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

ELA.K-12.1	Developing Responsibility for Learning: Cultivating independence, self-reflection, and responsibility for one's own learning.
ELA.K-12.3	Valuing Evidence in Argumentation: Constructing viable claims and evaluating, defending, challenging, and qualifying the arguments of others.
ELA.K-12.4	Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media.
MATH.9-12.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.
MATH.9-12.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.
MATH.9-12.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 $n \geq 1$.
MATH.9-12.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).
MATH.9-12.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