Unit 3: Exponential and Logarithmic Functions

Unit 3 Introduction

Exponential functions are used in modeling many real-world phenomena, such as the growth of a population or the growth of an investment that earns compound interest. Once an exponential model is obtained, we can use the model to predict population size or calculate the amount of an investment for any future date. Logarithmic functions are the inverses of exponential functions. Logarithms have some unique properties that make them especially useful when working with large numbers. Logarithms are used to measure the size of earthquakes and how acidic something is.

Unit Priority Standards

Standard	Skills	Check
10.IF.7.e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	
10.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
10.BF.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	

Unit Transfer Goals

- Apply mathematics to problems that arise in everyday life, society, and the workplace.
- Communicate and organize mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate in a professional manner.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Unit Essential questions	
1. How do you model phenomena using exponential or logarithmic functions?	
Acquisition of Knowledge Skill	
Students will know… 1. Laws of exponents 2. Properties of logarithms 3. When a function models growth or decay 4. Features of the graphs of exponential and logarithmic functions 5. What strategies to attempt to model phenomena	*Students will be skilled at…*I can... 1. Graphing exponential and logarithmic functions 2. Solve problems involving exponential and logarithmic functions 3. Apply the properties of exponents and logarithms to solve problems.

Unit Plan

Week 1: 11/15-11/19	**Focus: Exponential Functions** How do you model phenomena using exponential or logarithmic functions?
Learning Target(s):	3.1 Exponential Functions
Acquired Knowledge and Skills:	❏ Graph and analyze exponential functions ❏ Use exponential functions to model growth and decay
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-in 3.1

Week 2: 11/22-11/25	**Focus: Logarithmic Functions** **Happy Thanksgiving!** How do you model phenomena using exponential or logarithmic functions?
Learning Target(s):	3.2 Logarithmic Functions 3.3 Properties of Logarithms
Acquired Knowledge and Skills:	❏ Graph and analyze logarithmic functions ❏ Use logarithmic functions to model phenomena
Activities:	Guided Notes Student.desmos.com
Due Dates and Assessments:	All assigned practice is due the next class period. Check-in 3.2

Week 3: 11/29-12/3	**Focus: Exponential and Logarithmic Equations** How do you model phenomena using exponential or logarithmic functions?
Learning Target(s):	3.4 Exponential and Logarithmic Equations Review and Test
Acquired Knowledge and Skills:	❏ Apply the one-to-one property of exponential and logarithmic functions to solve problems
Activities:	Guided Notes Student.desmos.com Test on the 3rd day of class this week.
Due Dates and Assessments:	All assigned practice is due the next class period.

Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
Summative Chapter 3 Test ● Assesses skills and knowledge learned in the unit.	**Formative** Desmos Activities ● Non-graded activities will provide myself and students with information about their understanding. These will also be used as discussion points in class. Q&A ● Questions asked randomly to students will help with review and reinforce knowledge. Check-In ● Gives students focused feedback on their progress in acquiring skills and knowledge. Discussion ● Small group and class discussions provide myself and students with information about their ability to communicate understandings and inferences.

Extended Learning Opportunities

Website Description	Website
Khan Academy: videos & exercises to practice	Khan Academy
Albert IO – Practice Questions	Albert IO
Wolfram Alpha - Mathematical computation engine	Wolfram Alpha