Course Description:

This course builds off students' knowledge of functions beginning with exponential functions and their inverse, logarithmic functions. Students learn how these two types of functions are related and how they can be used to solve equations, including those modeling contextual situations.

The course moves into trigonometry and trigonometric functions beginning with radian measure and the unit circle, leading into graphs of trigonometric functions and their transformations, and using trigonometric functions to model contextual situations.

Once students have an understanding of different functions, they work with more than one function at a time, comparing them by their key features and locating the solutions to the systems of equations.

Finally, students expand their knowledge of statistical studies by learning about their design and validity. They use data from surveys to find sample means and estimate a range of results by using a margin of error. They learn about normal distributions and how to use z-scores to find a particular area under a normal curve. Statistics concludes with probability simulations and experimental simulations and what these types of simulations can be used for.

Course Objectives:

- Graph exponential, logarithmic, and trigonometric functions by identifying key features.
- Model contextual situations with exponential, logarithmic, and trigonometric functions.
- Solve exponential, logarithmic, and trigonometric functions modeled after contextual situations.
- Perform transformations on exponential, logarithmic, and trigonometric functions.
- Identify exponents and logarithms as inverses and use logarithms to solve exponential equations.
- Find the trigonometric ratios of common angles within the unit circle and use them to represent the sine, cosine, and tangent functions.
- Compare key features and average rates of change of functions represented in different ways.
- Identify the input that has a common output from the solution to a system of equations.
- Represent variables within a given population using a valid statistical study.
- Estimate population percentages, or area, under a normal curve.
- Make inferences about an experiment using simulations.

Required Materials:

In course.

Course Overview:

Unit 1: Exponential and Logarithmic Functions, Part 1

In this unit, students learn how to write functions that model exponential growth and decay, as well as the inverse of those functions. In addition, they see how to apply transformations to these functions, interpret their graphs and function rules in context, and evaluate them using technology.

Unit 2: Exponential and Logarithmic Functions, Part 2

In this unit, students learn how to set up and solve exponential equations in context, how to identify and use key features and properties of logarithms, and how to apply translations and dilations to logarithmic functions.

Unit 3: Trigonometry

In this unit, students learn some of the fundamentals of trigonometry, including trigonometric functions. They also learn about how those functions use triangles, circles, and the Pythagorean Theorem to relate distances and angles.

Unit 4: Trigonometric Functions

In this unit, students learn how to write and graph sine, cosine, and tangent functions, and how to identify and use key features and properties of these trigonometric functions. They also learn how to apply transformations to the trigonometric functions, and how to model real-world situations using the trigonometric functions.

Unit 5: More Than One Function

In this unit, students learn to compare key features for two different types of functions given as graphs, tables of values, and function rules. They then determine where those functions intersect.

Unit 6: Statistics

In this unit, students learn how to identify different types of statistical processes, determine whether claims based on statistics are valid, analyze the shape of data to draw conclusions from it, and use statistical simulations to evaluate a course of action.