Name_____ Date _____

6.6 Geometric Sequences

For use with Exploration 6.6

Essential Question How can you use a geometric sequence to describe a pattern?

In a **geometric sequence**, the ratio between each pair of consecutive terms is the same. This ratio is called the **common ratio**.

1 EXPLORATION: Describing Calculator Patterns

Work with a partner. Enter the keystrokes on a calculator and record the results in the table. Describe the pattern.

a. **Step 1** 2 =
Step 2 × 2 =
Step 3 × 2 =
Step 4 × 2 =
Step 5 × 2 =

Step	1	2	3	4	5
Calculator display					

b. **Step 1** 6 4 =
Step 2 × . 5 =
Step 3 × . 5 =
Step 4 × . 5 =
Step 5 × . 5 =

Step	1	2	3	4	5
Calculator display					

c. Use a calculator to make your own sequence. Start with any number and multiply by 3 each time. Record your results in the table.

Step	1	2	3	4	5
Calculator display					

d. Part (a) involves a geometric sequence with a common ratio of 2. What is the common ratio in part (b)? part (c)?

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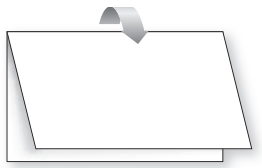
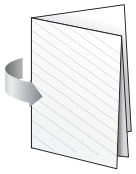
2 EXPLORATION: Folding a Sheet of Paper

Work with a partner. A sheet of paper is about 0.1 millimeter thick.

a. How thick will it be when you fold it in half once? twice? three times?



b. What is the greatest number of times you can fold a piece of paper in half? How thick is the result?



c. Do you agree with the statement below? Explain your reasoning.

"*If it were possible to fold the paper in half 15 times, it would be taller than you*."

Communicate Your Answer

3. How can you use a geometric sequence to describe a pattern?

4. Give an example of a geometric sequence from real life other than paper folding.

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6.6 Notetaking with Vocabulary

For use after Lesson 6.6

In your own words, write the meaning of each vocabulary term.

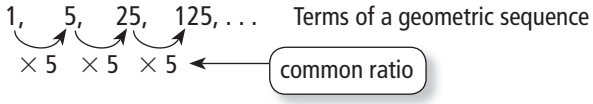
geometric sequence

common ratio

Core Concepts

Geometric Sequence

In a **geometric sequence**, the ratio between each pair of consecutive terms is the same. This ratio is called the **common ratio**. Each term is found by multiplying the previous term by the common ratio.



Notes:

Equation for a Geometric Sequence

Let a_n be the nth term of a geometric sequence with first term a_1 and common ratio r. The nth term is given by

$$a_n = a_1 r^{n-1}.$$

Notes:

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6.6 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–6, determine whether the sequence is *arithmetic*, *geometric*, or *neither*. Explain your reasoning.

1. $1, -4, 16, -64, \ldots$

2. $3, 7, 11, 15, \ldots$

3. $2, 4, 8, 32, \ldots$

4. $12, 9, 7, 5, \ldots$

5. $6, 18, 54, 162, \ldots$

6. $11, 19, 27, 35, \ldots$

In Exercises 7–9, write the next three terms of the geometric sequence.

7. $7, 21, 63, 189, \ldots$

8. $576, 288, 144, 72, \ldots$

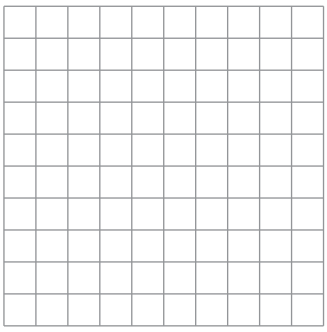
9. $5, -10, 20, -40, \ldots$

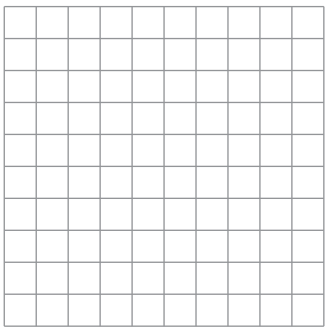
In Exercises 10–12, write the next three terms of the geometric sequence. Then graph the sequence.

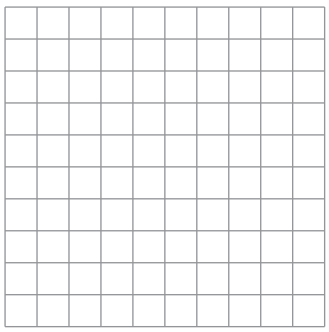
10. $12, 6, 3, \frac{3}{2}, \ldots$

11. $3, 12, 48, 192, \ldots$

12. $0.008, 0.04, 0.2, 1, \ldots$







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6.6 Notetaking with Vocabulary (continued)

In Exercises 13–20, write an equation for the *n*th term of the geometric sequence. Then find a_6.

13. $6561, 2187, 729, 243, \ldots$ **14.** $8, -24, 72, -216, \ldots$ **15.** $3, 15, 75, 375, \ldots$

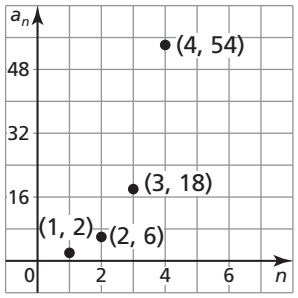
16.

n	1	2	3	4
a_n	2916	972	324	108

17.

n	1	2	3	4
a_n	11	44	176	704

18.



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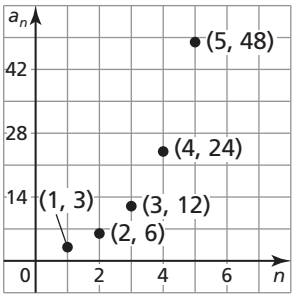

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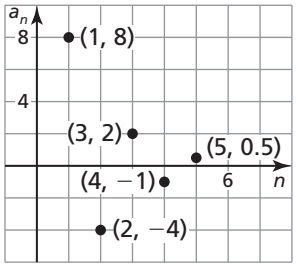

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