Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	MATH	Course:	Advanced Algebra (H)	Unit 9 Title:	Sequences and Series	Grade Level(s):	11
Assessed Trimester:	Trimester C	Pacing:	9-10 Days	Date Created:	6/25/2014	Last Revision Date:	6/25/2014

Course Understandings: *Student will understand that:*

A. Relationships exist between real-world situations, mathematical equations, and graphs for sequences, series, polynomial functions, and exponential functions.
B. Sequences, series, polynomial, and exponential function can be categorized by form and that each form has specific processes to consider when solving and graphing.
C. There are a variety of strategies of varying efficiency for simplifying sequences, series, polynomial, and exponential expressions.
E. The context of a problem is important in recognizing the reasonableness of a solution.
F. There are benefits and limitations in the use of calculators and other technology to solve mathematical situations.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

Minnesota State/Local/Technology Standard(s) addressed (2007):

- **Standard (9.2.1.#):** Understand the concept of function, and identify important features of functions and other relations using symbolic and graphical methods where appropriate.
  Benchmark:
  9.2.1.8 Make qualitative statements about the rate of change of a function, based on its graph or table of values.

- **Standard (9.2.2.# - Modified):** Recognize linear and other common functions in real-world and mathematical situations. Represent these functions with tables, verbal descriptions, symbols and graph. Solve problems involving these functions, and explain results in the original context.
  Benchmark:
  9.2.2.4 Express the terms in a geometric sequence recursively and by giving an explicit (closed form) formula, and express the partial sums of a geometric series recursively.
  9.2.2.5 Recognize and solve problems that can be modeled using finite geometric sequences and series, such as home mortgage and other compound interest examples. Know how to use spreadsheets and calculators to explore geometric sequences and series in various contexts.

- **Standard (9.2.4.#-Modified):** Represent real-world and mathematical situations using equations involving linear, quadratic, and exponential. Solve equations symbolically and graphically. Interpret solutions in the original context.
  Benchmark:
  9.2.4.8 Assess the reasonableness of a solution in its given context and compare the solution to appropriate graphical or numerical estimates; interpret a solution in the original context.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- Model, analyze and solve real world situations using sequences and series.

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● A real-world situation can be represented as an arithmetic or geometric sequence or series and will demonstrate an understanding of how to find reasonable solutions.	**Students will keep considering:** ● Where can I find situations involving arithmetic or geometric sequences or series in the real world? ● When looking at a sequence or series, how do the significant features of the formulas relate to real world representations? ● How do I decide which formula or method to use to solve a sequence or series?

	• How do the skills and knowledge that we are learning influence the task of understanding situations that can be modeled by sequences and series?

Acquisition

Knowledge - Students will:	**Skills - Students will:**
• Recognize which type of function based on symbols or table of values • Recognize geometric sequences and series • Recognize problems that can be modeled using finite sequences and series • Know how to apply compound interest **Reasoning - Students will:** • Evaluate a function at a given point • Distinguish between the different functions given tables or symbols • Distinguish between recursive and explicit forms • Compare and contrast the differences between arithmetic sequences and geometric sequences (arithmetic series and geometric series) • Compare and contrast between sequences and series • Identify an expression as a linear (arithmetic) or exponential (geometric) function, and as a sequence or a series • Interpret a solution in the original context • Compare solutions to appropriate numerical estimates	• Demonstrate writing the partial sums of a geometric series recursively • Model real-life situations using finite geometric sequences and series • Demonstrate the use of graphing technology • Understand if a Geometric Series is convergent or divergent • Determine how many terms is needed to find the sum of arithmetic and finite geometric series.

Common Misunderstandings	**Essential new vocabulary**
• Students have trouble making sense of expressions with exponents that are rational numbers (e.g. 2^0, $9^{\frac{1}{2}}$, $20.(8)^{\frac{2}{3}}$, 5^{-2}, -7^2). Making sense of many situations involving exponential functions requires the use of negative and fractional exponents. • Students struggle using and making sense of functions defined using subscript notation (i.e. $a_n = 2 \cdot a_{n-1},\ a_0 = 1,\ n \geq 1$) often used to describe terms in a sequence recursively. Students will often write *n* x 2 = *a* to describe the doubling sequence 1, 2, 4, 8,...	• Arithmetic sequence • Arithmetic series • Convergent Series • Explicit rule • Geometric sequence • Geometric series • Recursive rule • Subscript notation