B **1, 4, 9, 16, …**

Find the difference between successive terms.

1, 4, 9, 16, …

+3 +5 +7

The difference between successive terms is not the same.

This sequence is not an arithmetic sequence.

CHECK IT OUT! **Determine whether each sequence appears to be an arithmetic sequence. If so, find the common difference and the next three terms.**

1a. $-\frac{3}{4}, -\frac{1}{4}, \frac{1}{4}, \frac{3}{4}, \ldots$

1b. $-4, -2, 1, 5, \ldots$

To find the nth term of an arithmetic sequence when n is a large number, you need an equation or rule. Look for a pattern to find a rule for the sequence below.

1	2	3	4…	n	← Position
↓	↓	↓	↓		
3,	5,	7,	9…		← Term
a_1	a_2	a_3	a_4	a_n	

The sequence starts with 3. The common difference d is 2. You can use the first term and the common difference to write a rule for finding a_n.

Words	Numbers	Algebra
1st term	3	a_1
2nd term = 1st term plus common difference	$3 + (1)2 = 5$	$a_1 + 1d$
3nd term = 1st term plus 2 common differences	$3 + (2)2 = 7$	$a_1 + 2d$
4th term = 1st term plus 3 common differences	$3 + (3)2 = 9$	$a_1 + 3d$
⋮	⋮	⋮
nth term = 1st term plus $(n - 1)$ common differences	$3 + (n - 1)2$	$a_1 + (n - 1)d$

The pattern in the table shows that to find the nth term, add the **first term** to the product of $(n - 1)$ and the **common difference**.

Know it! Note

Finding the nth Term of an Arithmetic Sequence

The nth term of an arithmetic sequence with **common difference d** and **first term a_1** is

$$a_n = a_1 + (n - 1)d.$$

COMMON CORE GPS **EXAMPLE 2** MCC9-12.F.BF.2

Finding the nth Term of an Arithmetic Sequence

Find the indicated term of each arithmetic sequence.

A **22nd term: 5, 2, −1, −4, …**

Step 1 Find the common difference.

5, 2, −1, −4, …

−3 −3 −3

The common difference is −3.

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