NAME _____ DATE _____ PERIOD _____

4-7 Arithmetic Sequences *(Pages 233–238)*

An **arithmetic sequence** is a set of numbers in a specific order whose difference between successive terms is constant. Any number in the set is a **term**. To move from one term to the next term a constant number must be added to the previous term. For example, 3, 6, 9, 12,... is an arithmetic sequence because to progress from one term to the next, like 6 to 9, you must add a constant number, 3, to the previous term. In this example, 3 is called the **common difference**. Therefore, an arithmetic sequence can be found with $a_1, a_1 + d, a_2 + d, a_3 + d,...$ where a_1 is the first term of the sequence and d is the common difference. To calculate the nth term of an arithmetic sequence, you can use the formula $a_n = a_1 + (n - 1)d$.

Examples

a. Find the next three terms of the arithmetic sequence 0, 9, 18, 27,...

$9 - 0 = 9$	*Find the common*
$18 - 9 = 9$	*difference by subtracting*
$27 - 18 = 9$	*successive terms.*
$27 + 9 = 36$	*Add the common*
$36 + 9 = 45$	*difference to the next*
$45 + 9 = 54$	*three terms.*

The next three terms are 36, 45, and 54.

b. Find the 7th term of the arithmetic sequence 10, 23, 36,...

$23 - 10 = 13$	*Find the common*
$36 - 23 = 13$	*difference. d = 13*
$a_n = a_1 + (n - 1)d$	*Use the formula.*
$a_7 = 10 + (7 - 1)13$	*Substitute.*
$a_7 = 10 + 6 \cdot 13$	*Evaluate by the*
$a_7 = 10 + 78$	*order of operations.*
$a_7 = 88$	

Practice

Find the next three terms of each arithmetic sequence.

1. $1, \frac{1}{2}, 0, \frac{-1}{2},...$

2. 13, 30, 47, 64,...

3. 102, 94, 86, 78,...

4. 4, 8, 12, 16,...

5. $7, \frac{25}{4}, \frac{11}{2}, \frac{19}{4},...$

6. 13, 11, 9, 7,...

7. $-1, -7, -13, -19,...$

8. $-1, 2, 5, 8,...$

9. **Standardized Test Practice** Which of the following is the 24th term of the arithmetic sequence 3, −2, −7, −12,...?

A −62 **B** −92 **C** −112 **D** −162

Answers: **1.** $-1, \frac{-3}{2}, -2$ **2.** 81, 98, 115 **3.** 70, 62, 54 **4.** 20, 24, 28 **5.** $4, \frac{13}{4}, \frac{5}{2}$ **6.** 5, 3, 1 **7.** −25, −31, −37 **8.** 11, 14, 17 **9.** C