Algebra 2

Mathematics

Grade(s) 9th - 12th, Duration 1 Year, 1 Credit
Elective Course

Course Overview

Algebra 2 expands on the algebraic concepts and fundamentals introduced in Algebra I and Geometry. Topics covered include operations on real numbers, factoring, solving various types of equations and inequalities, graphing functions and relations, logarithms, series, sequences, probability, and trigonometry.

Scope And Sequence

Timeframe	Unit	Instructional Topics
3 Week(s)	Equations & Inequalities	1. Expressions, Formulas, and Properties of Real Numbers 2. Solving Equations and Inequalities 3. Solving Absolute Value Equations 4. Solving Compound and Absolute Value Inequalities
2 Week(s)	Linear Relations and Functions	1. Slope of a Line 2. Writing a Linear Equation 3. Parent Functions and Transformations 4. Graphing Linear, Quadratic, and Absolute Value Inequalities
2 Week(s)	Systems of Equations and Inequalities	1. Systems of Equations in Two Variables 2. Systems in Three Variables
4 Week(s)	Quadratic Functions and Relations	1. Factoring 2. Complex Numbers 3. Completing the Square 4. Quadratic Formula 5. Graphing Quadratics 6. Vertex Form and Standard Form of a Quadratic Function
4 Week(s)	Polynomials and Polynomial Functions	1. Operations with Polynomials 2. Dividing Polynomials 3. Factoring Polynomials 4. Solving Polynomial Equations 5. The Remainder and Factor Theorem 6. Roots and Zeroes
4 Week(s)	Inverses and Radical Functions and Relations	1. Operations on Functions 2. Inverse Functions and Relations 3. Square Root Functions and Inequalities 4. nth Roots 5. Operations with Radical Expressions 6. Rational Exponents 7. Solving Radical Equations and Inequalities
4 Week(s)	Exponential and Logarithmic Functions and Relations	1. Graphing Exponential Functions 2. Solving Exponential Equations and Inequalities 3. Logarithms and Logarithmic Functions 4. Solving Logarithmic Equations and Inequalities 5. Properties of Logarithms 6. Common Logarithms and Natural Logarithms 7. Using Exponential and Logarithmic Functions
4 Week(s)	Rational Functions and Relations	1. Multiplying and Dividing Rational Expressions 2. Adding and Subtracting Rational Expressions 3. Solving Rational Equations and Inequalities 4. Graphing Rational Functions
3 Week(s)	Trigonometric Functions	1. Trigonometric Functions in Right Triangles 2. Angles of Angle Measure 3. Trigonometric Functions of General Angles 4. Law of Sines 5. Law of Cosines

Prerequisites

Algebra 1

Course Details

Unit: Equations & Inequalities

Duration: 3 Week(s)

Academic Vocabulary

variable, algebraic expression, order of operations, formula, real numbers, rational numbers, irrational numbers, integers, whole numbers, natural numbers, equation, solution, absolute value, empty set, compound inequality, intersection, union

Summative Assessment

Chapter 1 practice test, page 53

Materials and Resources (optional)

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Topic: Expressions, Formulas, and Properties of Real Numbers **Duration:** 2 Day(s)

Topic Description (short)

Use the order of operations to evaluate expressions. Use formulas. Use the properties of real numbers to evaluate expressions.

Learning Targets

The student will use the order of operations to evaluate expressions
The student will use formulas to evaluate expressions.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Equations and Inequalities **Duration:** 2 Day(s)

Learning Targets

Standard - EE.A-CED.1
Determine the values or rule of a function using a graph or a table.
- Create an equation involving one operation with one variable, and use it to solve a real-world problem.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Absolute Value Equations **Duration:** 2 Day(s)

Learning Targets

The student will evaluate expressions involving absolute values.
The student will solve absolute value equations.
The student will solve absolute value equations.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Compound and Absolute Value Inequalities **Duration:** 2 Day(s)

Learning Targets

The student will solve compound inequalities.
The student will solve absolute value inequalities.

Learning Targets linked to Priority Standard = ✙

Unit: Linear Relations and Functions

Duration: 2 Week(s)

Unit Description

In this unit, students will learn how to graph linear equations. This will then be extended to piecewise functions and absolute value functions. Students will also be able to answer questions regarding real-life scenarios using these functions.

Enduring Understandings (Knowledge & Skills)

1) What does the slope of a line indicate about the line?
2) What information does the equation of a line give you?
3) How are equations and graphs related?

Academic Vocabulary

Slope
Rate of Change
Slope-Intercept Form
Vertical and Horizontal Lines
Writing Equations of Lines
Point-Slope Form
Slope-Intercept Form
Standard Form
Parallel Lines
Perpendicular Lines
Piecewise Function
Absolute Value Function

Summative Assessment

Unit 2 practice test, page127

Materials and Resources (optional)

Glencoe Algebra 2, McGraw Hill, 2014

Topic: Slope of a Line **Duration:** 2 Day(s)

Learning Targets

The student will be able to determine specific values of a function from a table, graph or equation.

Learning Targets linked to Priority Standard = ✙

Topic: Writing a Linear Equation **Duration:** 2 Day(s)

Learning Targets

The student will be able to represent a given function as a table, equation or graph.

Learning Targets linked to Priority Standard = ✙

Topic: Parent Functions and Transformations **Duration:** 2 Day(s)

Topic Description (short)

Identify and use parent functions; and describe transformations of functions. Use transformations to graph linear, quadratic, and absolute value functions.

Learning Targets

The student will be able to represent a given function as a table, equation or graph.

Learning Targets linked to Priority Standard = ✙

Topic: Graphing Linear, Quadratic, and Absolute Value Inequalities **Duration:** 2 Day(s)

Topic Description (short)

Students will be able to graph linear, quadratic and absolute value inequalities in two variables.

Learning Targets

Linear Inequality
Boundary

Learning Targets

The student will create graphs from the (linear, quadratic, cubic, square and cube root, absolute value, exponential, and logarithmic) parent graphs that demonstrate vertical stretch (expansion), or shrink (compression), reflection, horizontal and vertical translation and dilation.

Learning Targets linked to Priority Standard = ✙

Unit: Systems of Equations and Inequalities **Duration:** 2 Week(s)

Unit Description

In this unit, students will learn to solve systems of equations graphically and algebraically. This will be extended to linear inequalities. Students will also learn to solve real-world scenarios using linear programming.

Enduring Understandings (Knowledge & Skills)

1) What does the number of solutions (none, one or infinite) of a system of linear equations represent?
2) What are the advantages and disadvantages of solving a system of linear equations graphically versus algebraically?
3)How can systems of equations and inequalities be used to represent situations and solve problems?

Academic Vocabulary

Dependent System
Independent System
Consistent
Inconsistent
Elimination
Substitution
Linear Programming
System of Constraints
Objective Function
Feasible Region
Bounded
Unbounded

Topic: Systems of Equations in Two Variables **Duration:** 2 Day(s)

Topic Description (short)

Students will be able to solve systems of equations in two variables by graphing, substitution and elimination.

Learning Targets

System of Equations
Consistent

Inconsistent
Dependent
Independent
Substitution
Elimination

Learning Targets
The student will solve systems of equations that may include non-linear equations and inequalities.

Learning Targets linked to Priority Standard = ✚

Topic: Systems in Three Variables **Duration:** 2 Day(s)

Topic Description (short)
Students will solve systems in three variables by elimination and substitution.

Learning Targets
Ordered triple

Learning Targets
The student will solve systems of equations that may include non-linear equations and inequalities.

Learning Targets linked to Priority Standard = ✚

Unit: Quadratic Functions and Relations **Duration:** 4 Week(s)

Unit Description
In this unit, students will learn how to solve a quadratic function by graphing, factoring, completing the square and using the quadratic formula. Students will also learn to convert functions between standard form and vertex form. Students will also develop a basic understanding of complex numbers.

Enduring Understandings (Knowledge & Skills)
1) How does understanding how to find the vertex of a quadratic function help in making decisions in real-life scenarios?
2) How does understanding how to find the roots of a quadratic function help in making decisions in real-life scenarios?
3) What are the advantages of a quadratic function in vertex form? In standard form?
4) How is any quadratic function related to the parent quadratic function f(x)=x^2 ?

Academic Vocabulary
Standard Form
Vertex Form
Quadratic Form
Completing the Square
Imaginary Numbers
Complex Numbers
Rationalizing the Denominator

Topic: Factoring **Duration:** 4 Day(s)

Topic Description (short)
Factor by grouping and factor special trinomials

Learning Targets
Factor by grouping
Factor special trinomials

Learning Targets
The student will factor by grouping.
The student will factor trinomials of the form ax^2+bx+c where a=1
The student will factor trinomials of the form ax2+bx+c where a is not 1

Learning Targets linked to Priority Standard = ✚

Topic: Complex Numbers **Duration:** 2 Day(s)

Topic Description (short)
Students will perform operations on complex numbers of the form a+bi, where a and b are real numbers.
Students will solve quadratic equations using the square root method.

Learning Targets
Imaginary Unit
Pure Imaginary Numbers
Complex Number

Learning Targets
The student will add and subtract complex numbers with answers given in □ + □i form.

The student will be able to write all numbers in the form, □ + □i.
The student will be able to identify that □ and □ are real numbers and □ is defined as the square root of -1.

Learning Targets linked to Priority Standard = ✠

Topic: Completing the Square **Duration:** 2 Day(s)

Topic Description (short)
Students will solve quadratic equations by completing the square.

Learning Targets
Completing the Square

Learning Targets
The student will be able to identify that □ and □ are real numbers and □ is defined as the square root of -1.
The student will be able to simplify radical expressions
The student will be able to write all numbers in the form, □ + □i.
The student will solve equations that may include, but not limited to: linear, quadratic, cubic, exponential and absolute value.
The student will solve quadratic or exponential equations to determine solutions to problems algebraically or graphically (e.g. price-demand-cost-revenue-profit situations, compound interest problems and exponential growth or decay problems).
The student will understand that complex solutions always occur in pairs.

Learning Targets linked to Priority Standard = ✠

Topic: Quadratic Formula **Duration:** 2 Day(s)

Topic Description (short)
Students will solve quadratic equations using the quadratic formula. Students will also identify the number and type of solutions based on the value of the discriminant.

Learning Targets
Quadratic Formula
Discriminant

Learning Targets
The student will solve equations that may include, but not limited to: linear, quadratic, cubic, exponential and absolute value.
The student will solve quadratic or exponential equations to determine solutions to problems algebraically or graphically (e.g. price-demand-cost-revenue-profit situations, compound interest problems and exponential growth or decay problems).
The student will understand that complex solutions always occur in pairs.
The student will be able to identify that □ and □ are real numbers and □ is defined as the square root of -1.
The student will be able to simplify radical expressions
The student will be able to write all numbers in the form, □ + □i.

Learning Targets linked to Priority Standard = ✠

Topic: Graphing Quadratics **Duration:** 2 Day(s)

Topic Description (short)
Students will graph quadratics in standard form and vertex form.

Learning Targets
Quadratic Function
Parabola
Axis of Symmetry
Vertex
Maximum Value
Minimum Value

Learning Targets
The student will be able to represent a given function as a table, equation or graph.
The student will compose functions and determine the domain and range of the new function.
The student will create quadratic or exponential equations to model problems.
The student will identify the following key characteristics of functions from graphs, tables and equations: domain, range, end behavior, x- and y-intercepts, local maxima and minima values, symmetries, points of discontinuity, intervals of increasing and decreasing, and horizontal and vertical asymptotes.
The student will solve quadratic or exponential equations to determine solutions to problems algebraically or graphically (e.g. price-demand-cost-revenue-profit situations, compound interest problems and exponential growth or decay problems).

Learning Targets linked to Priority Standard = ✠

Topic: Vertex Form and Standard Form of a Quadratic Function **Duration:** 4 Day(s)

Topic Description (short)
Students will change quadratic equations from standard form to vertex form and vice versa. Students will also write the equation of a parabola given the vertex and a point on the parabola.

Learning Targets
Vertex Form
Standard Form
Vertex
Parabola

Learning Targets
The student will identify these key characteristics for general polynomials: square roots, cube roots, absolute value of linear functions, simple piece-wise defined, step functions, exponential, logarithmic and rational functions.
The student will translate between equivalent forms of functions.
The student will use the zeros and other key characteristics to sketch the function defined by the polynomial (x- and yintercepts, end behavior, local minima and maxima).
The student will write a quadratic function in vertex form, standard form and/or in intercept form by factorization, completing the square and multiplication.
The student will find equivalent forms of functions to highlight key characteristics.

Learning Targets linked to Priority Standard = ✠

Unit: Polynomials and Polynomial Functions

Duration: 4 Week(s)

Unit Description
In this unit, students will identify, classify, add, subtract and multiply polynomials. To find products, they will use the distributive property and patterns (including the FOIL model, first, outer, inner, last), the square of a binomial pattern and the sum and difference patterns). Students will write polynomials to describe and solve real-world problems, and solve polynomial equations. Students will factor polynomials and use factoring to solve equations, to find the zeros of functions, and the roots of equations. They will factor polynomials completely using a variety of techniques.

Enduring Understandings (Knowledge & Skills)
1) How do we know which factoring method(s) to use to solve a problem?
2) How can factoring polynomials assist in solving real-world problems?
3) How are the roots of a polynomial related to the graph of the polynomial?

Academic Vocabulary
Synthetic Division
Factoring
Polynomial
Binomial
Trinomial
Terms
Leading Coefficient
Degree
Root
Solution
Zeroes
Quadratic Expression
Quadratic Form
Difference of Squares
Sum and Difference of Cubes
Factor by Grouping

Topic: Operations with Polynomials

Duration: 4 Day(s)

Topic Description (short)
Students will multiply, divide and simplify monomials and expressions involving exponents. Students will add, subtract and multiply polynomials.

Learning Targets
Simplify
Monomial
Polynomial
Degree of a Polynomial

Learning Targets
The student will add and subtract rational expressions, including those with polynomial numerators and denominators, including those with unlike denominators.
The student will multiply and divide rational expressions, including those with polynomial numerators and denominators.

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Learning Targets linked to Priority Standard = ✠

Topic: Dividing Polynomials **Duration:** 2 Day(s)

Topic Description (short)
Students will divide polynomials using long division and synthetic division.

Learning Targets
Synthetic Division

Learning Targets
Students will express the result as a quotient with a remainder.
Students will understand that a remainder of zero indicates the divisor is a factor of the dividend.
Students will understand that a remainder other than zero indicates the divisor is not a factor of the dividend.
The student will divide polynomials, using long division and synthetic division, by given factors or zeros to determine other factors.

Learning Targets linked to Priority Standard = ✠

Topic: Factoring Polynomials **Duration:** 2 Day(s)

Topic Description (short)
Students will determine if a binomial is a factor of a polynomial. Students will factor the sum and difference of cubes using a formula

Learning Targets
Polynomial in One Variable
Leading Coefficient
Polynomial Function
Power Functions
End Behavior

Learning Targets
The student will be able to determine specific values of a function from a table, graph or equation.
The student will be able to represent a given function as a table, equation or graph.

Learning Targets linked to Priority Standard = ✠

Topic: Solving Polynomial Equations **Duration:** 2 Day(s)

Topic Description (short)
Students will solve polynomial equations by factoring.

Learning Targets
Prime Polynomials
Quadratic Form

Learning Targets
The student will create equations that may include, but not limited to: linear, quadratic, cubic, exponential, step and absolute value.
The student will solve equations that may include, but not limited to: linear, quadratic, cubic, exponential and absolute value.
The student will extend the knowledge of factoring to completely factor general polynomial expressions.
The student will factor simple expressions that require complex coefficients such as, $\square^2 + 16 = (\square + 4\square)(\square - 4\square)$.
The student will factor polynomials and use the zero product property to identify the zeros.
The student will recognize that the degree of a polynomial determines the number of solutions (real + imaginary).

Learning Targets linked to Priority Standard = ✠

Topic: The Remainder and Factor Theorem **Duration:** 2 Day(s)

Topic Description (short)
Students will evaluate functions by using synthetic division. Students will determine whether a binomial is a factor of a polynomial by using synthetic division.

Learning Targets
Remainder Theorem
Synthetic Substitution
Depressed Polynomial
Factor Theorem

Learning Targets
Students will understand that a remainder of zero indicates the divisor is a factor of the dividend.

Students will understand that a remainder other than zero indicates the divisor is not a factor of the dividend.

Learning Targets linked to Priority Standard = ✙

Topic: Roots and Zeroes **Duration:** 4 Day(s)

Topic Description (short)
Students will determine the number and type of roots for a polynomial equation. Students will find the zeroes of a polynomial function. Students will identify possible rational zeroes of a polynomial function and then find all of the rational zeroes .

Learning Targets
Fundamental Theorem of Algebra
Complex Conjugate Theorem
Rational Zero Theorem

Learning Targets
The student will factor polynomials and use the zero product property to identify the zeros.
The student will use the zeros and other key characteristics to sketch the function defined by the polynomial (x- and yintercepts, end behavior, local minima and maxima).

Learning Targets linked to Priority Standard = ✙

Unit: Inverses and Radical Functions and Relations **Duration:** 4 Week(s)

Unit Description
In this unit, students will learn to relate the inverse of a function to the function itself. They will also learn to perform operations with radicals and how to simplify radicals, including those with a higher index than two. Students will also learn to solve equations involving radicals.

Enduring Understandings (Knowledge & Skills)
1) To simplify the nth root of an expression, what must be true about the expression?
2) When you square each side of an equation, is the resulting equation equivalent to the original?
3) How are a function and its inverse function related?

Academic Vocabulary
Inverse Functions
Rational Exponents
Square Roots
Extraneous Solutions
Radical Expression

Summative Assessment
Chapter 6 Practice Test, page 443

Topic: Operations on Functions **Duration:** 1 Day(s)

Topic Description (short)
Students will find the sum, difference, product and quotient of functions. Students will find the composition of functions.

Learning Targets
Composition of Functions

Learning Targets
The student will add functions to create new functions and determine the domain and range of the new function (modifying the domain and range as necessary).
The student will compose functions and determine the domain and range of the new function.
The student will divide functions to create new function, and determine the domain and range of the new function (modifying the domain and range as necessary).
The student will subtract functions to create new functions and determine the domain and range of the new function (modifying the domain and range as necessary).
The student will multiply functions to create new functions and determine the domain and range of the new function (modifying the domain and range as necessary).

Learning Targets linked to Priority Standard = ✙

Topic: Inverse Functions and Relations **Duration:** 1 Day(s)

Topic Description (short)
Students will find the inverse of a function or relation. Students will determine whether two functions or relations are inverses.

Learning Targets
Inverse Functions

Learning Targets
The student will compose functions to determine if they are inverses.
The student will compose the inverse with the original function to prove that the functions are inverses.

The student will derive inverses of given functions.

Learning Targets linked to Priority Standard = ✣

Topic: Square Root Functions and Inequalities **Duration:** 1 Day(s)

Topic Description (short)
Students will graph and analyze square root functions. Students will graph square root inequalities.

Learning Targets
Square Root Function
Radical Function
Square Root Inequality

Learning Targets
The student will create equations from the parent functions that produce a variety of transformations (linear, quadratic, cubic, square and cube root, absolute value, exponential, and logarithmic).
The student will create graphs from the (linear, quadratic, cubic, square and cube root, absolute value, exponential, and logarithmic) parent graphs that demonstrate vertical stretch (expansion), or shrink (compression), reflection, horizontal and vertical translation and dilation.
The student will describe the effects of transformations algebraically using a, h, and k, given an equation in the form f(x)=a(x-h)+k, or given other general forms of the functions listed.
The student will describe the effects of transformations graphically using terms such as horizontal or vertical stretch (expansion), or shrink (compression), reflection, horizontal and vertical translation and dilation.
The student will identify these key characteristics for general polynomials: square roots, cube roots, absolute value of linear functions, simple piece-wise defined, step functions, exponential, logarithmic and rational functions.

Learning Targets linked to Priority Standard = ✣

Topic: nth Roots **Duration:** 1 Day(s)

Topic Description (short)
Students will simplify radials. Students will use a calculator to approximate radicals.

Learning Targets
Index
Radical Sign
Radicand
Principal Root
nth Root

Learning Targets
The student will be able to simplify radical expressions

Learning Targets linked to Priority Standard = ✣

Topic: Operations with Radical Expressions **Duration:** 1 Day(s)

Topic Description (short)
Students will simplify radical expressions. Students will add, subtract, multiply and divide radical expressions.

Learning Targets
Rationalizing the Denominator
Like Radical Expressions

Learning Targets
The student will be able to simplify radical expressions
The student will able to perform operations with radical expressions, including those that require simplifying prior to combining terms.
The student will use conjugates to simplify rational expressions containing radicals in the denominator.

Learning Targets linked to Priority Standard = ✣

Topic: Rational Exponents **Duration:** 1 Day(s)

Topic Description (short)
Students will write expressions with rational exponents in radical form and vice versa. Students will simplify expressions in exponential or radical form.

Learning Targets
Rational Exponents
Radical Form

Learning Targets
The student will be able to convert from radical form to rational exponent form.

The student will be able to convert from rational exponent form to radical form.
The student will be able to simplify expressions with rational exponents.
The student will recognize that radical form and rational exponent forms are equivalent.
The student will apply the rules of exponents to expressions that include rational exponents.
The student will simplify expressions including constants and variables as bases and using rational exponents, including those with integer numerators other than one.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Radical Equations and Inequalities **Duration:** 1 Day(s)

Topic Description (short)
Students will solve equations containing radicals. Students will solve inequalities containing radicals.

Learning Targets
Radical Equations
Extraneous Solution
Radical Inequality

Learning Targets
The student will check for and identify extraneous solutions.
The student will solve equations involving radical expressions.
The student will solve equations involving rational exponents.

Learning Targets linked to Priority Standard = ✙

Unit: Exponential and Logarithmic Functions and Relations **Duration:** 4 Week(s)

Unit Description
In this unit, students will solve exponential and logarithmic equations. They will recognize that these two functions are inverse operations.

Academic Vocabulary
Exponential equations
Logarithm
Logarithmic equation
Asymptote
Common logarithm
Natural logarithm

Summative Assessment
Chapter 7 Practice Test, page 521

Topic: Graphing Exponential Functions **Duration:** 1 Day(s)

Topic Description (short)
Students will be able to graph exponential growth and decay functions. Students will recognize that graphs of exponential functions have a horizontal asymptote. Students will also be able to apply the rules of transformations to exponential functions.

Learning Targets
The student will be able to represent a given function as a table, equation or graph.
The student will identify these key characteristics for general polynomials: square roots, cube roots, absolute value of linear functions, simple piece-wise defined, step functions, exponential, logarithmic and rational functions.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Exponential Equations and Inequalities **Duration:** 1 Day(s)

Topic Description (short)
Students will be able to solve exponential equations. These are equations where the variable is in the exponent. In this lesson, students will change both sides of an equation to have the same base. Students will also use an exponential model to solve real-world problems.

Learning Targets
The student may use algebraic and/or graphical methods to solve these problems.
The student will create equations that may include, but not limited to: linear, quadratic, cubic, exponential, step and absolute value.
The student will solve equations that may include, but not limited to: linear, quadratic, cubic, exponential and absolute value.
The student will solve exponential equations that do not require logarithms.
The student will solve inequalities that may include, but not limited to: linear, quadratic, cubic, exponential and absolute value.
The student will write an equation or inequality to model a context.
The student will understand that factors repeated n times have a multiplicity of n.

Learning Targets linked to Priority Standard = ✙

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Topic: Logarithms and Logarithmic Functions **Duration:** 1 Day(s)

Topic Description (short)
Students will convert between exponential and logarithmic notation. Students will also recognize that logarithms are inverse functions of exponential functions. Students will be able to graph logarithmic functions.

Learning Targets
The student will be able to convert equations from exponential to logarithmic form.
The student will be able to convert equations from logarithmic to exponential form.
The student will develop the definition of logarithms, $\log_{\square} \square = \square$, if and only if $\square^{\square} = \square$, based on properties of exponents.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Logarithmic Equations and Inequalities **Duration:** 1 Day(s)

Topic Description (short)
Students will be able to solve logarithmic equations that involve rewriting the equations as an exponential equation.

Learning Targets
The student will use the inverse relationship between exponents and logarithms to solve simple logarithmic equations.
The student will check solutions and identify those that are extraneous.

Learning Targets linked to Priority Standard = ✙

Topic: Properties of Logarithms **Duration:** 1 Day(s)

Topic Description (short)
Students will use the properties of logarithms to expand and condense logarithmic expressions. Students will then apply the properties of logarithms to solve logarithmic equations.

Learning Targets
The student will condense expressions using properties of logarithms.
The student will expand expressions using properties of logarithms.
The student will solve equations using properties of logarithms.

Learning Targets linked to Priority Standard = ✙

Topic: Common Logarithms and Natural Logarithms **Duration:** 1 Day(s)

Topic Description (short)
Students will recognize the two special cases of logarithms. They should recognize that common logs have a base 10 and natural logs have a base e, also called the natural base. Students will then use these two special logs to solve exponential equations where a common base cannot be found.

Learning Targets
The student will use the inverse relationship between exponents and logarithms to solve simple exponential equations.

Learning Targets linked to Priority Standard = ✙

Topic: Using Exponential and Logarithmic Functions **Duration:** 1 Day(s)

Topic Description (short)
Students will use properties of logarithms and exponential functions to solve real-world problems. Students will also create a model to solve real-world problems.

Learning Targets
Students will demonstrate an understanding of how logarithmic scales are used to compare quantities.
The student will demonstrate an understanding of applications of the logarithmic scale and apply it in problem solving.
Description: For example: pH scale, Richter scale, sound intensity, light intensity and the musical scale.

Learning Targets linked to Priority Standard = ✙

Unit: Rational Functions and Relations

Duration: 4 Week(s)

Unit Description
Students will simplify rational expressions and complex fractions. Students will also solve rational equations and graph rational functions.

Academic Vocabulary
Rational function
Rational expression
Complex fraction

Summative Assessment
Chapter 8 Practice Test, page 585

Topic: Multiplying and Dividing Rational Expressions **Duration:** 1 Day(s)

Topic Description (short)
Students will apply prior knowledge of fraction multiplication and division to rational expressions. Students will simplify rational expressions and complex fractions.

Learning Targets
The student will extend the knowledge of factoring to completely factor general polynomial expressions.
The student will multiply and divide rational expressions, including those with polynomial numerators and denominators.
Final answers should not have common factors in the numerators and denominators.

Learning Targets linked to Priority Standard = ✙

Topic: Adding and Subtracting Rational Expressions **Duration:** 2 Day(s)

Topic Description (short)
Students will apply prior knowledge of adding and subtracting fractions to adding and subtracting rational expressions. Students will find the least common denominator of two polynomial expressions.

Learning Targets
The student will determine the least common multiple for two or more polynomials.
The student will add and subtract rational expressions, including those with polynomial numerators and denominators, including those with unlike denominators.

Learning Targets linked to Priority Standard = ✙

Topic: Solving Rational Equations and Inequalities **Duration:** 2 Day(s)

Topic Description (short)
Students will solve equations and inequalities that involve rational expressions. Students will also be able to identify extraneous solutions.

Learning Targets
The student will check solutions and identify those that are extraneous.
The student will solve rational equations by various methods, including instances when the numerator and denominator are polynomials.

Learning Targets linked to Priority Standard = ✙

Topic: Graphing Rational Functions **Duration:** 1 Day(s)

Topic Description (short)
Graph transformations of reciprocal functions.

Learning Targets
Determine properties of reciprocal functions. Graph using transformations.

Learning Targets
Use and interpret functions.
- Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems.

Learning Targets linked to Priority Standard = ✙

Unit: Trigonometric Functions **Duration:** 3 Week(s)

Unit Description
Students will find values of trigonometric functions, solve problems by using right triangle trigonometry, solve triangles by using the Law of Sines and Law of Cosines.

Academic Vocabulary
trigonometry
sine
cosine
tangent
cosecant
secant
cotangent
angle of elevation
angle of depression
standard position
radian
Law of Sines
Law of Cosines

Summative Assessment
Chapter 12 Practice Test, page 865

Topic: Trigonometric Functions in Right Triangles **Duration:** 2 Day(s)

Topic Description (short)
Find values of trigonometric functions for acute angles. Use trigonometric functions to find side lengths and angle measures of right triangles.

Learning Targets
Define trigonometric ratios, and solve problems involving right triangles.

Learning Targets linked to Priority Standard = ✣

Topic: Angles of Angle Measure **Duration:** 1 Day(s)

Topic Description (short)
Draw and find angles in standard position. Convert between degree measures and radian measures.

Learning Targets
Define trigonometric ratios, and solve problems involving right triangles.
Define trigonometric ratios, and solve problems involving right triangles.

Learning Targets linked to Priority Standard = ✣

Topic: Trigonometric Functions of General Angles **Duration:** 1 Day(s)

Topic Description (short)
Find values of trigonometric functions for general angles. Find values of trigonometric functions by using reference angles.

Learning Targets
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles.

Learning Targets linked to Priority Standard = ✣

Topic: Law of Sines **Duration:** 1 Day(s)

Topic Description (short)
Find the area of a triangle using two sides and an included angle.

Topic: Law of Cosines **Duration:** 1 Day(s)

Topic Description (short)
Use the Law of Cosines to solve triangles. Choose methods to solve triangles