Lesson 1.3: Geometric Sequences

Explore Your Understanding Assignment

This assignment includes multiple choice and short answer questions. For multiple choice questions, select the best answer. Each is worth 1 mark. Marks assigned to short answer questions are indicated for each question. Be sure to show all necessary work.

(1) _____ 1. Determine the value of t_9 in a geometric sequence if $t_1 = 5$ and $r = -3$.

A. –98 415
B. –32 805
C. 32 805
D. 98 415

(1) _____ 2. Determine the value of the common ratio, r, for the geometric sequence $21, \_\_\_\_, \_\_\_\_, 7\,203, \_\_\_\_$.

A. 7
B. 19
C. 114
D. 343

(1) _____ 3. Determine a value of the common ratio, r, for the geometric sequence $\_\_\_\_, \_\_\_\_, 20, \_\_\_\_, 80$.

A. –15
B. –2
C. 4
D. 30

(1) _____ 4. Determine the number of terms, n, in the geometric sequence 6.4, 25.6, 102.4, …, 26 214.4.

A. 6
B. 7
C. 8
D. 9

5. Determine if the following sequences are geometric. Justify each decision. For the sequences that are geometric, determine the general term.

(1) a. $\frac{1}{3}, -\frac{1}{6}, \frac{1}{9}, \ldots$

(1) b. 50, 250, 1 250, …

6. A new annual festival just began in a small town in northern Alberta. In the first year, the festival had 25 participants. It is expected that the number of people attending the festival will double every year.

(2) a. In how many years can the organizers expect 800 people in attendance?

(1) b. What is assumed in order to answer part a.?

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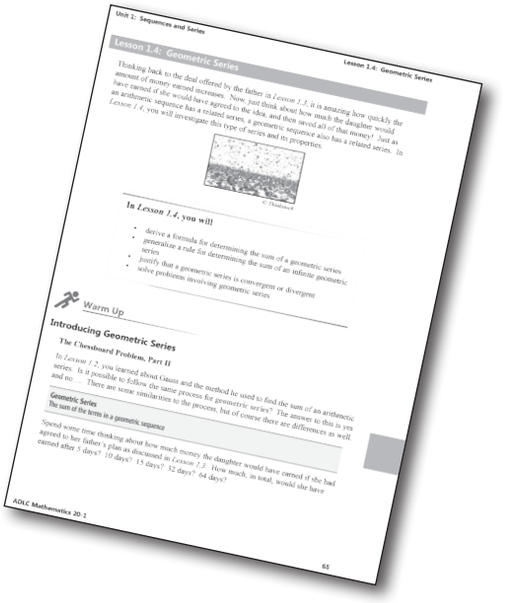
You have completed *Lesson 1.3 Explore Your Understanding Assignment*. Please return to the *Module* and continue your exploration with *Lesson 1.4*.


Unit 1: Sequences and Series

Lesson 1.4: Geometric Series

Lesson 1.4: Geometric Series

Thinking back to the deal offered by the father in *Lesson 1.3*, it is amazing how quickly the amount of money earned increases. Now just think about how much the daughter would have earned if she would have agreed to the idea, and then saved all of that money! Just as an arithmetic sequence has a related series, a geometric sequence also has a related series. In *Lesson 1.4*, you will investigate this type of series and its properties.

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In *Lesson 1.4*, you will

- derive a formula for determining the sum of a geometric series
- generalize a rule for determining the sum of an infinite geometric series
- justify that a geometric series is convergent or divergent
- solve problems involving geometric series

Warm Up

Introducing Geometric Series

The Chessboard Problem, Part II

In *Lesson 1.2*, you learned about Gauss and the method he used to find the sum of an arithmetic series. Is it possible to follow the same process for geometric series? The answer to this is yes and no. There are some similarities to the process, but of course there are differences as well.

Geometric Series

The sum of the terms in a geometric sequence.

Spend some time thinking about how much money the daughter would have earned if she had agreed to her father's plan as discussed in *Lesson 1.3*. How much, in total, would she have earned after 5 days? 10 days? 15 days? 32 days? 64 days?

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