# 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

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| MA.F-BF.A.1b | Combine standard function types using arithmetic operations. |
| MA.F-BF.B.4a | 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. |
| MA.F-IF.C.8 | Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. |
| MA.F-IF.C.9 | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). |
| MA.F-IF.C.7e | Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. |
| MA.F-LE.A.4 | 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. |
| MA.A-CED.A.2 | Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. |
| MA.A-REI.D.11 | 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. |
| MA.A-SSE.A.1b | Interpret complicated expressions by viewing one or more of their parts as a single entity. |

## 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