



6-7 Additional Practice

Geometric Sequences and Series

Is the sequence geometric? If so, write a recursive definition for the sequence.

1. 3, 9, 27, 81, ...

2. 4, 8, 12, 16, ...

3. 1, 0.5, 0.25, 0.125, ...

Yes.

No

Yes.

$$a_n = \begin{cases} 3, & \text{if } n = 1 \\ a_{n-1}(3), & \text{if } n > 1 \end{cases}$$

$$a_n = \begin{cases} 1, & \text{if } n = 1 \\ a_{n-1}(0.5), & \text{if } n > 1 \end{cases}$$

Translate between the recursive and explicit definitions for each sequence.

4. $a_n = \begin{cases} 5, & \text{if } n = 1 \\ a_{n-1}(4), & \text{if } n > 1 \end{cases}$

5. $a_n = \frac{2}{3}(7)^{n-1}$

6. $a_n = \begin{cases} 2, & \text{if } n = 1 \\ a_{n-1}\left(\frac{3}{4}\right), & \text{if } n > 1 \end{cases}$

$$a_n = 5(4)^{n-1}$$

$$a_n = \begin{cases} \frac{2}{3}, & \text{if } n = 1 \\ a_{n-1}(7), & \text{if } n > 1 \end{cases}$$

$$a_n = 2\left(\frac{3}{4}\right)^{n-1}$$

Write the expansion of each series. What is the sum?

7. $\sum_{n=1}^5 3(2)^{n-1}$

$$3 + 6 + 12 + 24 + 48 = 93$$

8. $\sum_{n=1}^6 5(3)^{n-1}$

$$5 + 15 + 45 + 135 + 405 + 1215 = 1820$$

9. $\sum_{n=1}^4 4\left(\frac{1}{2}\right)^{n-1}$

$$4 + 2 + 1 + 0.5 = 7.5$$

How many terms are in the geometric series?

10. $75 + 300 + 1200 + \dots + 4,915,200$

9

11. $20 + 60 + 180 + \dots + 1,180,980$

11

12. $400 + 100 + \dots + 0.391$

6

13. The sum of a geometric series is 2,351,461. The first term of the series is 7 and its common ratio is 6. How many terms are in the series? 8

14. What is the monthly payment for a \$32,000 loan for 5 years with an annual interest rate of 5.4%? \$609.76

15. A geometric sequence can be used to describe the population of rabbits on a farm. The first spring, the farmer purchased 8 rabbits. Five years later, there are 648 rabbits at the farm. Assuming that none of the rabbits leave the farm, how many rabbits were on the farm in year 3? 72 rabbits