

ALGEBRA 2

Unit 10

SEQUENCE

FINITE Sequence

INFINITE Sequence

TERM Notation

- The first term in a sequence is a_1 .
- Each subsequent term is a_n .

SERIES

PARTIAL SUMS

Find the partial sum for each given sequence.

- {1, 2, 3, 4, 5, ...}; find S_5
- {4, ...}

ARITHMETIC Sequence

COMMON DIFFERENCE

EXAMPLES

Determine whether the sequence is arithmetic. If yes, identify the common difference and give the next three terms.

- {5, 8, 11, 14, 17, ...}
- {23, 16, 9, 2, -5, ...}
- {-6, -8, -10, -12, -14, ...}

ARITHMETIC, GEOMETRIC... or Neither?

Directions: Determine the type of sequence. Shade the boxes using the color codes below. For arithmetic and geometric sequences, identify the common difference or common ratio, then write the formula.

Arithmetic Sequence: Purple Geometric Sequence: Light Green Neither: Uncolored

- {4, -20, 100, -500, ...}
- {15, 5, $\frac{5}{3}$, $\frac{5}{9}$, ...}
- {1, -2, 3, -4, ...}
- {-18, -11, -4, 3, ...}
- {1, 8, 27, 64, ...}
- { $\frac{9}{2}$, $\frac{5}{2}$, $\frac{11}{2}$, $\frac{3}{2}$, ...}

GEOMETRIC Series

A geometric series is the sum of the terms of a geometric sequence.

To find the sum, use the formula:

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$

where n is the number of terms, a_1 is the first term, and r is the common ratio.

Find the indicated sum for each geometric series.

- {4 + 20 + 100 + 500 + ...}; S_4
- {...}

SEQUENCES & SERIES

NOTES • HOMEWORK • QUIZZES • TEST

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Unit 10 - Sequences & Series: Sample Unit Outline

	TOPIC	HOMEWORK
DAY 1	Introduction to Sequences, Series, and Summation Notation	HW #1
DAY 2	Arithmetic Sequences & Series	HW #2
DAY 3	Quiz 10-1	None
DAY 4	Geometric Sequences	HW #3
DAY 5	Geometric Series & Infinite Geometric Series; Finding the Sum of a Convergent Infinite Series	HW #4
DAY 6	Arithmetic vs. Geometric (Mixed Review with Applications)	HW #5
DAY 7	Unit 10 Review	Study for Test
DAY 8	UNIT 10 TEST	None

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
SEQUENCE	
FINITE Sequence	Example:
INFINITE Sequence	Example:
TERM Notation	<ul style="list-style-type: none"> The first term in a sequence Each subsequent term is determined by the term number in the sequence

SERIES

Main Ideas/Questions	Notes/Examples
Sequence	{1, 2, 3, 4} {3, 6, 9, 12}
Series	

PARTIAL SUMS Find the partial sum for each given sequence.

Name: _____ Date: _____

Algebra 2

Date: _____ Per: _____ Unit _____

Quiz 10-1: Intro to Seq. & Ser., Arith.

Part I: Intro to Sequences & Series

Give the first five terms of each sequence.

- $a_1 = -4; a_n = a_{n-1} - 6$ (for $n \geq 2$)
- $a_1 = 3, a_2 = 8; a_n = 2a_{n-2} + a_{n-1}$ (for $n \geq 3$)
- $a_n = 15 - 2n$
- $a_n = n^3 - 20$

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
ARITHMETIC Sequence	
Common DIFFERENCE	
EXAMPLES	Determine whether the sequence is arithmetic. If yes, identify the common difference and give the next three terms. 1. {5, 8, 11, 14, 17, ...} 2. {23, 16, 9, 2, -5, ...} 3. {1, 2, 3, 5, 8, ...} 4. {1, 4, 9, 16, 25, ...} 5. {-20, -10, -5, 0, 5, ...}

Name: _____ Date: _____

Unit 10: Sequences & Series

Per: _____ Homework 2: Arithmetic Sequences & Series

**** This is a 2-page document! ****

Determine whether the sequence is arithmetic. If yes, identify the common difference and give the next three terms.

- {-3, -12, -48, -192, ...}
- {-18, -27, -36, -45, ...}
- {4, 11, 18, 25, ...}
- {1, 6, 8, 4, 1, ...}

ARITHMETIC, GEOMETRIC... or Neither?

Directions: Determine the type of sequence. Shade the boxes using the color codes below. For arithmetic and geometric sequences, identify the common difference or common ratio, then write the formula.

Arithmetic Sequence: Purple Geometric Sequence: Light Green Neither: Uncolored

- {-4, -20, 100, -500, ...}
- {15, 5, $\frac{5}{3}, \frac{5}{9}, \dots$ }
- {-2, 3, -4, ...}
- {-18, -11, -4, 3, ...}
- {-3, -27, -243, -2187, ...}

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
GEOMETRIC Sequence	
Common RATIO	
EXAMPLES	Determine whether the sequence is arithmetic. If yes, identify the common difference and give the next three terms. 1. {5, 8, 11, 14, 17, ...} 2. {23, 16, 9, 2, -5, ...}

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
GEOMETRIC Series	A geometric series is the _____ of a geometric sequence. To find the sum, use the following formula: <div style="border: 1px solid black; width: 100px; height: 30px; margin: 5px 0;"></div> where n is the _____ a_1 is the _____, and r is the _____ Find the indicated sum for each geometric series. 1. $500 + \dots; S_4$ 2. $181 + 27 + 9 + 3 + \dots; S_{10}$

Directions: Indicate whether the sequence is arithmetic, geometric, or neither. If arithmetic, give the common difference d . If geometric, give the common ratio r .

- {3, -1, -5, -9, ...}; S_n
- $\sum_{k=1}^4 -3 \cdot 2^{k-1}$

Unit 10 Test Study Guide (Sequences & Series)

Name: _____ Date: _____

Per: _____

Topic 1: Sequences, Explicit & Recursive Formulas

- What is a sequence?
- Describe the difference between recursive and explicit formulas:

Name: _____ Date: _____

Unit 10 Test Sequences & Series

Per: _____

- Give the first five terms of the sequence:
 $a_1 = -4; a_n = 2a_{n-1} - 1$ (for $n \geq 2$)
- Give the first five terms of the sequence:
 $a_1 = \frac{2}{5}; a_2 = \frac{4}{5}; a_n = a_{n-2} \cdot a_{n-1}$ (for $n \geq 3$)
- Give the first five terms of the sequence:
 $a_n = n^3 - 2n$
- Give the first five terms of the sequence:
 $a_n = 1 - \frac{1}{n}$

	ARITHMETIC Sequence	GEOMETRIC Sequence	ARITHMETIC Series	GEOMETRIC Series	INF. GEOMETRIC Series
Definition					
Formula					
Example 1	Find a_{20} : {5, 9, 23, 37, 51, ...}	Find a_{14} : {-8, 16, -32, 64, ...}	Find S_{17} : {(3) + (7) + (11) + ...}	Find S_{12} : {2-6+18-54+...}	Find the sum: {400 + 200 + 100 + ...}
Example 2	Find a_{23} : {9, $\frac{13}{2}$, 4, $\frac{3}{2}$, -1, ...}	Find a_7 : {1024, 768, 576, 432, ...}	Find the sum: $\sum_{i=1}^{\infty} (6i - 15)$	Find the sum: $\sum_{i=1}^6 -512 \cdot (\frac{3}{2})^{i-1}$	Find the sum: $\sum_{i=1}^8 48 \cdot (-\frac{1}{4})^{i-1}$

sequence.

- $a_1 = 1, a_2 = 2; a_n = (a_{n-1})^2 - a_{n-2}$ (for $n \geq 3$)
- $a_n = \frac{1}{4} \cdot (-2)^{n-1}$
- $a_n = n^3 - n^2$
- $a_n = n^2 + 2n$

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- Which formula can be used to represent the sequence below?
{2, 5, 17, 65, 257, ...}
- Which formula can be used to represent the sequence below?
{-6, -3, 2, 9, 18, ...}

A. $a_n = n_5 - 3$
 B. $a_n = 4n - 3$
 C. $a_1 = 2; a_n = (a_{n-1})^3 - 3$ (for $n \geq 2$)
 D. $a_1 = 2; a_n = 4a_{n-1} - 3$ (for $n \geq 2$)

A. $a_1 = 3n - 9$
 B. $a_n = n_5 - 7$
 C. $a_n = -6; a_n = 2a_{n-1} + 9$ (for $n \geq 2$)
 D. $a_n = -6; a_n = \frac{1}{2}a_{n-1} - 1$ (for $n \geq 2$)

7. Find the sum of the first nine terms in the series below.
{1 + 8 + 27 + 64 + 125 + ...}

8. Expand and evaluate the series:
 $\sum_{k=1}^{15} (5 - 2k^2)$

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