

# 9-2 Reteaching

## Arithmetic Sequences

The explicit formula for the  $n$ th term of an arithmetic sequence is

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

- $a$  is the starting value and  $d$  is the common difference.
- $n$  is always greater than or equal to 1.
- You can write the sequence as  $a, a + d, a + 2d, a + 3d, \dots$

### Problem

Find the 15th term of an arithmetic sequence whose first three terms are 20, 16.5, and 13.

$$20 - 16.5 = 3.5$$

$$16.5 - 13 = 3.5$$

First, find the common difference. The difference between consecutive terms is 3.5. The sequence decreases. The common difference is  $-3.5$ .

$$a_n = a + (n - 1)d$$

Use the explicit formula.

$$a_{15} = 20 + (15 - 1)(-3.5)$$

Substitute  $a = 20$ ,  $n = 15$ , and  $d = -3.5$ .

$$= 20 + (14)(-3.5)$$

Subtract within parentheses.

$$= 20 + -49$$

Multiply.

$$= -29$$

The 15th term is  $-29$ .

Check the answer. Write  $a_1, a_2, \dots, a_{15}$  down the left side of your paper. Start with  $a_1 = 20$ . Subtract 3.5 and record 16.5 next to  $a_2$ . Continue until you find  $a_{15}$ .

### Exercises

Find the 25th term of each sequence.

1. 20, 18, 16, 14, ... **-28**

2. 0.0057, 0.0060, 0.0063, ... **0.0129**

3. 4, 0, -4, -8, ... **-92**

4. 0.2, 0.7, 1.2, 1.7, ... **12.2**

5. -10, -8.8, -7.6, -6.4, ... **18.8**

6. 22, 26, 30, 34, ... **118**

# 9-2 **Reteaching** (continued)

## Arithmetic Sequences

To solve word problems that involve arithmetic sequences, identify the common difference  $d$ , the starting value  $a$ , and the number of terms in the sequence  $n$ .

### Problem

As a part-time home health care aide, you are paid a weekly salary plus a fixed fuel fee for every patient you visit. You receive \$240 in a week that you visit 1 patient. You receive \$250 in a week that you visit 2 patients. How much will you receive if you visit 12 patients in 1 week?

$d = a_2 - a_1 = 250 - 240 = 10$	The common difference is the difference between two consecutive terms. You receive \$10 per visit.
$a = 240$	Identify the starting value. You receive \$240 for a week with 1 visit.
$n = 12$	You want to find the earnings in a week in which you visit 12 patients.
$a_n = a + (n - 1)d$	Write the formula for the $n$ th term.
$= 240 + (12 - 1)10$	Substitute.
$= 240 + 110 = 350$	Simplify.

You will earn \$350 if you visit 12 patients in 1 week.

### Exercises

7. Suppose you begin to work selling ads for a newspaper. You will be paid \$50/wk plus a minimum of \$7.50 for each potential customer you contact. What is the least amount of money you earn after contacting eight businesses in 1 wk? **\$110**
8. A boy starts a savings account for a mountain bike. He initially deposits \$15. He decides to increase each deposit by \$8. How much is his 17th deposit? **\$143**
9. A woman is knitting a blanket for her infant niece. Each day, she knits four more rows than the day before. She knitted seven rows on Sunday. How many rows will she knit on the following Saturday? **31 rows**
10. Joe started a 30-min workout program this week. He wants to increase the workout by 5 min every week. How long will his program be in the 16th week? **105 min**