Unit 09 Sequence and Series

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 4**
Length: **2 weeks (if time permits)**
Status: **Published**

Brief Summary of Unit

Sequences are lists of numbers that are generated according to a pattern. Arithmetic sequences have a constant difference between consecutive terms and geometric sequences have a constant ratio between consecutive terms. The sum of the terms of a sequence is a series. Under certain conditions infinite geometric series converge to a finite sum.

Revised Date: July 2025

Standards

1	Developing Responsibility for Learning: Cultivating independence, self-reflection, and responsibility for one's own learning.
3	Valuing Evidence in Argumentation: Constructing viable claims and evaluating, defending, challenging, and qualifying the arguments of others.
4	Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media.
F.BF.A.2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
F.IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F.IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n + 1) = f(n) + f(n - 1)$ for $n \geq 1$.
F.LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
A.SSE.B.4	Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. Patterns

Essential Questions

- How can an infinite amount of numbers add up to a finite quantity?
- To what extent is an arithmetic sequence linear and a geometric sequence exponential?

- What characteristics must be met to satisfy the definition of a function?

Enduring Understandings

- An arithmetic sequence has a constant difference between consecutive terms where a geometric sequence has a constant ratio between consecutive terms.
- Sequences and series result from finding numerical patterns from a set of numbers.
- The sums of finite arithmetic and geometric series can be computed with easily derivable formulas; the sums of infinite geometric series can be approximated.

Students Will Know

- Students will know that a geometric sequence continues by multiplying a constant.
- Students will know that a series is the sum of terms of a sequence.
- Students will know that an arithmetic sequence continues by adding a constant.
- Students will know that sequences contain patterns, which can be defined explicitly, or recursively.

Students Will Be Skilled At

- Students will be skilled at analyzing arithmetic and geometric sequences and series.
- Students will be skilled at defining and using sequences and series.
- Students will be skilled at describing how to find sums o infinite geometric series.
- Students will be skilled at explaining how to write recursive rules for sequences.
- Students will be skilled at finding partial sums of infinite geometric series.
- Students will be skilled at finding sums of finite arithmetic series.
- Students will be skilled at finding sums of finite geometric series.
- Students will be skilled at finding sums of geometric series.
- Students will be skilled at identifying arithmetic sequences.
- Students will be skilled at identifying geometric sequences.
- Students will be skilled at using rules to write terms of sequences.
- Students will be skilled at writing and finding sums of series.
- Students will be skilled at writing rules for arithmetic sequences.
- Students will be skilled at writing rules for geometric sequences.
- Students will be skilled at writing rules for sequences.

Evidence/Performance Tasks

Assessments

- Formative: Daily assessments using examples from class notes, NJSLA test bank problems, and/or

Albert/AP Classroom assessments

- Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Albert/AP Classroom and/or Big Ideas Math unit assessments
- Benchmark: IXL or teacher created diagnostic assessments in addition to unit assessments from Big Ideas Math
- Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and differentiated learning tasks in Khan Academy, DeltaMath, and IXL

- Answer essential questions
- Class discussion of daily topic
- Classwork and homework that assess the essential questions
- Provide alternative means of assessments for certain students
- Teacher Observation
- Tests and quizzes that assess the essential questions
- Written assignments that assess the essential questions that involves providing explanations

Learning Plan

Unit 9 Series and Sequences (Chapter 11, 2 weeks)

As time permits

11.1 Defining and Using Sequences and Series

- Use rules to write terms of sequences.
- Introduce and discuss series, summation notation, and sigma notation.
- Write rules for sequences.
- Write and Find sums of series.

11.2 Analyzing Arithmetic Sequences and Series

- Identify arithmetic sequences.
- Write rules for arithmetic sequences.
- Find sums of finite arithmetic series.

11.3 Analyzing Geometric Sequences and Series

- Identify geometric sequences.
- Write rules for geometric sequences.
- Find sums of finite geometric series.

11.4 Finding Sums of Infinite Geometric Series

- Find partial sums of infinite geometric series.
- Find sums of infinite geometric series.

Materials

Core instructional materials:Core Book List including Algebra & Trigonometry 4E by Stewart

Supplemental materials: Khan Academy, Edia, and DeltaMath

- District approved textbook and ancillary materials
- Online Technology; Edia, Delta Math, Desmos, Khan Academy, Ed Puzzle
- Teacher created activiites
- Teacher created notes

Integrated Accommodation & Modifications

Integrated Accommodation & Modifications for Algebra 2/Intro to Trig Honors