

Options EHS Precalculus A 2020		Scope and Sequence
Unit	Lesson	Objectives
Prerequisites		
	Solving Polynomial Equations using Technology	Use technology to solve or approximate solutions of one-variable polynomial equations.
	Complex Numbers	<p>Represent square roots of negative numbers as multiples of i.</p> <p>Represent complex numbers in the form $a + bi$ or in the complex plane.</p> <p>Simplify powers of i using their cyclic nature.</p> <p>Determine the absolute value of a complex number.</p>
	Performing Operations with Complex Numbers	<p>Perform addition, subtraction, multiplication, and division of complex numbers.</p> <p>Identify the field properties of complex numbers.</p>
	The Quadratic Formula	<p>Find real and complex solutions of quadratic equations using the quadratic formula.</p> <p>Use the discriminant to determine the number and type of roots of a quadratic equation.</p>
	Completing The Square	<p>Recognize the pattern of a perfect-square trinomial as the square of a binomial.</p> <p>Use the square root property to solve equations.</p> <p>Find complex solutions to quadratic equations by completing the square.</p>
	Absolute Value Inequalities	<p>Rewrite absolute value inequalities as compound inequalities.</p> <p>Solve absolute value inequalities graphically and algebraically.</p>

Unit Lesson**Objectives**

Quadratic Inequalities

Find real solutions of quadratic inequalities algebraically and graphically.

Create quadratic inequalities in one variable and use them to solve problems.

Test

Functions and Their Graphs

Symmetry

Determine the symmetry of a relation from a graph.

Determine the symmetry of a function algebraically.

Comparing Characteristics of Functions

Determine the similarities and differences in characteristics of multiple functions graphically.

Determine the similarities and differences in characteristics of multiple functions tabularly.

Determine the similarities and differences in characteristics of multiple functions symbolically.

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Piecewise Defined Functions

Graph piecewise defined functions.

Evaluate piecewise defined functions.

Determine the domain, range, and continuity of piecewise defined functions.

Step Functions

Evaluate step functions.

Analyze step functions to determine key features of the graph.

Use step functions to model real-world problems.

Absolute Value Functions

Unit Lesson**Objectives**

Analyze absolute value functions to determine key features of the graph.

Model and solve mathematical and real-world problems with absolute value functions.

Function Operations

Combine functions using arithmetic operations, expressing the results both algebraically and graphically.

Evaluate sums, differences, products, and quotients of functions.

Composition of Functions

Write an expression for the composition of functions.

Find the domain of the composition of functions.

Evaluate the composition of functions.

Function Inverses

Find the inverse of a function.

Use composition to verify that functions are inverses.

Transformations of Functions

Identify a function as belonging to a family of functions.

Analyze a function rule or graph to determine transformations of the parent function.

Mathematical Modeling

Identify a mathematical model

Solve problems using formulas as a model

Develop a function model

Recognize patterns and trends between two variables using tables as models

Unit Test

Polynomial Functions

Unit Lesson**Objectives**

Graphs of Polynomial Functions

Identify the key features of a polynomial function from a given graph.

Describe the key features of a polynomial function.

Synthetic Division and the Remainder Theorem

Use synthetic division to divide a polynomial by a linear factor.

Apply the remainder theorem.

The Fundamental Theorem of Algebra

Apply the fundamental theorem of algebra to determine the number of roots of a polynomial function.

Use the complex conjugate theorem to factor and solve polynomial equations.

Factoring Polynomials Completely

Analyze the structure of a polynomial to write it in completely factored form.

Polynomial Inequalities

Solve polynomial inequalities having real coefficients.

Apply polynomial inequalities to mathematical and real-world problems.

Graphing Radical Functions

Relate transformations to the graphs of square root and cube root functions to their parent function.

Determine the domain and range of square root and cube root functions.

Unit Test

Rational Functions

Vertical Asymptotes of Rational Functions

Determine the vertical asymptotes and holes in the graph of a rational function having the x-axis as its only horizontal asymptote.

Unit Lesson**Objectives**

Solve problems involving inverse variation.

Graphing Rational Functions

Determine the horizontal asymptotes of a rational function.

Graph rational functions that have only vertical or horizontal asymptotes.

Graphs of Rational Functions

Use algebraic techniques to determine key features of a rational function.

Analyze key features of a rational function.

Graph a rational function.

Rational Inequalities

Solve rational inequalities algebraically and determine extraneous solutions.

Modeling with Rational Functions

Model and solve real-world problems using rational functions.

Unit Test

Exponential, Logistic, and Logarithmic Functions

Graphing Exponential Functions

Identify exponential functions.

Determine the domain and range of exponential functions.

Graph exponential functions.

Rewriting Exponential Functions

Write exponential functions and expressions in equivalent forms, using the properties of exponents to justify steps.

Use alternative forms of an exponential function to highlight different information about that function and the real-world situation it models.

Unit Lesson**Objectives**

Equations of Exponential Functions

Determine the equation of an exponential function that best fits the given data

Make predictions using an exponential regression equation

Determine whether a linear or exponential model best fits given data

Exponential Growth Functions

Identify an exponential growth function given tables, graphs, and function rules, determining the rate of change.

Graph an exponential growth function, and state the domain and range.

State the domain and range of an exponential growth function.

Write an exponential growth function to model a real-world problem, pointing out constraints in the modeling context.

Exponential Decay Functions

Identify an exponential decay function given tables, graphs, and function rules, determining the rate of change.

Graph an exponential decay function, and state the domain and range.

Write an exponential decay function to model a real-world problem, pointing out constraints in the modeling context.

Relate exponential growth and decay functions using laws of exponents and reflections over the y-axis.

Graphing Logarithmic Functions

Identify logarithmic functions.

Determine the domain and range of logarithmic functions.

Identify and analyze the graphs of logarithmic functions.

Evaluating Logarithmic Expressions

Evaluate logarithmic expressions by converting between logarithmic and exponential forms.

Solve logarithmic equations by converting between logarithmic and exponential forms.

Unit Lesson**Objectives**

Evaluate common logarithms using a calculator.

Properties of Logarithms

Evaluate, expand, and simplify logarithmic expressions using properties of logarithms.

Base e

Apply properties of logarithms and exponents to solve exponential and logarithmic equations having base e.

Analyze exponential and logarithmic functions in base e to determine key features of the graph.

Determine the domain and range of exponential and logarithmic functions in base e.

Solving Logarithmic Equations using
Technology

Rewrite logarithmic expressions using the change of base algorithm.

Solve a one-variable equation containing logarithms by transforming it into a system of equations.

Exponential, Logistic and Logarithmic
Models

Interpret the numeric values in an exponential, logarithmic, or logistic function in terms of a context.

Model a problem using an exponential, logarithmic, or logistic function.

Solve a problem using an exponential, logarithmic, or logistic function.

Solving Exponential Equations by
Rewriting the Base

Solve exponential equations by rewriting bases.

Solving Equations using Properties of
Logarithms

Apply properties of logarithms to solve logarithmic equations.

Determine extraneous solutions of logarithmic equations.

Solving Exponential and Logarithmic
Equations

Unit Lesson**Objectives**

Solve exponential and logarithmic equations using inverses, properties, and algorithms.

Modeling with Exponential and
Logarithmic Equations

Model and solve real-world problems using exponential and logarithmic functions.

Test

Cumulative Exam

Cumulative Exam Review

Cumulative Exam