

Unit Title: Sequences and Series

Grade Level: 9-12

Subject Area: Pre-Calculus

Duration/Length/Number of class periods: 6 periods block schedule (80 minute periods)

Description: Students will learn about arithmetic and geometric sequences and series. Students will learn about visual representations and formulas to solve real-life applications.

Established Goals:

IB Benchmarks:

Arithmetic sequences and series. Use of the formulae for the n th term and the sum of the first n terms of the sequence. Use of sigma notation for sums of arithmetic sequences. Spreadsheets, GDCs and graphing software may be used to generate and display sequences in several ways. If technology is used in examinations, students will be expected to identify the first term and the common difference. Applications. Examples include simple interest over a number of years. Analysis, interpretation and prediction where a model is not perfectly arithmetic in real life. Students will need to approximate common differences.

Geometric sequences and series. Use of the formulae for the n th term and the sum of the first n terms of the sequence. Spreadsheets, GDCs and graphing software may be used to generate and display sequences in several ways.

Use of sigma notation for the sums of geometric sequences. If technology is used in examinations, students will be expected to identify the first term and the ratio. Link to: models/functions in topic 2 and regression in topic 4. Applications. Examples include the spread of disease, salary increase and decrease and population growth.

Financial applications of geometric sequences and series: • compound interest • annual depreciation. Examination questions may require the use of technology, including built-in financial packages. The concept of simple interest may be used as an introduction to compound interest. Calculate the real value of an investment with an interest rate and an inflation rate. In examinations, questions that ask students to derive the formula will not be set. Compound interest can be calculated yearly, half yearly, quarterly or monthly. Link to: exponential models/functions in topic 2

State Standards:

9.5. Represent and connect mathematical patterns and relationships using verbal descriptions, generalizations, tables and graphs. Use representations to solve mathematical and real-world situations, in various cultures, especially in historical and contemporary Dakota and Anishinaabe communities. 9.5.4 4. Express the terms in an arithmetic or geometric sequence

recursively and by giving an explicit (closed form) formula.** (MP8) 9 5. Represent and connect mathematical patterns and relationships using verbal descriptions, generalizations, tables and graphs. Use representations to solve mathematical and real-world situations, in various cultures, especially in historical and contemporary Dakota and Anishinaabe communities.

What Enduring Understandings are desired?

Patterns can be generalized by explicit and recursive formulas.

Patterns provide insights into potential relationships, arithmetic and geometric.

Sums for sequences can be determined using formulas.

What Essential Questions will be considered?

Why is it important to be able to recognize and generalize patterns?

How do I express a pattern to show a relationship?

How can patterns be used to make predictions?

To what extent do patterns relate to my life?

Students will know / be able to:

Apply arithmetic and geometric sequences to a variety of real life and theoretical applications.

Find the finite sum for an arithmetic and geometric series.

Find the infinite sum for a geometric series when possible.

Students will be able to find the nth term of arithmetic and geometric sequences.

Students will be able to solve IB test questions relating to sequences.

Description <i>Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.</i>	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
Day 1 Introduction to sequences (9.1) grains of rice on a checkerboard video			x				5c
Day 1 Using explicit and recursive formulas to find the first 5 terms of a sequence (9.1)				x			5c
Day 1 Evaluating Factorials and expanding Sigma Notation (9.1)				x			5c
Day 2 and 3 Definition of arithmetic sequences (9.2) Use stations				x			5c
Day 2 and 3 Finding partial sums of arithmetic series (9.2) schoology Quiz				x			5c

Day 2 and 3 Applications for arithmetic sequences (9.2)	x						3d
Day 2 and 3 Definition of geometric sequence (9.3)				x			5c
Day 2 and 3 Finding partial and infinite sums for geometric series (9.3)				x			5c
Day 2 and 3 Applications for geometric sequences (9.3) Use stations	x						5b,3d
Google Sheets Project: savings account example , credit card example , Credit Project student	x			x	x	x	5b, 3d
Day 4 Domino Review Game domino review game	x						5c
Day 4 IB Review Questions IB Test Questions	x						5c
Day 5 Jeopardy Review Game Jeopardy Review Game	x						5c
Day 6 Unit test 9.1-9.3 Test		x					5c

Materials, tools and resources:

Text book: Pre-Calculus with Limits, Larson, et al.

Schoology

EdPuzzle

TI GDC

Unit Plan Author : Kelly Schleper and Mike McKay Highland Park High School

Additional credit given to: