ALEKS®

College Algebra with Trigonometry

This course covers the topics outlined below. You can customize the scope and sequence of this course to meet your curricular needs.

Curriculum (556 topics + 614 additional topics)

- Algebra and Geometry Review (126 topics)
  - ♦ Real Numbers and Algebraic Expressions (14 topics)
    - ◊ Signed fraction addition or subtraction: Basic
    - ◊ Signed fraction subtraction involving double negation
    - ◊ Signed fraction multiplication: Basic
    - ◊ Signed fraction division
    - ◊ Computing the distance between two integers on a number line
    - ◊ Exponents and integers: Problem type 1
    - ◊ Exponents and signed fractions
    - ◊ Order of operations with integers
    - ◊ Evaluating a linear expression: Integer multiplication with addition or subtraction
    - ◊ Evaluating a quadratic expression: Integers
    - ◊ Evaluating a linear expression: Signed fraction multiplication with addition or subtraction
    - ◊ Distributive property: Integer coefficients
    - ◊ Using distribution and combining like terms to simplify: Univariate
    - ◊ Using distribution with double negation and combining like terms to simplify: Multivariate
  - ♦ Exponents (20 topics)
    - ◊ Introduction to the product rule of exponents
    - ◊ Product rule with positive exponents: Univariate
    - ◊ Product rule with positive exponents: Multivariate
    - ◊ Introduction to the power of a power rule of exponents
    - ◊ Introduction to the power of a product rule of exponents
    - ◊ Power rules with positive exponents: Multivariate products
    - ◊ Power rules with positive exponents: Multivariate quotients
    - ◊ Simplifying a ratio of multivariate monomials: Basic
    - ◊ Introduction to the quotient rule of exponents
    - ◊ Simplifying a ratio of univariate monomials
    - ◊ Quotient of expressions involving exponents
    - ◊ Evaluating expressions with exponents of zero
    - ◊ Evaluating an expression with a negative exponent: Whole number base
    - ◊ Evaluating an expression with a negative exponent: Positive fraction base
    - ◊ Evaluating an expression with a negative exponent: Negative integer base
    - ◊ Rewriting an algebraic expression without a negative exponent
    - ◊ Introduction to the product rule with negative exponents
    - ◊ Quotient rule with negative exponents: Problem type 1
    - ◊ Power of a power rule with negative exponents
    - ◊ Power rules with negative exponents
  - ♦ Polynomial Expressions (14 topics)
    - ◊ Degree and leading coefficient of a univariate polynomial
    - ◊ Simplifying a sum or difference of two univariate polynomials

- ◊ Multiplying a univariate polynomial by a monomial with a positive coefficient
- ◊ Multiplying a univariate polynomial by a monomial with a negative coefficient
- ◊ Multiplying a multivariate polynomial by a monomial
- ◊ Multiplying binomials with leading coefficients of 1
- ◊ Multiplying binomials with leading coefficients greater than 1
- ◊ Multiplying binomials in two variables
- ◊ Multiplying conjugate binomials: Univariate
- ◊ Squaring a binomial: Univariate
- ◊ Squaring a binomial: Multivariate
- ◊ Multiplying binomials with negative coefficients
- ◊ Multiplication involving binomials and trinomials in one variable
- ◊ Multiplication involving binomials and trinomials in two variables

♦ Factoring Polynomials (16 topics)

- ◊ Greatest common factor of 2 numbers
- ◊ Factoring a linear binomial
- ◊ Introduction to the GCF of two monomials
- ◊ Greatest common factor of two multivariate monomials
- ◊ Factoring out a monomial from a polynomial: Univariate
- ◊ Factoring out a monomial from a polynomial: Multivariate
- ◊ Factoring out a binomial from a polynomial: GCF factoring, basic
- ◊ Factoring a univariate polynomial by grouping: Problem type 1
- ◊ Factoring a quadratic with leading coefficient 1
- ◊ Factoring out a constant before factoring a quadratic
- ◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- ◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- ◊ Factoring a quadratic with a negative leading coefficient
- ◊ Factoring a perfect square trinomial with leading coefficient 1
- ◊ Factoring a difference of squares in one variable: Basic
- ◊ Factoring a difference of squares in one variable: Advanced

♦ Rational Expressions (28 topics)

- ◊ Restriction on a variable in a denominator: Linear
- ◊ Simplifying a ratio of factored polynomials: Linear factors
- ◊ Simplifying a ratio of polynomials using GCF factoring
- ◊ Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
- ◊ Simplifying a ratio of polynomials: Problem type 1
- ◊ Multiplying rational expressions made up of linear expressions
- ◊ Multiplying rational expressions involving quadratics with leading coefficients of 1
- ◊ Dividing rational expressions involving linear expressions
- ◊ Dividing rational expressions involving quadratics with leading coefficients of 1
- ◊ Least common multiple of 2 numbers
- ◊ Least common multiple of 3 numbers
- ◊ Introduction to the LCM of two monomials
- ◊ Finding the LCD of rational expressions with linear denominators: Relatively prime
- ◊ Writing equivalent rational expressions with polynomial denominators
- ◊ Introduction to adding fractions with variables and common denominators
- ◊ Adding rational expressions with common denominators and monomial numerators
- ◊ Adding rational expressions with common denominators and binomial numerators
- ◊ Adding rational expressions with common denominators and GCF factoring
- ◊ Adding rational expressions with common denominators and quadratic factoring
- ◊ Adding rational expressions with different denominators and a single occurrence of a variable
- ◊ Adding rational expressions with denominators ax and bx: Basic
- ◊ Adding rational expressions with denominators ax and bx: Advanced
- ◊ Adding rational expressions with linear denominators without common factors: Basic

- ◊ Complex fraction without variables: Problem type 1
- ◊ Complex fraction without variables: Problem type 2
- ◊ Complex fraction involving univariate monomials
- ◊ Complex fraction: GCF factoring
- ◊ Complex fraction made of sums involving rational expressions: Problem type 1

♦ Perfect Squares and nth Roots (7 topics)

- ◊ Square root of a rational perfect square
- ◊ Square roots of perfect squares with signs
- ◊ Introduction to simplifying a radical expression with an even exponent
- ◊ Square root of a perfect square monomial
- ◊ Introduction to solving an absolute value equation
- ◊ Cube root of an integer
- ◊ Finding n^{th} roots of perfect n^{th} powers with signs

♦ Rational Exponents (4 topics)

- ◊ Converting between radical form and exponent form
- ◊ Rational exponents: Unit fraction exponents and whole number bases
- ◊ Rational exponents: Non−unit fraction exponent with a whole number base
- ◊ Rational exponents: Negative exponents and fractional bases

♦ Radical Expressions (19 topics)

- ◊ Simplifying the square root of a whole number less than 100
- ◊ Simplifying a radical expression with an even exponent
- ◊ Introduction to simplifying a radical expression with an odd exponent
- ◊ Simplifying a radical expression with an odd exponent
- ◊ Simplifying a higher root of a whole number
- ◊ Introduction to square root addition or subtraction
- ◊ Square root addition or subtraction
- ◊ Introduction to square root multiplication
- ◊ Square root multiplication: Basic
- ◊ Square root multiplication: Advanced
- ◊ Introduction to simplifying a product of radical expressions: Univariate
- ◊ Introduction to simplifying a product involving square roots using the distributive property
- ◊ Simplifying a product involving square roots using the distributive property: Basic
- ◊ Simplifying a product involving square roots using the distributive property: Advanced
- ◊ Simplifying a quotient of square roots
- ◊ Simplifying a quotient involving a sum or difference with a square root
- ◊ Rationalizing a denominator: Quotient involving square roots
- ◊ Rationalizing a denominator: Square root of a fraction
- ◊ Rationalizing a denominator using conjugates: Integer numerator

♦ Geometry (4 topics)

- ◊ Circumference of a circle
- ◊ Volume of a rectangular prism
- ◊ Introduction to the Pythagorean Theorem
- ◊ Pythagorean Theorem

• Equations and Inequalities (83 topics)

♦ Linear Equations and Applications (27 topics)

- ◊ Additive property of equality with signed fractions
- ◊ Multiplicative property of equality with signed fractions
- ◊ Solving a multi−step equation given in fractional form
- ◊ Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
- ◊ Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution

- ◊ Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
- ◊ Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
- ◊ Solving a two−step equation with signed fractions
- ◊ Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
- ◊ Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
- ◊ Solving a proportion of the form (x+a)/b = c/d
- ◊ Solving for a variable in terms of other variables using addition or subtraction: Basic
- ◊ Solving for a variable in terms of other variables using addition or subtraction: Advanced
- ◊ Solving for a variable in terms of other variables using multiplication or division: Basic
- ◊ Solving for a variable in terms of other variables using multiplication or division: Advanced
- ◊ Solving for a variable in terms of other variables using addition or subtraction with division
- ◊ Solving for a variable inside parentheses in terms of other variables
- ◊ Solving for a variable in terms of other variables in a linear equation with fractions
- ◊ Translating a sentence into a one−step equation
- ◊ Translating a sentence into a multi−step equation
- ◊ Solving a word problem with two unknowns using a linear equation
- ◊ Solving a decimal word problem using a linear equation of the form Ax + B = C
- ◊ Solving a word problem with three unknowns using a linear equation
- ◊ Solving a one−step word problem using the formula d = rt
- ◊ Solving a distance, rate, time problem using a linear equation
- ◊ Finding the perimeter or area of a rectangle given one of these values
- ◊ Finding the sale price given the original price and percent discount

♦ Absolute Value Equations (2 topics)
- ◊ Solving an absolute value equation: Problem type 1
- ◊ Solving an absolute value equation: Problem type 2

♦ Linear Inequalities and Applications (7 topics)
- ◊ Graphing a linear inequality on the number line
- ◊ Graphing a compound inequality on the number line
- ◊ Set−builder and interval notation
- ◊ Identifying solutions to a two−step linear inequality in one variable
- ◊ Solving a two−step linear inequality: Problem type 1
- ◊ Solving a two−step linear inequality: Problem type 2
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 1

♦ Rational Equations that Simplify to Linear (8 topics)
- ◊ Solving a rational equation that simplifies to linear: Denominator x
- ◊ Solving a rational equation that simplifies to linear: Denominator x+a
- ◊ Solving a rational equation that simplifies to linear: Denominators a, x, or ax
- ◊ Solving a rational equation that simplifies to linear: Denominators ax and bx
- ◊ Solving a rational equation that simplifies to linear: Like binomial denominators
- ◊ Solving a rational equation that simplifies to linear: Unlike binomial denominators
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 1
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 2

♦ Complex Numbers (4 topics)
- ◊ Using i to rewrite square roots of negative numbers
- ◊ Adding or subtracting complex numbers
- ◊ Multiplying complex numbers
- ◊ Dividing complex numbers

♦ Quadratic Equations (20 topics)
- ◊ Solving an equation written in factored form

- ◊ Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- ◊ Finding the roots of a quadratic equation with leading coefficient 1
- ◊ Finding the roots of a quadratic equation with leading coefficient greater than 1
- ◊ Solving a quadratic equation needing simplification
- ◊ Roots of a product of polynomials
- ◊ Writing a quadratic equation given the roots and the leading coefficient
- ◊ Solving a word problem using a quadratic equation with rational roots
- ◊ Solving an equation of the form $x^2 = a$ using the square root property
- ◊ Solving a quadratic equation using the square root property: Exact answers, basic
- ◊ Solving a quadratic equation using the square root property: Exact answers, advanced
- ◊ Completing the square
- ◊ Solving a quadratic equation by completing the square: Exact answers
- ◊ Applying the quadratic formula: Exact answers
- ◊ Applying the quadratic formula: Decimal answers
- ◊ Solving a quadratic equation with complex roots
- ◊ Discriminant of a quadratic equation
- ◊ Solving a word problem using a quadratic equation with irrational roots
- ◊ Solving an equation using the odd−root property: Problem type 1
- ◊ Solving an equation using the odd−root property: Problem type 2

♦ Rational Equations that Simplify to Quadratic (5 topics)

- ◊ Restriction on a variable in a denominator: Quadratic
- ◊ Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- ◊ Solving a rational equation that simplifies to quadratic: Denominator x
- ◊ Solving a rational equation that simplifies to quadratic: Binomial denominators, constant numerators
- ◊ Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators

♦ Radical Equations (10 topics)

- ◊ Introduction to solving a radical equation
- ◊ Solving a radical equation that simplifies to a linear equation: One radical, basic
- ◊ Solving a radical equation that simplifies to a linear equation: One radical, advanced
- ◊ Solving a radical equation that simplifies to a linear equation: Two radicals
- ◊ Solving a radical equation that simplifies to a quadratic equation: One radical, basic
- ◊ Solving a radical equation that simplifies to a quadratic equation: One radical, advanced
- ◊ Algebraic symbol manipulation with radicals
- ◊ Solving an equation with a root index greater than 2: Problem type 1
- ◊ Solving an equation with a root index greater than 2: Problem type 2
- ◊ Solving an equation that can be written in quadratic form: Problem type 1

• Graphs and Functions (138 topics)

♦ The Coordinate Plane, Distance, and Midpoint (9 topics)

- ◊ Reading a point in the coordinate plane
- ◊ Plotting a point in the coordinate plane
- ◊ Naming the quadrant or axis of a point given its coordinates
- ◊ Naming the quadrant or axis of a point given the signs of its coordinates
- ◊ Table for a linear equation
- ◊ Distance between two points in the plane: Exact answers
- ◊ Midpoint of a line segment in the plane
- ◊ Identifying solutions to a linear equation in two variables
- ◊ Finding a solution to a linear equation in two variables

♦ Graphs of Equations (16 topics)

- ◊ Graphing a linear equation of the form $y = mx$
- ◊ Graphing a line given its equation in slope−intercept form: Integer slope
- ◊ Graphing a line given its equation in slope−intercept form: Fractional slope
- ◊ Graphing a line given its equation in standard form
- ◊ Graphing a vertical or horizontal line

- ◊ Finding x− and y−intercepts given the graph of a line on a grid
- ◊ Finding x− and y−intercepts of a line given the equation: Basic
- ◊ Finding x− and y−intercepts of a line given the equation: Advanced
- ◊ Graphing a line by first finding its x− and y−intercepts
- ◊ Finding intercepts of a nonlinear function given its graph
- ◊ Finding x− and y−intercepts of the graph of a nonlinear equation
- ◊ Graphing an absolute value equation of the form $y = A|x|$
- ◊ Graphing a parabola of the form $y = ax^2$
- ◊ Graphing a parabola of the form $y = ax^2 + c$
- ◊ Graphing a cubic function of the form $y = ax^3$
- ◊ Determining if graphs have symmetry with respect to the x−axis, y−axis, or origin

♦ Slope and Equations of Lines (17 topics)

- ◊ Finding slope given the graph of a line on a grid
- ◊ Finding slope given two points on the line
- ◊ Finding the slope of horizontal and vertical lines
- ◊ Graphing a line given its slope and y−intercept
- ◊ Finding the slope and y−intercept of a line given its equation in the form $y = mx + b$
- ◊ Finding the slope and y−intercept of a line given its equation in the form $Ax + By = C$
- ◊ Graphing a line by first finding its slope and y−intercept
- ◊ Writing an equation of a line given its slope and y−intercept
- ◊ Writing an equation in slope−intercept form given the slope and a point
- ◊ Finding the slope and a point on a line given its equation in point−slope form
- ◊ Writing an equation in point−slope form given the slope and a point
- ◊ Writing an equation of a line given the y−intercept and another point
- ◊ Writing the equation of the line through two given points
- ◊ Writing the equations of vertical and horizontal lines through a given point
- ◊ Finding slopes of lines parallel and perpendicular to a line given in slope−intercept form
- ◊ Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$
- ◊ Writing equations of lines parallel and perpendicular to a given line through a point

♦ Linear Applications (5 topics)

- ◊ Writing and evaluating a function that models a real−world situation: Advanced
- ◊ Writing an equation and drawing its graph to model a real−world situation: Advanced
- ◊ Finding the initial amount and rate of change given a graph of a linear function
- ◊ Interpreting the parameters of a linear function that models a real−world situation
- ◊ Application problem with a linear function: Finding a coordinate given two points

♦ Circles (6 topics)

- ◊ Identifying the center and radius to graph a circle given its equation in standard form
- ◊ Identifying the center and radius to graph a circle given its equation in general form: Basic
- ◊ Writing the equation of a circle centered at the origin given its radius or a point on the circle
- ◊ Writing an equation of a circle given its center and radius or diameter
- ◊ Writing an equation of a circle given its center and a point on the circle
- ◊ Writing an equation of a circle given the endpoints of a diameter

♦ Functions (26 topics)

- ◊ Identifying functions from relations
- ◊ Vertical line test
- ◊ Table for a linear function
- ◊ Evaluating functions: Linear and quadratic or cubic
- ◊ Evaluating a rational function: Problem type 1
- ◊ Evaluating a rational function: Problem type 2
- ◊ Table for a square root function
- ◊ Evaluating a cube root function
- ◊ Evaluating functions: Absolute value, rational, radical
- ◊ Evaluating a piecewise−defined function

- ◊ Variable expressions as inputs of functions: Problem type 1
- ◊ Variable expressions as inputs of functions: Problem type 2
- ◊ Variable expressions as inputs of functions: Problem type 3
- ◊ Domain and range from ordered pairs
- ◊ Domain of a rational function: Excluded values
- ◊ Domain of a rational function: Interval notation
- ◊ Domain of a square root function: Basic
- ◊ Domain of a square root function: Advanced
- ◊ Finding the domain of a fractional function involving radicals
- ◊ Determining whether an equation defines a function: Basic
- ◊ Determining whether an equation defines a function: Advanced
- ◊ Finding outputs of a one−step function that models a real−world situation: Function notation
- ◊ Finding outputs of a two−step function with decimals that models a real−world situation: Function notation
- ◊ Finding inputs and outputs of a two−step function that models a real−world situation: Function notation
- ◊ Finding a difference quotient for a linear or quadratic function
- ◊ Finding a difference quotient for a rational function

♦ Graphs of Functions (27 topics)

- ◊ Finding an output of a function from its graph
- ◊ Finding inputs and outputs of a function from its graph
- ◊ Domain and range from the graph of a continuous function
- ◊ Domain and range from the graph of a piecewise function
- ◊ Finding where a function is increasing, decreasing, or constant given the graph
- ◊ Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
- ◊ Finding local maxima and minima of a function given the graph
- ◊ Finding the absolute maximum and minimum of a function given the graph
- ◊ Finding values and intervals where the graph of a function is zero, positive, or negative
- ◊ Graphing a function of the form $f(x) = ax + b$: Integer slope
- ◊ Graphing a function of the form $f(x) = ax + b$: Fractional slope
- ◊ Graphing an absolute value equation in the plane: Basic
- ◊ Graphing an absolute value equation in the plane: Advanced
- ◊ Graphing a function of the form $f(x) = ax^2$
- ◊ Graphing a function of the form $f(x) = ax^2 + c$
- ◊ Graphing a parabola of the form $y = (x-h)^2 + k$
- ◊ Graphing a square root function: Problem type 1
- ◊ Graphing a square root function: Problem type 2
- ◊ Matching parent graphs with their equations
- ◊ Graphing a piecewise−defined function: Problem type 1
- ◊ Graphing a piecewise−defined function: Problem type 2
- ◊ Graphing a piecewise−defined function: Problem type 3
- ◊ Even and odd functions: Problem type 1
- ◊ Even and odd functions: Problem type 2
- ◊ Finding the average rate of change of a function
- ◊ Finding the average rate of change of a function given its graph
- ◊ Word problem involving average rate of change

♦ Transformations (13 topics)

- ◊ Translating the graph of a parabola: One step
- ◊ Translating the graph of a parabola: Two steps
- ◊ How the leading coefficient affects the shape of a parabola
- ◊ Translating the graph of an absolute value function: One step
- ◊ Translating the graph of an absolute value function: Two steps
- ◊ Writing an equation for a function after a vertical translation

- ◊ Translating the graph of a function: One step
- ◊ Translating the graph of a function: Two steps
- ◊ Transforming the graph of a function by reflecting over an axis
- ◊ Transforming the graph of a function by shrinking or stretching
- ◊ Transforming the graph of a function using more than one transformation
- ◊ Transforming the graph of a quadratic, cubic, square root, or absolute value function
- ◊ Writing an equation for a function after a vertical and horizontal translation

♦ Combining Functions; Composite Functions; Inverse Functions (19 topics)

- ◊ Sum, difference, and product of two functions
- ◊ Quotient of two functions: Basic
- ◊ Quotient of two functions: Advanced
- ◊ Combining functions: Advanced
- ◊ Introduction to the composition of two functions
- ◊ Composition of two functions: Basic
- ◊ Composition of a function with itself
- ◊ Expressing a function as a composition of two functions
- ◊ Composition of two functions: Advanced
- ◊ Composition of two rational functions
- ◊ Word problem involving composition of two functions
- ◊ Horizontal line test
- ◊ Determining whether two functions are inverses of each other
- ◊ Inverse functions: Linear, discrete
- ◊ Inverse functions: Quadratic, square root
- ◊ Inverse functions: Cubic, cube root
- ◊ Inverse functions: Rational
- ◊ Graphing the inverse of a function given its graph
- ◊ Finding, evaluating, and interpreting an inverse function for a given linear relationship

• Polynomial and Rational Functions (64 topics)

♦ Quadratic Functions (16 topics)

- ◊ Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
- ◊ Graphing a parabola of the form $y = x^2 + bx + c$
- ◊ Graphing a parabola of the form $y = a(x-h)^2 + k$
- ◊ Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
- ◊ Finding the zeros of a quadratic function given its equation
- ◊ Using a graphing calculator to find the zeros of a quadratic function
- ◊ Writing a quadratic function given its zeros
- ◊ Finding the x−intercept(s) and the vertex of a parabola
- ◊ Using a graphing calculator to find the x−intercept(s) and vertex of a quadratic function
- ◊ Rewriting a quadratic function to find its vertex and sketch its graph
- ◊ Finding the maximum or minimum of a quadratic function
- ◊ Word problem involving the maximum or minimum of a quadratic function
- ◊ Word problem involving optimizing area by using a quadratic function
- ◊ Domain and range from the graph of a quadratic function
- ◊ Range of a quadratic function
- ◊ Writing the equation of a quadratic function given its graph

♦ Polynomial Functions (10 topics)

- ◊ Finding zeros of a polynomial function written in factored form
- ◊ Finding zeros and their multiplicities given a polynomial function written in factored form
- ◊ Finding a polynomial of a given degree with given zeros: Real zeros
- ◊ Finding x− and y−intercepts given a polynomial function
- ◊ Determining the end behavior of the graph of a polynomial function
- ◊ Determining end behavior and intercepts to graph a polynomial function
- ◊ Matching graphs with polynomial functions

- ◊ Inferring properties of a polynomial function from its graph
- ◊ Using a graphing calculator to find local extrema of a polynomial function
- ◊ Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function

♦ Division of Polynomials; Remainder and Factor Theorems (6 topics)
- ◊ Polynomial long division: Problem type 1
- ◊ Polynomial long division: Problem type 2
- ◊ Polynomial long division: Problem type 3
- ◊ Synthetic division
- ◊ Using the remainder theorem to evaluate a polynomial
- ◊ The Factor Theorem

♦ Real Zeros of Polynomial Functions (7 topics)
- ◊ Using a given zero to write a polynomial as a product of linear factors: Real zeros
- ◊ Finding all possible rational zeros using the rational zeros theorem: Problem type 1
- ◊ Finding all possible rational zeros using the rational zeros theorem: Problem type 2
- ◊ Using the rational zeros theorem to find all zeros of a polynomial: Rational zeros
- ◊ Using the rational zeros theorem to find all zeros of a polynomial: Irrational zeros
- ◊ Using a graphing calculator to find zeros of a polynomial function
- ◊ Using a graphing calculator to solve a word problem involving a polynomial of degree 3

♦ Complex Zeros of Polynomials Functions (4 topics)
- ◊ Multiplying expressions involving complex conjugates
- ◊ Finding a polynomial of a given degree with given zeros: Complex zeros
- ◊ Using a given zero to write a polynomial as a product of linear factors: Complex zeros
- ◊ Using the rational zeros theorem to find all zeros of a polynomial: Complex zeros

♦ Rational Functions (13 topics)
- ◊ Finding the intercepts, asymptotes, domain, and range from the graph of a rational function
- ◊ Finding the asymptotes of a rational function: Constant over linear
- ◊ Finding the asymptotes of a rational function: Linear over linear
- ◊ Finding horizontal and vertical asymptotes of a rational function: Quadratic numerator or denominator
- ◊ Finding the asymptotes of a rational function: Quadratic over linear
- ◊ Graphing a rational function: Constant over linear
- ◊ Graphing a rational function: Linear over linear
- ◊ Transforming the graph of a rational function
- ◊ Graphing a rational function: Quadratic over linear
- ◊ Graphing rational functions with holes
- ◊ Matching graphs with rational functions: Two vertical asymptotes
- ◊ Graphing a rational function with more than one vertical asymptote
- ◊ Using a graphing calculator to solve a word problem involving a local extremum of a rational function

♦ Polynomial and Rational Inequalities (8 topics)
- ◊ Solving a quadratic inequality written in factored form
- ◊ Solving a quadratic inequality
- ◊ Solving a polynomial inequality: Problem type 1
- ◊ Solving a polynomial inequality: Problem type 2
- ◊ Solving a polynomial inequality: Problem type 3
- ◊ Solving a polynomial inequality: Problem type 4
- ◊ Solving a rational inequality: Problem type 1
- ◊ Solving a rational inequality: Problem type 2

• Exponential and Logarithmic Functions (50 topics)

♦ Graphing Exponential Functions (8 topics)
- ◊ Table for an exponential function
- ◊ Graphing an exponential function and its asymptote: $f(x)=b^x$

- ◊ Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
- ◊ Graphing an exponential function and its asymptote: $f(x)=b^{-x}$ or $f(x)=-b^{ax}$
- ◊ Translating the graph of an exponential function
- ◊ The graph, domain, and range of an exponential function
- ◊ Transforming the graph of a natural exponential function
- ◊ Graphing an exponential function and its asymptote: $f(x) = a(e)^{x-b} + c$

♦ Applications of Exponential Functions (7 topics)

- ◊ Using a calculator to evaluate exponential expressions
- ◊ Evaluating an exponential function that models a real−world situation
- ◊ Using a calculator to evaluate exponential expressions involving base e
- ◊ Evaluating an exponential function with base e that models a real−world situation
- ◊ Introduction to compound interest
- ◊ Finding a final amount in a word problem on exponential growth or decay
- ◊ Finding the final amount in a word problem on compound interest

♦ Logarithmic Functions (9 topics)

- ◊ Using a calculator to evaluate natural and common logarithmic expressions
- ◊ Converting between logarithmic and exponential equations
- ◊ Converting between natural logarithmic and exponential equations
- ◊ Evaluating logarithmic expressions
- ◊ Solving an equation of the form $\log_b a = c$
- ◊ Translating the graph of a logarithmic function
- ◊ Graphing a logarithmic function: Basic
- ◊ The graph, domain, and range of a logarithmic function
- ◊ Domain of a logarithmic function: Advanced

♦ Properties of Logarithms (6 topics)

- ◊ Basic properties of logarithms
- ◊ Using properties of logarithms to evaluate expressions
- ◊ Expanding a logarithmic expression: Problem type 1
- ◊ Expanding a logarithmic expression: Problem type 2
- ◊ Writing an expression as a single logarithm
- ◊ Change of base for logarithms: Problem type 1

♦ Logarithmic and Exponential Equations (10 topics)

- ◊ Solving a multi−step equation involving a single logarithm: Problem type 1
- ◊ Solving a multi−step equation involving a single logarithm: Problem type 2
- ◊ Solving a multi−step equation involving natural logarithms
- ◊ Solving an equation involving logarithms on both sides: Problem type 1
- ◊ Solving an equation involving logarithms on both sides: Problem type 2
- ◊ Solving an exponential equation by finding common bases: Linear exponents
- ◊ Solving an exponential equation by using logarithms: Decimal answers, basic
- ◊ Solving an exponential equation by using natural logarithms: Decimal answers
- ◊ Solving an exponential equation by using logarithms: Decimal answers, advanced
- ◊ Solving an exponential equation by using logarithms: Exact answers in logarithmic form

♦ Applications (10 topics)

- ◊ Finding the time to reach a limit in a word problem on exponential growth or decay
- ◊ Finding the time in a word problem on compound interest
- ◊ Finding the time given an exponential function with base e that models a real−world situation
- ◊ Finding the final amount in a word problem on continuous compound interest
- ◊ Finding the initial amount in a word problem on continuous compound interest
- ◊ Finding the final amount in a word problem on continuous exponential growth or decay
- ◊ Finding the rate or time in a word problem on continuous exponential growth or decay
- ◊ Finding half−life or doubling time
- ◊ Writing and evaluating a function modeling continuous exponential growth or decay given doubling time or half−life

- ◊ Writing and evaluating a function modeling continuous exponential growth or decay given two outputs

- Trigonometric Functions (58 topics)
  - ♦ Angles and Their Measure (5 topics)
    - ◊ Converting between degree and radian measure: Problem type 1
    - ◊ Converting between degree and radian measure: Problem type 2
    - ◊ Sketching an angle in standard position
    - ◊ Coterminal angles
    - ◊ Arc length and central angle measure
  - ♦ The Unit Circle and Evaluating Trigonometric Functions (9 topics)
    - ◊ Finding coordinates on the unit circle for special angles
    - ◊ Trigonometric functions and special angles: Problem type 1
    - ◊ Finding trigonometric ratios from a point on the unit circle
    - ◊ Trigonometric functions and special angles: Problem type 2
    - ◊ Trigonometric functions and special angles: Problem type 3
    - ◊ Evaluating expressions involving sine and cosine
    - ◊ Even and odd properties of trigonometric functions
    - ◊ Using a calculator to approximate sine, cosine, and tangent values
    - ◊ Evaluating a sinusoidal function that models a real−world situation
  - ♦ Right Triangle Trigonometry (9 topics)
    - ◊ Sine, cosine, and tangent ratios: Variables for side lengths
    - ◊ Using the Pythagorean Theorem to find a trigonometric ratio
    - ◊ Finding trigonometric ratios given a right triangle
    - ◊ Using a trigonometric ratio to find a side length in a right triangle
    - ◊ Using trigonometry to find a length in a word problem with one right triangle
    - ◊ Using a trigonometric ratio to find an angle measure in a right triangle
    - ◊ Using trigonometry to find angles of elevation or depression in a word problem
    - ◊ Solving a right triangle
    - ◊ Using trigonometry to find a length in a word problem with two right triangles
  - ♦ Trigonometric Functions of Angles (7 topics)
    - ◊ Reference angles: Problem type 1
    - ◊ Reference angles: Problem type 2
    - ◊ Determining the location of a terminal point given the signs of trigonometric values
    - ◊ Finding values of trigonometric functions given information about an angle: Problem type 1
    - ◊ Finding values of trigonometric functions given information about an angle: Problem type 2
    - ◊ Finding values of trigonometric functions given information about an angle: Problem type 3
    - ◊ Finding values of trigonometric functions given information about an angle: Problem type 4
  - ♦ Graphs of Sine and Cosine Functions (14 topics)
    - ◊ Sketching the graph of $y= a \sin(x)$ or $y= a \cos(x)$
    - ◊ Sketching the graph of $y= \sin(bx)$ or $y= \cos(bx)$
    - ◊ Sketching the graph of $y= \sin(x)+ d$ or $y= \cos(x)+ d$
    - ◊ Sketching the graph of $y= \sin(x+c)$ or $y= \cos(x+c)$
    - ◊ Sketching the graph of $y= a \sin(x+c)$ or $y= a \cos(x+c)$
    - ◊ Sketching the graph of $y= a \sin(bx)$ or $y= a \cos(bx)$
    - ◊ Sketching the graph of $y= a \sin(bx+c)$ or $y= a \cos(bx+c)$
    - ◊ Sketching the graph of $y= a \sin(bx)+ d$ or $y= a \cos(bx)+ d$
    - ◊ Amplitude and period of sine and cosine functions
    - ◊ Amplitude, period, and phase shift of sine and cosine functions
    - ◊ Writing the equation of a sine or cosine function given its graph: Problem type 1
    - ◊ Writing the equation of a sine or cosine function given its graph: Problem type 2
    - ◊ Word problem involving a sine or cosine function: Problem type 1
    - ◊ Word problem involving a sine or cosine function: Problem type 2
  - ♦ Graphs of Other Trigonometric Functions (6 topics)

- ◊ Domains and ranges of trigonometric functions
- ◊ Matching graphs and equations for secant, cosecant, tangent, and cotangent functions
- ◊ Sketching the graph of a secant or cosecant function: Problem type 1
- ◊ Sketching the graph of a secant or cosecant function: Problem type 2
- ◊ Sketching the graph of a tangent or cotangent function: Problem type 1
- ◊ Sketching the graph of a tangent or cotangent function: Problem type 2

♦ Inverse Trigonometric Functions (8 topics)

- ◊ Values of inverse trigonometric functions
- ◊ Composition of a trigonometric function with its inverse trigonometric function: Problem type 1
- ◊ Composition of a trigonometric function with its inverse trigonometric function: Problem type 2
- ◊ Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 1
- ◊ Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 2
- ◊ Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 3
- ◊ Composition of trigonometric functions with variable expressions as inputs: Problem type 1
- ◊ Using a calculator to approximate inverse trigonometric values

• Trigonometric Identities and Equations (32 topics)

♦ Verifying Trigonometric Identities (6 topics)

- ◊ Simplifying trigonometric expressions
- ◊ Using cofunction identities
- ◊ Verifying a trigonometric identity
- ◊ Proving trigonometric identities: Problem type 1
- ◊ Proving trigonometric identities: Problem type 2
- ◊ Proving trigonometric identities: Problem type 3

♦ Sum and Difference Formulas (6 topics)

- ◊ Sum and difference identities: Problem type 1
- ◊ Sum and difference identities: Problem type 2
- ◊ Sum and difference identities: Problem type 3
- ◊ Sum and difference identities: Problem type 4
- ◊ Proving trigonometric identities using sum and difference properties: Problem type 1
- ◊ Proving trigonometric identities using sum and difference properties: Problem type 2

♦ Double−Angle, Half−Angle, Product−to−Sum, and Power Reducing Formulas (8 topics)

- ◊ Double−angle identities: Problem type 1
- ◊ Double−angle identities: Problem type 2
- ◊ Power−reducing identities
- ◊ Half−angle identities: Problem type 1
- ◊ Half−angle identities: Problem type 2
- ◊ Product−to−sum and sum−to−product identities: Problem type 1
- ◊ Product−to−sum and sum−to−product identities: Problem type 2
- ◊ Proving trigonometric identities using double−angle properties

♦ Trigonometric Equations (12 topics)

- ◊ Finding solutions in an interval for a basic equation involving sine or cosine
- ◊ Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
- ◊ Solving a basic trigonometric equation using a calculator
- ◊ Solving a basic trigonometric equation involving sine or cosine
- ◊ Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- ◊ Finding solutions in an interval for a trigonometric equation in factored form
- ◊ Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 1
- ◊ Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2
- ◊ Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 1

- ◊ Finding solutions in an interval for an equation with sine and cosine using double−angle identities
- ◊ Solving a trigonometric equation modeling a real−world situation
- ◊ Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant

- Additional Topics in Trigonometry (5 topics)
  - ♦ Laws of Sines and Cosines (5 topics)
    - ◊ Solving a triangle with the law of sines: Problem type 1
    - ◊ Solving a triangle with the law of sines: Problem type 2
    - ◊ Solving a word problem using the law of sines
    - ◊ Solving a triangle with the law of cosines
    - ◊ Solving a word problem using the law of cosines

- Other Topics Available(*) (614 additional topics)
  - ♦ Algebra and Geometry Review (160 topics)
    - ◊ Fractional position on a number line
    - ◊ Plotting rational numbers on a number line
    - ◊ Ordering integers
    - ◊ Estimating a square root
    - ◊ Ordering real numbers
    - ◊ Identifying numbers as integers or non−integers
    - ◊ Identifying numbers as rational or irrational
    - ◊ Signed fraction addition or subtraction: Advanced
    - ◊ Addition and subtraction of 3 fractions involving signs
    - ◊ Signed fraction multiplication: Advanced
    - ◊ Operations with absolute value: Problem type 2
    - ◊ Exponents and integers: Problem type 2
    - ◊ Order of operations with integers and exponents
    - ◊ Converting between temperatures in Fahrenheit and Celsius
    - ◊ Properties of addition
    - ◊ Properties of real numbers
    - ◊ Identifying properties used to simplify an algebraic expression
    - ◊ Understanding the product rule of exponents
    - ◊ Ordering numbers with positive exponents
    - ◊ Understanding the power rules of exponents
    - ◊ Power and product rules with positive exponents
    - ◊ Simplifying a ratio of multivariate monomials: Advanced
    - ◊ Power and quotient rules with positive exponents
    - ◊ Ordering numbers with negative exponents
    - ◊ Product rule with negative exponents
    - ◊ Quotient rule with negative exponents: Problem type 2
    - ◊ Power and quotient rules with negative exponents: Problem type 1
    - ◊ Power and quotient rules with negative exponents: Problem type 2
    - ◊ Power, product, and quotient rules with negative exponents
    - ◊ Scientific notation with positive exponent
    - ◊ Scientific notation with negative exponent
    - ◊ Converting between scientific notation and standard form in a real−world situation
    - ◊ Multiplying numbers written in scientific notation: Basic
    - ◊ Multiplying numbers written in scientific notation: Advanced
    - ◊ Multiplying numbers written in decimal form or scientific notation in a real−world situation
    - ◊ Dividing numbers written in scientific notation: Basic
    - ◊ Dividing numbers written in scientific notation: Advanced
    - ◊ Finding the scale factor between numbers given in scientific notation in a real−world situation
    - ◊ Degree of a multivariate polynomial

◊ Simplifying a sum or difference of three univariate polynomials
◊ Simplifying a sum or difference of multivariate polynomials
◊ Multiplying conjugate binomials: Multivariate
◊ Prime numbers
◊ Prime factorization
◊ Greatest common factor of three univariate monomials
◊ Factoring a univariate polynomial by grouping: Problem type 2
◊ Factoring a multivariate polynomial by grouping: Problem type 1
◊ Factoring a multivariate polynomial by grouping: Problem type 2
◊ Factoring a quadratic in two variables with leading coefficient 1
◊ Factoring a quadratic with leading coefficient greater than 1: Problem type 3
◊ Factoring a quadratic by the ac−method
◊ Factoring a quadratic in two variables with leading coefficient greater than 1
◊ Factoring a perfect square trinomial with leading coefficient greater than 1
◊ Factoring a perfect square trinomial in two variables
◊ Factoring a difference of squares in two variables
◊ Factoring a polynomial involving a GCF and a difference of squares: Univariate
◊ Factoring a polynomial involving a GCF and a difference of squares: Multivariate
◊ Factoring a product of a quadratic trinomial and a monomial
◊ Factoring with repeated use of the difference of squares formula
◊ Factoring a sum or difference of two cubes
◊ Factoring out binomials from a polynomial: GCF factoring, advanced
◊ Using substitution to factor polynomials
◊ Simplifying a ratio of factored polynomials: Factors with exponents
◊ Simplifying a ratio of linear polynomials: 1, −1, and no simplification
◊ Simplifying a ratio of polynomials: Problem type 2
◊ Simplifying a ratio of polynomials: Problem type 3
◊ Simplifying a ratio of multivariate polynomials
◊ Multiplying rational expressions involving multivariate monomials
◊ Multiplying rational expressions involving quadratics with leading coefficients greater than 1
◊ Multiplying rational expressions involving multivariate quadratics
◊ Dividing rational expressions involving multivariate monomials
◊ Dividing rational expressions involving quadratics with leading coefficients greater than 1
◊ Dividing rational expressions involving multivariate quadratics
◊ Multiplication and division of 3 rational expressions
◊ Least common multiple of two monomials
◊ Finding the LCD of rational expressions with linear denominators: Common factors
◊ Finding the LCD of rational expressions with quadratic denominators
◊ Writing equivalent rational expressions with monomial denominators
◊ Writing equivalent rational expressions involving opposite factors
◊ Adding rational expressions with denominators ax^n and bx^m
◊ Adding rational expressions with multivariate monomial denominators: Basic
◊ Adding rational expressions with multivariate monomial denominators: Advanced
◊ Adding rational expressions with linear denominators without common factors: Advanced
◊ Adding rational expressions with linear denominators with common factors: Basic
◊ Adding rational expressions with linear denominators with common factors: Advanced
◊ Adding rational expressions with denominators ax−b and b−ax
◊ Adding rational expressions involving different quadratic denominators
◊ Adding 3 rational expressions with different quadratic denominators
◊ Complex fraction involving multivariate monomials
◊ Complex fraction: Quadratic factoring
◊ Complex fraction made of sums involving rational expressions: Problem type 2
◊ Complex fraction made of sums involving rational expressions: Problem type 3

◊ Complex fraction made of sums involving rational expressions: Problem type 4
◊ Complex fraction made of sums involving rational expressions: Problem type 5
◊ Complex fraction made of sums involving rational expressions: Problem type 6
◊ Complex fraction made of sums involving rational expressions: Multivariate
◊ Complex fraction with negative exponents: Problem type 1
◊ Complex fraction with negative exponents: Problem type 2
◊ Complex fraction that contains a complex fraction
◊ Finding all square roots of a number
◊ Square roots of integers raised to even exponents
◊ Using absolute value to simplify square roots of perfect square monomials
◊ Finding the n^{th} root of a perfect n^{th} power fraction
◊ Finding the n^{th} root of a perfect n^{th} power monomial
◊ Using absolute value to simplify higher radical expressions
◊ Rational exponents: Unit fraction exponents and bases involving signs
◊ Rational exponents: Product rule
◊ Rational exponents: Quotient rule
◊ Rational exponents: Products and quotients with negative exponents
◊ Rational exponents: Power of a power rule
◊ Rational exponents: Powers of powers with negative exponents
◊ Simplifying the square root of a whole number greater than 100
◊ Simplifying a radical expression with two variables
◊ Introduction to simplifying a higher radical expression
◊ Simplifying a higher radical expression: Univariate
◊ Simplifying a higher radical expression: Multivariate
◊ Square root addition or subtraction with three terms
◊ Introduction to simplifying a sum or difference of radical expressions: Univariate
◊ Simplifying a sum or difference of radical expressions: Univariate
◊ Simplifying a sum or difference of radical expressions: Multivariate
◊ Simplifying a sum or difference of higher roots
◊ Simplifying a sum or difference of higher radical expressions
◊ Simplifying a product of radical expressions: Univariate
◊ Simplifying a product of radical expressions: Multivariate
◊ Simplifying a product of radical expressions: Multivariate, fractional expressions
◊ Introduction to simplifying a product of higher roots
◊ Simplifying a product of higher radical expressions
◊ Special products of radical expressions: Conjugates and squaring
◊ Classifying sums and products as rational or irrational
◊ Rationalizing a denominator: Quotient involving a monomial
◊ Rationalizing a denominator using conjugates: Square root in numerator
◊ Rationalizing a denominator using conjugates: Variable in denominator
◊ Rationalizing a denominator: Quotient involving a higher radical
◊ Rationalizing a denominator: Quotient involving higher radicals and monomials
◊ Simplifying products or quotients of higher radicals with different indices: Univariate
◊ Simplifying products or quotients of higher radicals with different indices: Multivariate
◊ Area of a piecewise rectangular figure
◊ Word problem involving the area between two rectangles
◊ Area of a triangle
◊ Area of a parallelogram
◊ Area of a trapezoid
◊ Perimeter involving rectangles and circles
◊ Circumference and area of a circle
◊ Circumference and area of a circle: Exact answers in terms of pi
◊ Area involving rectangles and circles

- ◊ Word problem involving the area between two concentric circles
- ◊ Area involving inscribed figures
- ◊ Volume of a triangular prism
- ◊ Volume of a pyramid
- ◊ Volume of a cylinder
- ◊ Word problem involving the rate of filling or emptying a cylinder
- ◊ Volume of a cone
- ◊ Volume of a cone: Exact answers in terms of pi
- ◊ Volume of a sphere
- ◊ Surface area of a cube or a rectangular prism
- ◊ Surface area of a triangular prism
- ◊ Surface area of a cylinder
- ◊ Surface area of a cylinder: Exact answers in terms of pi
- ◊ Surface area of a sphere
- ◊ Word problem involving the Pythagorean Theorem

♦ Equations and Inequalities (76 topics)

- ◊ Identifying properties used to solve a linear equation
- ◊ Solving equations with zero, one, or infinitely many solutions
- ◊ Solving a decimal word problem using a linear equation with the variable on both sides
- ◊ Solving a fraction word problem using a linear equation with the variable on both sides
- ◊ Solving a word problem involving consecutive integers
- ◊ Writing a multi−step equation for a real−world situation
- ◊ Solving a value mixture problem using a linear equation
- ◊ Finding a side length given the perimeter and side lengths with variables
- ◊ Circumference ratios
- ◊ Solving equations involving vertical angles
- ◊ Finding angle measures of a triangle given angles with variables
- ◊ Finding the value for a new score that will yield a given mean
- ◊ Finding the multiplier to give a final amount after a percentage increase or decrease
- ◊ Finding the total cost including tax or markup
- ◊ Finding the original price given the sale price and percent discount
- ◊ Computing a percent mixture
- ◊ Solving a percent mixture problem using a linear equation
- ◊ Finding simple interest without a calculator
- ◊ Converting a repeating decimal to a fraction
- ◊ Solving an absolute value equation: Problem type 3
- ◊ Solving an absolute value equation: Problem type 4
- ◊ Solving an absolute value equation of the form $|ax+b| = |cx+d|$
- ◊ Translating a sentence into a one−step inequality
- ◊ Translating a sentence into a multi−step inequality
- ◊ Writing an inequality for a real−world situation
- ◊ Writing an inequality given a graph on the number line
- ◊ Translating a sentence into a compound inequality
- ◊ Writing a compound inequality given a graph on the number line
- ◊ Set−builder notation
- ◊ Union and intersection of finite sets
- ◊ Union and intersection of intervals
- ◊ Additive property of inequality with signed fractions
- ◊ Multiplicative property of inequality with signed fractions
- ◊ Solving a two−step linear inequality with a fractional coefficient
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 2
- ◊ Solving a linear inequality with multiple occurrences of the variable: Problem type 3
- ◊ Solving inequalities with no solution or all real numbers as solutions

- ◊ Solving a compound linear inequality: Graph solution, basic
- ◊ Solving a compound linear inequality: Interval notation
- ◊ Solving a decimal word problem using a two−step linear inequality
- ◊ Solving a decimal word problem using a linear inequality with the variable on both sides
- ◊ Solving an absolute value inequality: Problem type 1
- ◊ Writing an absolute value inequality given a graph on the number line
- ◊ Solving an absolute value inequality: Problem type 2
- ◊ Solving an absolute value inequality: Problem type 3
- ◊ Solving an absolute value inequality: Problem type 4
- ◊ Solving an absolute value inequality: Problem type 5
- ◊ Solving a proportion of the form $a/(x+b) = c/x$
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 3
- ◊ Word problem on proportions: Problem type 1
- ◊ Word problem on proportions: Problem type 2
- ◊ Similar polygons
- ◊ Similar right triangles
- ◊ Indirect measurement
- ◊ Ratio of volumes
- ◊ Word problem involving multiple rates
- ◊ Solving a work problem using a rational equation
- ◊ Solving a distance, rate, time problem using a rational equation
- ◊ Ordering fractions with variables
- ◊ Simplifying a product and quotient involving square roots of negative numbers
- ◊ Simplifying a power of i
- ◊ Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
- ◊ Discriminant of a quadratic equation with parameter
- ◊ Solving a rational equation that simplifies to quadratic: Proportional form, basic
- ◊ Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator
- ◊ Solving a rational equation that simplifies to quadratic: Proportional form, advanced
- ◊ Solving a radical equation with a quadratic expression under the radical
- ◊ Solving a radical equation with two radicals that simplifies to $\text{sqrt}(x) = a$
- ◊ Solving a radical equation that simplifies to a quadratic equation: Two radicals
- ◊ Word problem involving radical equations: Basic
- ◊ Word problem involving radical equations: Advanced
- ◊ Solving an equation with exponent 1/a: Problem type 1
- ◊ Solving an equation with exponent 1/a: Problem type 2
- ◊ Solving an equation with positive rational exponent
- ◊ Solving an equation with negative rational exponent
- ◊ Solving an equation that can be written in quadratic form: Problem type 2

♦ Graphs and Functions (61 topics)

- ◊ Finding the area of a triangle or parallelogram in the coordinate plane
- ◊ Distance between two points in the plane: Decimal answers
- ◊ Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
- ◊ Finding an endpoint of a line segment given the other endpoint and the midpoint
- ◊ Graphing a line given its x− and y−intercepts
- ◊ Testing an equation for symmetry about the axes and origin
- ◊ Classifying slopes given graphs of lines
- ◊ Finding the coordinate that yields a given slope
- ◊ Graphing a line through a given point with a given slope
- ◊ Identifying linear equations: Advanced
- ◊ Identifying linear functions given ordered pairs
- ◊ Rewriting a linear equation in the form $Ax + By = C$
- ◊ Writing an equation and graphing a line given its slope and y−intercept

- ◊ Finding the slope, y−intercept, and equation for a linear function given a table of values
- ◊ Graphing a line given its equation in point−slope form
- ◊ Writing an equation in standard form given the slope and a point
- ◊ Comparing linear functions to the parent function y=x
- ◊ Identifying parallel and perpendicular lines from equations
- ◊ Identifying parallel and perpendicular lines from coordinates
- ◊ Identifying coordinates that give right triangles
- ◊ Graphing ordered pairs and writing an equation from a table of values in context
- ◊ Finding the initial amount and rate of change given a table for a linear function
- ◊ Combining functions to write a new function that models a real−world situation
- ◊ Comparing properties of linear functions given in different forms
- ◊ Application problem with a linear function: Finding a coordinate given the slope and a point
- ◊ Solving a linear equation by graphing
- ◊ Constructing a scatter plot
- ◊ Sketching the line of best fit
- ◊ Scatter plots and correlation
- ◊ Predictions from the line of best fit
- ◊ Approximating the equation of a line of best fit and making predictions
- ◊ Computing residuals
- ◊ Interpreting residual plots
- ◊ Classifying linear and nonlinear relationships from scatter plots
- ◊ Linear relationship and the correlation coefficient
- ◊ Identifying outliers and clustering in scatter plots
- ◊ Finding outliers in a data set
- ◊ Identifying solutions to a system of linear equations
- ◊ Graphically solving a system of linear equations
- ◊ Using a graphing calculator to solve a system of linear equations: Basic
- ◊ Using a graphing calculator to solve a system of linear equations: Advanced
- ◊ Writing a system of linear equations given its graph
- ◊ Solving a system of linear equations using substitution
- ◊ Solving a system of linear equations using elimination with addition
- ◊ Solving a system of linear equations using elimination with multiplication and addition
- ◊ Identifying the center and radius to graph a circle given its equation in general form: Advanced
- ◊ Writing an equation of a circle and identifying points that lie on the circle
- ◊ Deriving the equation of a circle using the Pythagorean Theorem
- ◊ Domains of higher root functions
- ◊ Domain and range of a linear function that models a real−world situation
- ◊ Rewriting a multivariate function as a univariate function given a relationship between its variables
- ◊ Domain and range from the graph of a discrete relation
- ◊ Finding domain and range from a linear graph in context
- ◊ Choosing a graph to fit a narrative: Basic
- ◊ Choosing a graph to fit a narrative: Advanced
- ◊ Graphing an integer function and finding its range for a given domain
- ◊ Graphing a square root function: Problem type 3
- ◊ Graphing a cube root function
- ◊ Writing the equation of a secant line
- ◊ How the leading coefficient affects the graph of an absolute value function
- ◊ Composition of two functions: Domain and range

♦ Polynomial and Rational Functions (27 topics)

- ◊ Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
- ◊ Rewriting a quadratic function in standard form
- ◊ Solving a quadratic equation by graphing
- ◊ Comparing properties of quadratic functions given in different forms

- ◊ Classifying the graph of a function
- ◊ Choosing a quadratic model and using it to make a prediction
- ◊ Identifying polynomial functions
- ◊ Dividing a polynomial by a monomial: Univariate
- ◊ Dividing a polynomial by a monomial: Multivariate
- ◊ Remainder theorem: Advanced
- ◊ Closure properties of integers and polynomials
- ◊ Descartes' Rule of Signs
- ◊ Using the conjugate zeros theorem to find all zeros of a polynomial
- ◊ Linear factors theorem and conjugate zeros theorem
- ◊ Writing the equation of a rational function given its graph
- ◊ Identifying direct variation equations
- ◊ Identifying direct variation from ordered pairs and writing equations
- ◊ Writing a direct variation equation
- ◊ Word problem on direct variation
- ◊ Interpreting direct variation from a graph
- ◊ Writing an inverse variation equation
- ◊ Identifying direct and inverse variation equations
- ◊ Identifying direct and inverse variation from ordered pairs and writing equations
- ◊ Word problem on inverse variation
- ◊ Word problem on inverse proportions
- ◊ Writing an equation that models variation
- ◊ Word problem on combined variation

♦ Exponential and Logarithmic Functions (12 topics)

- ◊ Finding domain and range from the graph of an exponential function
- ◊ Calculating and comparing simple interest and compound interest
- ◊ Finding the initial amount and rate of change given an exponential function
- ◊ Writing an equation that models exponential growth or decay
- ◊ Writing an exponential function rule given a table of ordered pairs
- ◊ Choosing an exponential model and using it to make a prediction
- ◊ Comparing linear, polynomial, and exponential functions
- ◊ Graphing a logarithmic function: Advanced
- ◊ Expanding a logarithmic expression: Problem type 3
- ◊ Change of base for logarithms: Problem type 2
- ◊ Solving an exponential equation by finding common bases: Linear and quadratic exponents
- ◊ Solving an exponential equation by using substitution and quadratic factoring

♦ Trigonometric Functions (13 topics)

- ◊ Converting degrees−minutes−seconds to decimal degrees
- ◊ Converting a decimal degree to degrees−minutes−seconds
- ◊ Area of a sector of a circle
- ◊ Angular and linear speed
- ◊ Finding a point on the unit circle given one coordinate
- ◊ Using a calculator to approximate cosecant, secant, and cotangent values
- ◊ Special right triangles: Exact answers
- ◊ Sine, cosine, and tangent ratios: Numbers for side lengths
- ◊ Understanding trigonometric ratios through similar right triangles
- ◊ Relationship between the sines and cosines of complementary angles
- ◊ Using similar right triangles to find trigonometric ratios
- ◊ Sketching a graph of a damped sine or cosine function
- ◊ Composition of trigonometric functions with variable expressions as inputs: Problem type 2

♦ Trigonometric Identities and Equations (15 topics)

- ◊ Proving trigonometric identities: Problem type 4
- ◊ Proving trigonometric identities using odd and even properties

- ◊ Double−angle identities: Problem type 3
- ◊ Proving trigonometric identities using sum−to−product formulas
- ◊ Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 2
- ◊ Using a graphing calculator to solve a trigonometric equation
- ◊ Using a graphing calculator to solve a trigonometric inequality
- ◊ Solving a trigonometric equation involving a squared function: Problem type 1
- ◊ Solving a trigonometric equation involving a squared function: Problem type 2
- ◊ Solving a trigonometric equation involving more than one function
- ◊ Solving a trigonometric equation involving an angle multiplied by a constant
- ◊ Finding solutions in an interval for an equation with sine and cosine using sum and difference identities
- ◊ Solving a trigonometric equation using sum and difference identities
- ◊ Solving a trigonometric equation using double−angle identities
- ◊ Solving a trigonometric equation using half−angle identities

♦ Additional Topics in Trigonometry (60 topics)

- ◊ Proving the law of sines
- ◊ Proving the law of cosines
- ◊ Using trigonometry to find the area of a right triangle
- ◊ Finding the area of a triangle using trigonometry
- ◊ Expressing the area of a triangle in terms of the sine of one of its angles
- ◊ Heron's formula
- ◊ Writing a position vector in ai+bj form given its graph
- ◊ Writing a vector in ai+bj form given its initial and terminal points
- ◊ Writing a vector in component form given its initial and terminal points
- ◊ Magnitude of a vector given in ai+bj form
- ◊ Magnitude of a vector given in component form
- ◊ Vector addition and scalar multiplication: ai+bj form
- ◊ Linear combination of vectors: ai+bj form
- ◊ Vector addition and scalar multiplication: Component form
- ◊ Linear combination of vectors: Component form
- ◊ Unit vectors
- ◊ Multiplication of a vector by a scalar: Geometric approach
- ◊ Vector addition: Geometric approach
- ◊ Vector subtraction: Geometric approach
- ◊ Finding the magnitude and direction of a vector given its graph
- ◊ Finding the components of a vector given its graph
- ◊ Finding the direction angle of a vector given in ai+bj form
- ◊ Writing a vector given its magnitude and direction angle
- ◊ Writing a vector to represent a force pushing or pulling an object
- ◊ Finding the magnitude and direction angle of the resultant force of two vectors
- ◊ Finding magnitudes of forces related to a sum of three vectors
- ◊ Finding magnitudes of forces related to an object suspended by cables
- ◊ Dot product of vectors given in ai+bj form
- ◊ Dot product of vectors given in component form
- ◊ Finding the angle between two vectors given in component form
- ◊ Classifying vector relationships by finding the angle between two vectors given in ai + bj form
- ◊ Using the dot product to find perpendicular vectors
- ◊ Finding the component of a vector along another vector
- ◊ Decomposing a vector into two orthogonal vectors
- ◊ Finding the amount of work done given a force vector and a distance
- ◊ Finding magnitudes of forces related to an object on a ramp
- ◊ Plotting points in polar coordinates

- ◊ Multiple representations of polar coordinates
- ◊ Converting rectangular coordinates to polar coordinates: Special angles
- ◊ Converting rectangular coordinates to polar coordinates: Decimal answers
- ◊ Converting polar coordinates to rectangular coordinates
- ◊ Converting an equation written in rectangular form to one written in polar form
- ◊ Converting an equation written in polar form to one written in rectangular form: Problem type 1
- ◊ Converting an equation written in polar form to one written in rectangular form: Problem type 2
- ◊ Graphing a polar equation: Basic
- ◊ Graphing a polar equation: Circle
- ◊ Graphing a polar equation: Limacon
- ◊ Graphing a polar equation: Rose
- ◊ Graphing a polar equation: Lemniscate
- ◊ Matching polar equations with their graphs
- ◊ Identifying symmetries of graphs given their polar equations
- ◊ Plotting complex numbers
- ◊ Writing a complex number in standard form given its trigonometric form
- ◊ Writing a complex number in trigonometric form: Special angles
- ◊ Writing a complex number in trigonometric form: Decimal answers
- ◊ Multiplying and dividing complex numbers in trigonometric form
- ◊ De Moivre's Theorem: Answers in trigonometric form
- ◊ De Moivre's Theorem: Answers in standard form
- ◊ Finding the nth roots of a number: Problem type 1
- ◊ Finding the nth roots of a number: Problem type 2

♦ Systems of Equations and Matrices (72 topics)

- ◊ Classifying systems of linear equations from graphs
- ◊ Solving a system of linear equations with fractional coefficients
- ◊ Solving a system of linear equations with decimal coefficients
- ◊ Solving a 2x2 system of linear equations that is inconsistent or consistent dependent
- ◊ Creating an inconsistent system of linear equations
- ◊ Identifying the operations used to create equivalent systems of equations
- ◊ Consistency and independence of a system of linear equations
- ◊ Interpreting the graphs of two functions
- ◊ Solving a word problem involving a sum and another basic relationship using a system of linear equations
- ◊ Solving a word problem using a system of linear equations of the form $Ax + By = C$
- ◊ Solving a word problem using a system of linear equations of the form $y = mx + b$
- ◊ Solving a value mixture problem using a system of linear equations
- ◊ Solving a percent mixture problem using a system of linear equations
- ◊ Solving a distance, rate, time problem using a system of linear equations
- ◊ Solving a tax rate or interest rate problem using a system of linear equations
- ◊ Introduction to solving a 3x3 system of linear equations
- ◊ Solving a 3x3 system of linear equations: Problem type 1
- ◊ Solving a 3x3 system of linear equations: Problem type 2
- ◊ Solving a 3x3 system of linear equations that is inconsistent or consistent dependent
- ◊ Solving a word problem using a 3x3 system of linear equations: Problem type 1
- ◊ Solving a word problem using a 3x3 system of linear equations: Problem type 2
- ◊ Scalar multiplication of a matrix
- ◊ Addition or subtraction of matrices
- ◊ Linear combination of matrices
- ◊ Squaring and multiplying 2x2 matrices
- ◊ Multiplication of matrices: Basic
- ◊ Multiplication of matrices: Advanced
- ◊ Word problem involving multiplication of matrices

- ◊ Finding the inverse of a 2x2 matrix
- ◊ Finding the inverse of a 3x3 matrix
- ◊ Finding the determinant of a 2x2 matrix
- ◊ Finding the determinant of a 3x3 matrix
- ◊ Completing Gauss−Jordan elimination with a 2x2 matrix
- ◊ Gauss−Jordan elimination with a 2x2 matrix
- ◊ Writing solutions to 3x3 systems of linear equations from augmented matrices
- ◊ Completing Gauss−Jordan elimination with a 3x3 matrix
- ◊ Solving a system of linear equations given its augmented matrix
- ◊ Finding the inverse of a matrix to solve a 2x2 system of linear equations
- ◊ Using the inverse of a matrix to solve a 3x3 system of linear equations
- ◊ Using Cramer's rule to solve a 2x2 system of linear equations
- ◊ Using Cramer's rule to solve a 3x3 system of linear equations
- ◊ Introduction to partial fraction decomposition with distinct linear factors
- ◊ Partial fraction decomposition with distinct linear factors
- ◊ Partial fraction decomposition with repeated linear factors
- ◊ Partial fraction decomposition with an irreducible quadratic factor
- ◊ Partial fraction decomposition with repeated, irreducible quadratic factors
- ◊ Graphically solving a system of linear and quadratic equations
- ◊ Using a graphing calculator to solve a system of linear and quadratic equations: Basic
- ◊ Using a graphing calculator to solve a system of equations
- ◊ Using a graphing calculator to solve an exponential or logarithmic equation
- ◊ Solving a system of linear and quadratic equations
- ◊ Solving a system of nonlinear equations: Problem type 1
- ◊ Solving a system of nonlinear equations: Problem type 2
- ◊ Solving a word problem involving geometry using a system of nonlinear equations
- ◊ Identifying solutions to a linear inequality in two variables
- ◊ Graphing a linear inequality in the plane: Vertical or horizontal line
- ◊ Graphing a linear inequality in the plane: Slope−intercept form
- ◊ Graphing a linear inequality in the plane: Standard form
- ◊ Writing an inequality given its graph in the plane: Horizontal or vertical boundary line
- ◊ Writing an inequality given its graph in the plane: Slanted boundary line
- ◊ Graphing a quadratic inequality: Problem type 1
- ◊ Graphing a quadratic inequality: Problem type 2
- ◊ Graphing an inequality involving a circle
- ◊ Graphing a system of two linear inequalities: Basic
- ◊ Graphing a system of two linear inequalities: Advanced
- ◊ Graphing a system of three linear inequalities
- ◊ Graphing a system of nonlinear inequalities: Problem type 1
- ◊ Writing a multi−step inequality for a real−world situation
- ◊ Solving a word problem using a system of linear inequalities: Problem type 1
- ◊ Solving a word problem using a system of linear inequalities: Problem type 2
- ◊ Linear programming
- ◊ Solving a word problem using linear programming

♦ Conic Sections (38 topics)

- ◊ Graphing a parabola of the form $y^2 = ax$ or $x^2 = ay$
- ◊ Graphing a parabola of the form $x=a(y-k)^2+h$ or $y=a(x-h)^2+k$
- ◊ Graphing a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$
- ◊ Writing an equation of a parabola given the vertex and the focus
- ◊ Writing an equation of a parabola given the focus and the directrix
- ◊ Deriving the equation of a parabola given its focus and directrix
- ◊ Finding the vertex, focus, directrix, and axis of symmetry of a parabola
- ◊ Finding the focus of a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$

- ◊ Writing an equation of a parabola given its graph
- ◊ Word problem involving a parabola
- ◊ Graphing an ellipse given its equation in standard form
- ◊ Graphing an ellipse centered at the origin: $Ax^2 + By^2 = C$
- ◊ Graphing an ellipse given its equation in general form
- ◊ Finding the center, vertices, and foci of an ellipse
- ◊ Finding the foci of an ellipse given its equation in general form
- ◊ Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis
- ◊ Writing an equation of an ellipse given the foci and the major axis length
- ◊ Graphing a system of nonlinear inequalities: Problem type 2
- ◊ Word problem involving an ellipse
- ◊ Graphing a hyperbola given its equation in standard form
- ◊ Graphing a hyperbola centered at the origin: $Ax^2 + By^2 = C$
- ◊ Graphing a hyperbola given its equation in general form
- ◊ Finding the center, vertices, foci, and asymptotes of a hyperbola
- ◊ Finding the foci of a hyperbola given its equation in general form
- ◊ Writing an equation of a hyperbola given the foci and the vertices
- ◊ Writing an equation of a hyperbola given the foci and the asymptotes: Basic
- ◊ Writing an equation of a hyperbola given the foci and the asymptotes: Advanced
- ◊ Classifying conics given their equations
- ◊ Completing a table and choosing a graph given a pair of parametric equations
- ◊ Writing the equation of a line and sketching its graph given its parametric equations
- ◊ Writing the equation of a parabola and sketching its graph given its parametric equations
- ◊ Writing the equation of a circle or ellipse and sketching its graph given its parametric equations
- ◊ Graphing a pair of parametric equations with a restricted domain: Line or parabola
- ◊ Graphing a pair of parametric equations with a restricted domain: Circle
- ◊ Graphing a pair of parametric equations with a restricted domain: Ellipse
- ◊ Completing pairs of parametric equations
- ◊ Word problem involving parametric equations for projectile motion: Problem type 1
- ◊ Word problem involving parametric equations for projectile motion: Problem type 2

♦ Sequences, Series, and Probability (65 topics)

- ◊ Finding the first terms of an arithmetic sequence using an explicit rule
- ◊ Finding the first terms of a geometric sequence using an explicit rule
- ◊ Finding the first terms of a sequence using an explicit rule with multiple occurrences of n
- ◊ Finding the next terms of an arithmetic sequence with integers
- ◊ Finding the first terms of a sequence using a recursive rule
- ◊ Identifying arithmetic sequences and finding the common difference
- ◊ Finding a specified term of an arithmetic sequence given the first terms
- ◊ Finding a specified term of an arithmetic sequence given the common difference and first term
- ◊ Finding a specified term of an arithmetic sequence given two terms of the sequence
- ◊ Writing an explicit rule for an arithmetic sequence
- ◊ Writing a recursive rule for an arithmetic sequence
- ◊ Sum of the first n terms of an arithmetic sequence
- ◊ Finding the next terms of a geometric sequence with signed numbers
- ◊ Identifying arithmetic and geometric sequences
- ◊ Identifying geometric sequences and finding the common ratio
- ◊ Finding a specified term of a geometric sequence given the first terms
- ◊ Finding a specified term of a geometric sequence given the common ratio and first term
- ◊ Finding a specified term of a geometric sequence given two terms of the sequence
- ◊ Arithmetic and geometric sequences: Identifying and writing an explicit rule
- ◊ Writing recursive rules for arithmetic and geometric sequences
- ◊ Sum of the first n terms of a geometric sequence

- ◊ Sum of an infinite geometric series
- ◊ Identifying linear, quadratic, and exponential functions given ordered pairs
- ◊ Factorial expressions
- ◊ Interpreting a tree diagram
- ◊ Introduction to the counting principle
- ◊ Counting principle
- ◊ Computing permutations and combinations
- ◊ Introduction to permutations and combinations
- ◊ Permutations and combinations: Problem type 1
- ◊ Permutations and combinations: Problem type 2
- ◊ Permutations and combinations: Problem type 3
- ◊ Binomial formula
- ◊ Determining a sample space and outcomes for a simple event
- ◊ Determining a sample space and outcomes for a compound event
- ◊ Probability of an event
- ◊ Experimental and theoretical probability
- ◊ Outcomes and event probability
- ◊ Probabilities of a permutation and a combination
- ◊ Area as probability
- ◊ Probability of independent events: Decimal answers
- ◊ Probability of dependent events
- ◊ Probabilities of draws with replacement
- ◊ Probabilities of draws without replacement
- ◊ Interpreting a Venn diagram of 2 sets
- ◊ Interpreting a Venn diagram of 3 sets
- ◊ Venn diagrams: Two events
- ◊ Shading a Venn diagram with 3 sets to represent a group
- ◊ Probabilities involving two rolls of a die
- ◊ Determining outcomes for compound events and complements of events
- ◊ Using a Venn diagram to understand the addition rule for probability
- ◊ Outcomes and event probability: Addition rule
- ◊ Word problem involving the probability of a union or an intersection
- ◊ Identifying independent events given values of probabilities
- ◊ Probability of the union and intersection of independent events
- ◊ Probability of the union of mutually exclusive events and independent events
- ◊ Using a Venn diagram to understand the multiplication rule for probability
- ◊ Outcomes and event probability: Conditional probability
- ◊ Computing conditional probability using a two−way frequency table
- ◊ Computing conditional probability to make an inference using a two−way frequency table
- ◊ Conditional probability: Basic
- ◊ Intersection and conditional probability
- ◊ Binomial problems: Basic
- ◊ Binomial problems: Advanced
- ◊ Using a random number table to make a fair decision

♦ Limits and Continuity (15 topics)

- ◊ Estimating a limit numerically
- ◊ Finding limits from a graph
- ◊ Finding a limit by using the limit laws: Problem type 1
- ◊ Finding limits for a piecewise−defined function
- ◊ Finding a limit by using the limit laws: Problem type 2
- ◊ Finding a limit by using the limit laws: Problem type 3
- ◊ Squeeze Theorem
- ◊ Determining points of discontinuity from a graph

◊ Determining a parameter to make a function continuous
◊ Infinite limits and graphs
◊ Limits at infinity and graphs
◊ Limits at infinity and rational functions
◊ Infinite limits and rational functions
◊ Finding a limit of a trigonometric function by using continuity
◊ Finding a limit by using special trigonometric limits

***Other Topics Available** *By default, these topics are NOT included in the course, but can be added using the content editor in the Teacher Module.*

