# Integrated Alg2 PreCalc Unit 07: Exponential and Logarithmic Functions

Content Area: Math

Course(s): Integrated Algebra II & PreCalculus

Time Period: Semester 1
Length: 2.5 cycles
Status: Published

#### **Unit Introduction**

### **Standards**

Interpret complicated expressions by viewing one or more of their parts as a single entity.
Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
Combine standard function types using arithmetic operations.
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
Solve an equation of the form $f(x) = c$ for a simple function $f$ that has an inverse and write an expression for the inverse.
Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to $ab$ to the $ct$ power = $d$ where $a$ , $c$ , and $d$ are numbers and the base $b$ is 2, 10, or $e$ ; evaluate the logarithm using technology.
Explain why the $x$ -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

# **Essential Questions**

- · How are exponential and logarithmic functions related?
- · How are exponents and logarithms related?
- How do you model a quantity that changes regularly over time by the same percentage?

#### **Content**

· Exploring Exponential Models

- Exponential and Logarithmic Equations
- Logarithmic Functions as Inverses
- Natural Logarithms
- Properties of Exponential Functions
- Properties of Logarithms

# **Skills**

- Applications of Interest
- Evaluating e^x
- Expand logarithmic expressions
- Graphing exponential equations
- Graphing logarithmic equations
- Identify and model exponential growth and decay
- Modeling an exponential equation
- Perform operations with exponents
- Simplify logarithmic expressions
- Solving exponential equations
- Translating a logarithmic function
- Translating exponential functions
- Using an exponential model
- Write an exponential function