

Algebra 2 Honors

Geometric Sequences

Analyzing Geometric Sequences



#2: Find the indicated terms of the geometric sequences.

A. Find the 6th term of the sequence
3, -15, 75, ...

$$1) r = -5$$

$$2) a_n = 3(-5)^{n-1}$$

$$3) a_6 = 3(-5)^{6-1}$$

$$a_6 = 3(-5)^5$$

$$a_6 = 3(-3125)$$

$$a_6 = -9375$$

B. Find the 11th term of the sequence
64, -32, 16, ...

$$1) r = -\frac{1}{2}$$

$$2) a_n = 64\left(-\frac{1}{2}\right)^{n-1}$$

$$3) a_{11} = 64\left(-\frac{1}{2}\right)^{11-1}$$

$$a_{11} = 64\left(-\frac{1}{2}\right)^{10}$$

$$a_{11} = 64\left[\frac{1}{1024}\right]$$

$$a_{11} = \frac{1}{16}$$

Completely Editable

9.2

Lesson 9.2: Geometric Sequences

A sequence with a constant ratio between consecutive terms is known as a _____ sequence.

A geometric sequence with a starting value a and a common ratio r is a sequence of the form $a, ar, ar^2, ar^3, \dots$

EX. 4, 8, 16, 32, 64, $\dots$

The ratio of consecutive terms of a geometric sequence is called a _____ ratio.

EX. 4, 8, 16, 32, 64, $\dots$ has a common ratio of _____.

Given two positive numbers, the positive square root of the product of the two numbers is the _____.

EX. The geometric mean of 3 and 48 is _____.

Geometric Sequence Formulas

EXPLICIT DEFINITION:

$$a_n = a_1 \cdot r^{n-1}, \text{ for } n \geq 1$$

RECURSIVE

DEFINITION:

$$a_1 = a$$

$$a_n = a_{n-1} \cdot r, \text{ for } n > 1$$

How to find the ratios between consecutive terms?

EX. 2, 4, 8, 16, $\dots$

Identifying Geometric Sequences

EX #1: Determine whether each sequence is geometric. If so, find the common ratio, r .

A. 3, 6, 12, 24, $\dots$

B. 3, -9, 27, -81, $\dots$

C. 1, 5, 9, 13, 17, $\dots$

D. 48, -12, 3, $\dots$

Analyzing Geometric Sequences

EX #2: Find the indicated terms of the geometric sequences.

A. Find the 6th term of the sequence
3, -15, 75, $\dots$

B. Find the 11th term of the sequence
64, -32, 16, $\dots$

Using a Geometric Sequence

EX #3: When radioactive substances decay, the amount remaining will form a geometric sequence when measured over constant intervals of time. The table shows the amount of *Adamsium* (Ad) is a highly radioactive element, initially, and after 2 hours. Find the amounts left after 1 hour, 3 hours, and 4 hours.

Hours Lapsed	0	1	2	3	4
Grams of Adamsium	1320		384		

Using the Geometric Mean

The geometric mean of two positive numbers x and y is _____.

In a sequence the formula is:

EX #4: Insert the geometric mean between the following.

A. 45, $\square$, 80, $\dots$

B. 972, $\square$, $\square$, $\square$, 12, $\dots$

Writing Formulas for Sequences

EX #5: Write an explicit formula for the sequence and generate the first five terms.

A. $a_1 = 12, r = -\frac{1}{3}$

B. $a_1 = 5, r = 0.2$

NOTES

Name _____ Date _____

9.2

Geometric Sequences Practice

Problems 1 – 4, is the given sequence geometric? If so, identify the common ratio and find the next two terms.

1. $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$

2. $18, -6, 2, -\frac{2}{3}, \dots$

3. $9, 0.9, 0.09, 0.009, \dots$

4. $0.5, 0.25, 0.125, 0.0625, \dots$

Problems 5 – 8, write the explicit formula for each sequence. Then generate the first five terms.

5. $a_1 = 8, r = -3$

6. $a_1 = 0.0175, r = 5$

7. $a_1 = 13, r = -\frac{1}{2}$

8. $a_1 = 6561, r = \frac{1}{3}$

Problems 9 – 12, find the missing term of each geometric sequence.

9. $637, \square, 13, \dots$

10. $\dots, 8, \square, 1458, \dots$

11. $12, \square, 17.28$

12. $\dots, \frac{3}{5}, \square, \frac{27}{80}, \dots$

Problems 13 – 16, identify each sequence as *arithmetic*, *geometric*, or *neither*. Then find the next two terms.

13. $1, -2, 4, -8, \dots$

14. $40, 45, 50, 55, \dots$

15. $-4, 12, -36, 108, \dots$

16. $11, 12, 14, 17, 22, \dots$

Problems 17 – 20, find the missing terms of each geometric sequence.

17. $2187, \square, \square, \square, 27, \dots$

18. $12, \square, \square, \square, 60.75, \dots$

19. $0.1024, \square, \square, \square, 4, \dots$

20. $\frac{1}{2}, \square, \square, \square, \frac{8}{81}, \dots$

Problems 21 – 24, for the geometric sequence $2, 8, 32, 128, \dots$ find the indicated term.

21. 5th term

22. 13th term

23. 8th term

24. n th term

Problems 25 – 26, write the explicit formula for the sequence. Then generate the first five terms.

25. $a_1 = 5, r = -2$

26. $a_1 = 729, r = -\frac{1}{3}$

Problems 27 – 28, solve.

27. Jordan got some helium balloons from her best friend Madison on her birthday. The balloons lose one-fifth of the helium each day. Each balloon was filled to a volume of 2500 in³.

A. Write the geometric sequence representing the amount of helium in the balloons for the first five days.

B. What is the common ratio of the sequence? [Hint: Volume is in cubic inches.]

C. How much helium will be in the balloons on the 10th day?



Practice Sets

Lesson Warm-Ups

3. Is the sequence geometric? Find the common ratio. 0.3, 0.6, 1.2, ...	4. Find the missing term. 2, __, 50, ...
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Name _____ Date _____ Period _____	
Lesson 9.2: Geometric Sequences	
Warm-Up #2	
1. Find the first five terms of the sequence. $a_n = 5(2)^n$	2. Find the fifth term of the sequence. 1, 2, 4, ...
3. Is the sequence geometric? Find the common ratio. 0.25, 0.5, 1.0, ...	4. Find the missing term. 3, __, 12, ...

Form A	9.2 Geometric Sequences	Form B
_____	Name _____	_____
Period _____	Date _____	Period _____
_____	Questions 1 - 4: Use the sequence	_____
_____	-3, 9, -27, ...	_____
_____	1. Find the common ratio.	_____
_____	2. Write an explicit rule.	_____
_____	3. Write a recursive rule.	_____
_____	4. Find the 10 th term of the sequence.	_____

Daily Lesson Quiz

Grade: _____	Grade: _____
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