots + 43$  in summation notation as  $\sum_{n=3}^8 (3 + 5n)$ . Describe and correct the error.