ALEKS®

Integrated Mathematics III

This course covers the topics shown below.
Students navigate learning paths based on their level of readiness.
Institutional users may customize the scope and sequence to meet curricular needs.

Curriculum (608 topics + 936 additional topics)

- Real Numbers (106 topics)
  - ♦ Fractions and Decimals (28 topics)
    - ◊ Simplifying a fraction
    - ◊ Equivalent fractions
    - ◊ Division involving zero
    - ◊ Least common multiple of 2 numbers
    - ◊ Least common multiple of 3 numbers
    - ◊ Finding the LCD of two fractions
    - ◊ Introduction to addition or subtraction of fractions with different denominators
    - ◊ Addition or subtraction of fractions with different denominators
    - ◊ Product of a unit fraction and a whole number
    - ◊ Product of a fraction and a whole number: Problem type 1
    - ◊ Fraction multiplication
    - ◊ Product of a fraction and a whole number: Problem type 2
    - ◊ The reciprocal of a number
    - ◊ Division involving a whole number and a fraction
    - ◊ Fraction division
    - ◊ Complex fraction without variables: Problem type 1
    - ◊ Writing an improper fraction as a mixed number
    - ◊ Decimal place value: Tenths and hundredths
    - ◊ Rounding decimals
    - ◊ Using a calculator to convert a fraction to a rounded decimal
    - ◊ Addition of aligned decimals
    - ◊ Decimal subtraction: Basic
    - ◊ Decimal subtraction: Advanced
    - ◊ Introduction to decimal multiplication
    - ◊ Multiplying a decimal by a whole number
    - ◊ Multiplication of a decimal by a power of ten
    - ◊ Division of a decimal by a whole number
    - ◊ Division of a decimal by a power of ten
  - ♦ Plotting and Ordering (10 topics)
    - ◊ Fractional position on a number line
    - ◊ Plotting integers on a number line
    - ◊ Using a common denominator to order fractions
    - ◊ Introduction to ordering decimals
    - ◊ Ordering decimals
    - ◊ Ordering integers
    - ◊ Square root of a perfect square
    - ◊ Using a calculator to approximate a square root

- ◊ Absolute value of a number
- ◊ Finding all numbers with a given absolute value

♦ Operations with Signed Numbers (15 topics)

- ◊ Integer addition: Problem type 1
- ◊ Integer addition: Problem type 2
- ◊ Integer subtraction: Problem type 1
- ◊ Integer subtraction: Problem type 2
- ◊ Integer subtraction: Problem type 3
- ◊ Addition and subtraction with 3 integers
- ◊ Integer multiplication and division
- ◊ Multiplication of 3 or 4 integers
- ◊ Signed fraction addition or subtraction: Basic
- ◊ Signed fraction subtraction involving double negation
- ◊ Signed fraction addition or subtraction: Advanced
- ◊ Signed fraction multiplication: Basic
- ◊ Signed fraction division
- ◊ Signed decimal addition and subtraction
- ◊ Computing the distance between two integers on a number line

♦ Exponents and Order of Operations (12 topics)

- ◊ Introduction to exponents
- ◊ Order of operations with whole numbers
- ◊ Order of operations with whole numbers and grouping symbols
- ◊ Order of operations with whole numbers and exponents: Basic
- ◊ Order of operations with whole numbers and exponents: Advanced
- ◊ Exponents and fractions
- ◊ Order of operations with fractions: Problem type 1
- ◊ Order of operations with fractions: Problem type 2
- ◊ Order of operations with fractions: Problem type 3
- ◊ Exponents and integers: Problem type 1
- ◊ Exponents and signed fractions
- ◊ Order of operations with integers

♦ Evaluating Expressions (8 topics)

- ◊ Evaluating an algebraic expression: Whole number addition or subtraction
- ◊ Evaluating an algebraic expression: Whole number multiplication or division
- ◊ Evaluating an algebraic expression: Whole numbers with two operations
- ◊ Evaluating a formula
- ◊ Evaluating an algebraic expression: Whole numbers with one operation and an exponent
- ◊ Evaluating an algebraic expression: Whole number operations and exponents
- ◊ Evaluating a linear expression: Integer multiplication with addition or subtraction
- ◊ Evaluating a quadratic expression: Integers

♦ Properties of Real Numbers (13 topics)

- ◊ Combining like terms: Whole number coefficients
- ◊ Introduction to adding fractions with variables and common denominators
- ◊ Combining like terms: Integer coefficients
- ◊ Combining like terms: Fractional coefficients
- ◊ Combining like terms: Decimal coefficients
- ◊ Multiplying a constant and a linear monomial
- ◊ Distributive property: Whole number coefficients
- ◊ Distributive property: Integer coefficients
- ◊ Distributive property: Fractional coefficients
- ◊ Factors
- ◊ Using distribution and combining like terms to simplify: Univariate
- ◊ Using distribution with double negation and combining like terms to simplify: Multivariate

- ◊ Combining like terms in a quadratic expression
- ♦ Review of Geometry (16 topics)
  - ◊ Acute, obtuse, and right angles
  - ◊ Perimeter of a polygon
  - ◊ Perimeter of a square or a rectangle
  - ◊ Writing algebraic expressions for the perimeter of a figure
  - ◊ Area of a square or a rectangle
  - ◊ Distinguishing between the area and perimeter of a rectangle
  - ◊ Areas of rectangles with the same perimeter
  - ◊ Word problem involving the area of a rectangle: Problem type 2
  - ◊ Area of a triangle
  - ◊ Circumference of a circle
  - ◊ Classifying solids
  - ◊ Identifying horizontal and vertical cross sections of solids
  - ◊ Identifying solids generated by rotations of two−dimensional regions
  - ◊ Identifying geometric shapes that model real−world objects
  - ◊ Volume of a rectangular prism
  - ◊ Word problem involving the volume of a rectangular prism
- ♦ Ratios (4 topics)
  - ◊ Simplifying a ratio of whole numbers: Problem type 1
  - ◊ Solving a word problem on proportions using a unit rate
  - ◊ Finding missing values in a table of equivalent ratios
  - ◊ Using a table of equivalent ratios to find a missing quantity in a ratio

• Linear Equations and Inequalities (105 topics)
- ♦ Linear Equations (31 topics)
  - ◊ Identifying solutions to a one−step linear equation: Problem type 1
  - ◊ Identifying solutions to a one−step linear equation: Problem type 2
  - ◊ Additive property of equality with whole numbers
  - ◊ Additive property of equality with decimals
  - ◊ Additive property of equality with integers
  - ◊ Additive property of equality with signed fractions
  - ◊ Multiplicative property of equality with whole numbers
  - ◊ Multiplicative property of equality with whole numbers: Fractional answers
  - ◊ Multiplicative property of equality with fractions
  - ◊ Multiplicative property of equality with decimals
  - ◊ Multiplicative property of equality with integers
  - ◊ Multiplicative property of equality with signed fractions
  - ◊ Identifying solutions to a linear equation in one variable: Two−step equations
  - ◊ Using two steps to solve an equation with whole numbers
  - ◊ Additive property of equality with a negative coefficient
  - ◊ Solving a two−step equation with integers
  - ◊ Introduction to using substitution to solve a linear equation
  - ◊ Introduction to solving an equation with parentheses
  - ◊ Solving a multi−step equation given in fractional form
  - ◊ Introduction to solving an equation with variables on the same side
  - ◊ Solving a linear equation with several occurrences of the variable: Variables on the same side
  - ◊ Introduction to solving a linear equation with a variable on each side
  - ◊ Solving a linear equation with several occurrences of the variable: Variables on both sides
  - ◊ 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
- ◊ Clearing fractions in an equation
- ◊ 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 Formulas for a Variable (7 topics)

- ◊ 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

♦ Absolute Value Equations (1 topics)

- ◊ Introduction to solving an absolute value equation

♦ Writing Expressions and Equations (6 topics)

- ◊ Writing a one−step expression for a real−world situation
- ◊ Translating a phrase into a one−step expression
- ◊ Translating a phrase into a two−step expression
- ◊ Translating a sentence into a one−step equation
- ◊ Translating a sentence into a multi−step equation
- ◊ Writing an equation to represent a proportional relationship

♦ Applications Involving Linear Equations with One Variable (11 topics)

- ◊ Solving a fraction word problem using a linear equation of the form $Ax = B$
- ◊ Writing an equation of the form $Ax + B = C$ to solve a word problem
- ◊ Solving a decimal word problem using a linear equation of the form $Ax + B = C$
- ◊ Writing an equation of the form $A(x + B) = C$ to solve a word problem
- ◊ Solving a word problem with two unknowns using a linear equation
- ◊ Writing an equation to represent a real−world problem: Variable on both sides
- ◊ Writing a multi−step equation for a real−world situation
- ◊ Solving a word problem with three unknowns using a linear equation
- ◊ Solving a value mixture problem 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

♦ Applications Involving Geometry (10 topics)

- ◊ Introduction to segment addition
- ◊ Finding an angle measure of a triangle given two angles
- ◊ Finding side lengths of squares given an area and a perimeter
- ◊ Finding side lengths of rectangles given one dimension and an area or a perimeter
- ◊ Word problem on optimizing an area or perimeter
- ◊ Finding the dimensions of a rectangle given its perimeter and a relationship between sides
- ◊ Finding the perimeter or area of a rectangle given one of these values
- ◊ Word problem on population density
- ◊ Computations involving density, mass, and volume
- ◊ Word problem on density involving the volume of a rectangular solid

♦ Applications Involving Proportions and Percents (17 topics)

- ◊ Solving a proportion of the form $x/a=b/c$: Basic
- ◊ Solving a proportion of the form $x/a = b/c$

- ◊ Solving a proportion of the form (x+a)/b = c/d
- ◊ Solving a proportion of the form a/(x+b) = c/x
- ◊ Word problem on proportions: Problem type 1
- ◊ Converting between percentages and decimals
- ◊ Finding a percentage of a whole number
- ◊ Finding a percentage of a whole number without a calculator: Basic
- ◊ Applying the percent equation: Problem type 1
- ◊ Finding a percentage of a total amount: Real−world situations
- ◊ Finding a percentage of a total amount without a calculator: Sales tax, commission, discount
- ◊ Writing a ratio as a percentage
- ◊ Finding the multiplier to give a final amount after a percentage increase or decrease
- ◊ Finding the final amount given the original amount and a percentage increase or decrease
- ◊ Finding the sale price given the original price and percent discount
- ◊ Finding the sale price without a calculator given the original price and percent discount
- ◊ Introduction to compound interest

♦ Writing and Graphing Inequalities (7 topics)

- ◊ Translating a sentence by using an inequality symbol
- ◊ Introduction to identifying solutions to an inequality
- ◊ Translating a sentence into a one−step inequality
- ◊ Writing an inequality for a real−world situation
- ◊ Graphing a linear inequality on the number line
- ◊ Graphing a compound inequality on the number line
- ◊ Set builder and interval notation

♦ One−Step Linear Inequalities (6 topics)

- ◊ Identifying solutions to a one−step linear inequality
- ◊ Additive property of inequality with whole numbers
- ◊ Additive property of inequality with integers
- ◊ Additive property of inequality with signed decimals
- ◊ Multiplicative property of inequality with whole numbers
- ◊ Multiplicative property of inequality with integers

♦ Multi−Step Linear Inequalities (5 topics)

- ◊ Identifying solutions to a two−step linear inequality in one variable
- ◊ Solving a two−step linear inequality with whole numbers
- ◊ 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

♦ Applications Involving Linear Inequalities (4 topics)

- ◊ Solving a word problem using a one−step linear inequality
- ◊ Solving a word problem using a two−step linear inequality
- ◊ 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

• Graphing, Functions, and Systems (106 topics)

♦ Ordered Pairs (3 topics)

- ◊ Reading a point in the coordinate plane
- ◊ Plotting a point in the coordinate plane
- ◊ Finding distances between points that share a common coordinate given the graph

♦ Tables and Graphs of Lines (13 topics)

- ◊ Function tables with two−step rules
- ◊ Table for a linear equation
- ◊ Writing a function rule given a table of ordered pairs: One−step rules
- ◊ Identifying solutions to a linear equation in two variables
- ◊ Finding a solution to a linear equation in two variables
- ◊ 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
- ◊ Interpreting a line graph

♦ Slope (3 topics)

- ◊ Finding slope given the graph of a line in quadrant 1 that models a real−world situation
- ◊ Finding slope given the graph of a line on a grid
- ◊ Finding slope given two points on the line

♦ Equations of Lines (6 topics)

- ◊ Finding the slope and y−intercept of a line given its equation in the form y = mx + b
- ◊ 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
- ◊ Writing an equation of a line given the y−intercept and another point
- ◊ Comparing linear functions to the parent function y=x
- ◊ Identifying parallel and perpendicular lines

♦ Applications Involving Linear Equations with Two Variables (12 topics)

- ◊ Finding outputs of a one−step function that models a real−world situation: Two variable equation
- ◊ Finding outputs of a two−step function with decimals that models a real−world situation: Two variable equation
- ◊ Finding inputs and outputs of a two−step function that models a real−world situation: Two variable equation
- ◊ Writing and evaluating a function that models a real−world situation: Basic
- ◊ 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: Basic
- ◊ Writing an equation and drawing its graph to model a real−world situation: Advanced
- ◊ Finding the initial amount and rate of change given a table for a linear function
- ◊ Finding the initial amount and rate of change given a graph of 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
- ◊ Interpreting the parameters of a linear function that models a real−world situation

♦ Introduction to Functions (11 topics)

- ◊ Identifying functions from relations
- ◊ Vertical line test
- ◊ Domain and range from ordered pairs
- ◊ Table for a linear function
- ◊ Evaluating functions: Linear and quadratic or cubic
- ◊ Variable expressions as inputs of functions: Problem type 1
- ◊ Evaluating a piecewise−defined function
- ◊ 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
- ◊ Domain and range of a linear function that models a real−world situation

♦ Graphs of Functions (25 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 discrete relation
- ◊ Finding domain and range from a linear graph in context
- ◊ Domain and range from the graph of a continuous function

- ◊ Finding intercepts of a nonlinear function given its graph
- ◊ 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
- ◊ Choosing a graph to fit a narrative: Basic
- ◊ Choosing a graph to fit a narrative: Advanced
- ◊ 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 of the form $y = A|x|$
- ◊ Graphing an absolute value equation in the plane: Basic
- ◊ Graphing an absolute value equation in the plane: Advanced
- ◊ Graphing a parabola of the form $y = ax^2$
- ◊ Graphing a parabola of the form $y = ax^2 + c$
- ◊ 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 cubic function of the form $y = ax^3$
- ◊ Graphing a piecewise−defined function: Problem type 1
- ◊ Finding the average rate of change of a function given its equation
- ◊ Finding the average rate of change of a function given its graph

♦ Transforming the Graphs of Functions (11 topics)

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

♦ Systems of Linear Equations (8 topics)

- ◊ 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
- ◊ Solving a system of linear equations of the form $y = mx + b$
- ◊ 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

♦ Applications Involving Systems of Linear Equations (6 topics)

- ◊ 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 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

♦ Graphing Linear Inequalities (4 topics)

- ◊ 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
- ♦ Systems of Linear Inequalities (4 topics)
  - ◊ Graphing a system of two linear inequalities: Basic
  - ◊ Graphing a system of three linear inequalities
  - ◊ Writing a multi−step inequality for a real−world situation
  - ◊ Solving a word problem using a system of linear inequalities: Problem type 1
- • Exponents and Polynomials (61 topics)
  - ♦ Product, Power, and Quotient Rules (12 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
    - ◊ Simplifying a ratio of multivariate monomials: Advanced
  - ♦ Negative Exponents (5 topics)
    - ◊ 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
  - ♦ Polynomial Addition, Subtraction, and Multiplication (15 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
    - ◊ Multiplying conjugate binomials: Multivariate
    - ◊ 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
  - ♦ Polynomial Division (5 topics)
    - ◊ Dividing a polynomial by a monomial: Univariate
    - ◊ Polynomial long division: Problem type 1
    - ◊ Polynomial long division: Problem type 2
    - ◊ Synthetic division
    - ◊ Closure properties of integers and polynomials
  - ♦ Factoring Using the GCF (4 topics)
    - ◊ Greatest common factor of 2 numbers
    - ◊ Factoring a linear binomial
    - ◊ Introduction to the GCF of two monomials
    - ◊ Factoring out a monomial from a polynomial: Univariate

- ♦ Factoring by Grouping (1 topics)
  - ◊ Factoring a univariate polynomial by grouping: Problem type 1
- ♦ Factoring Quadratic Trinomials (5 topics)
  - ◊ 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 Special Products (4 topics)
  - ◊ Factoring a perfect square trinomial with leading coefficient 1
  - ◊ Factoring a perfect square trinomial with leading coefficient greater than 1
  - ◊ Factoring a difference of squares in one variable: Basic
  - ◊ Factoring a difference of squares in one variable: Advanced
- ♦ Solving Quadratic Equations by Factoring (8 topics)
  - ◊ Solving an equation written in factored form
  - ◊ 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
  - ◊ Finding the zeros of a quadratic function given its equation
  - ◊ Writing a quadratic equation given the roots and the leading coefficient
  - ◊ Solving a word problem using a quadratic equation with rational roots
- ♦ The Pythagorean Theorem (2 topics)
  - ◊ Introduction to the Pythagorean Theorem
  - ◊ Pythagorean Theorem

• Rational Expressions (54 topics)

- ♦ Simplifying Rational Expressions (12 topics)
  - ◊ Restriction on a variable in a denominator: Linear
  - ◊ Restriction on a variable in a denominator: Quadratic
  - ◊ Evaluating a rational function: Problem type 1
  - ◊ Evaluating a rational function: Problem type 2
  - ◊ Domain of a rational function: Excluded values
  - ◊ Simplifying a ratio of factored polynomials: Linear factors
  - ◊ Simplifying a ratio of factored polynomials: Factors with exponents
  - ◊ Simplifying a ratio of polynomials using GCF factoring
  - ◊ Simplifying a ratio of linear polynomials: 1, −1, and no simplification
  - ◊ Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
  - ◊ Simplifying a ratio of polynomials: Problem type 1
  - ◊ Simplifying a ratio of polynomials: Problem type 2
- ♦ Multiplication and Division (6 topics)
  - ◊ Multiplying rational expressions involving multivariate monomials
  - ◊ Multiplying rational expressions made up of linear expressions
  - ◊ Multiplying rational expressions involving quadratics with leading coefficients of 1
  - ◊ Dividing rational expressions involving multivariate monomials
  - ◊ Dividing rational expressions involving linear expressions
  - ◊ Dividing rational expressions involving quadratics with leading coefficients of 1
- ♦ Addition and Subtraction (17 topics)
  - ◊ Introduction to the LCM of two monomials
  - ◊ Finding the LCD of rational expressions with linear denominators: Relatively prime
  - ◊ 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 polynomial 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
- ◊ 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 involving different quadratic denominators

♦ Complex Fractions (2 topics)

- ◊ Complex fraction without variables: Problem type 2
- ◊ Complex fraction involving univariate monomials

♦ Rational Equations (12 topics)

- ◊ Introduction to solving a rational equation
- ◊ 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 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
- ◊ Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator

♦ Applications (5 topics)

- ◊ 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
- ◊ Word problem involving multiple rates
- ◊ Solving a work problem using a rational equation
- ◊ Solving a distance, rate, time problem using a rational equation

• Radicals (45 topics)

♦ Roots of Perfect Powers (5 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
- ◊ Cube root of an integer

♦ Radical Functions (7 topics)

- ◊ Table for a square root function
- ◊ Evaluating a cube root function
- ◊ Domain of a square root function: Basic
- ◊ Domain of a square root function: Advanced
- ◊ Graphing a square root function: Problem type 1
- ◊ Graphing a square root function: Problem type 2
- ◊ Graphing a cube root function

♦ Rational Exponents (3 topics)

- ◊ 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

♦ Simplifying Expressions (2 topics)

- ◊ Simplifying the square root of a whole number less than 100
- ◊ Simplifying the square root of a whole number greater than 100

♦ Addition and Subtraction (3 topics)
- ◊ Introduction to square root addition or subtraction
- ◊ Square root addition or subtraction
- ◊ Introduction to simplifying a sum or difference of radical expressions: Univariate

♦ Multiplication (8 topics)
- ◊ 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
- ◊ Special products of radical expressions: Conjugates and squaring

♦ Division and Rationalization (2 topics)
- ◊ Simplifying a quotient of square roots
- ◊ Rationalizing a denominator: Quotient involving square roots

♦ Radical Equations (12 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
- ◊ Word problem involving radical equations: Basic
- ◊ Word problem involving radical equations: Advanced
- ◊ Solving an equation of the form $x^3 = a$ using integers
- ◊ Finding the side length of a cube given its volume
- ◊ Solving an equation using the odd−root property: Problem type 1

♦ Complex Numbers (3 topics)
- ◊ Using i to rewrite square roots of negative numbers
- ◊ Adding or subtracting complex numbers
- ◊ Multiplying complex numbers

• Polynomial, Exponential, and Logarithmic Functions (65 topics)

♦ Quadratic Equations (7 topics)
- ◊ 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
- ◊ Completing the square
- ◊ Applying the quadratic formula: Exact answers
- ◊ Applying the quadratic formula: Decimal answers
- ◊ Solving a quadratic equation with complex roots
- ◊ Solving a word problem using a quadratic equation with irrational roots

♦ Quadratic Functions (12 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 $y = ax^2 + bx + c$: Integer coefficients
- ◊ Writing a quadratic function given its zeros
- ◊ Finding the x−intercept(s) and the vertex of a parabola
- ◊ Rewriting a quadratic function to find the vertex of its graph
- ◊ Finding the maximum or minimum of a quadratic function
- ◊ Word problem involving the maximum or minimum of a quadratic function

- ◊ Domain and range from the graph of a parabola
- ◊ Solving a quadratic equation by graphing
- ◊ Comparing properties of quadratic functions given in different forms
- ◊ Classifying the graph of a function

♦ Function Operations (4 topics)
- ◊ Sum, difference, and product of two functions
- ◊ Quotient of two functions: Basic
- ◊ Introduction to the composition of two functions
- ◊ Composition of two functions: Basic

♦ Inverse Functions (1 topics)
- ◊ Inverse functions: Linear, discrete

♦ Graphing Exponential Functions (6 topics)
- ◊ Table for an exponential function
- ◊ Graphing an exponential function: $f(x) = a^x$
- ◊ Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
- ◊ Finding domain and range from the graph of an exponential function
- ◊ Translating the graph of an exponential function
- ◊ The graph, domain, and range of an exponential function

♦ Applications of Exponential Functions (6 topics)
- ◊ Evaluating an exponential function that models a real−world situation
- ◊ Evaluating an exponential function with base e that models a real−world situation
- ◊ Finding a final amount in a word problem on exponential growth or decay
- ◊ 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

♦ Polynomial Functions (8 topics)
- ◊ Even and odd functions: Problem type 1
- ◊ Finding zeros of 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
- ◊ Matching graphs with polynomial functions
- ◊ 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

♦ Remainder and Factor Theorems (2 topics)
- ◊ Using the remainder theorem to evaluate a polynomial
- ◊ The Factor Theorem

♦ Complex Zeros of Polynomial Functions (4 topics)
- ◊ Multiplying expressions involving complex conjugates
- ◊ Finding a polynomial of a given degree with given zeros: Complex zeros
- ◊ Using the conjugate zeros theorem to find all zeros of a polynomial
- ◊ Linear factors theorem and conjugate zeros theorem

♦ Logarithmic Functions (6 topics)
- ◊ Converting between logarithmic and exponential equations
- ◊ Converting between natural logarithmic and exponential equations
- ◊ Evaluating a logarithmic expression
- ◊ Solving an equation of the form $\log_b a = c$
- ◊ Translating the graph of a logarithmic function
- ◊ Graphing a logarithmic function: Basic

♦ Properties of Logarithms (2 topics)
- ◊ Basic properties of logarithms
- ◊ Expanding a logarithmic expression: Problem type 1

- ♦ Logarithmic and Exponential Equations and Applications (7 topics)
  - ◊ Solving a multi−step equation involving a single logarithm
  - ◊ 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: Exact answers in logarithmic form
  - ◊ Finding the time to reach a limit in a word problem on exponential growth or decay
  - ◊ Finding the initial or final amount in a word problem on exponential growth or decay
  - ◊ Finding the rate or time in a word problem on continuous exponential growth or decay

• Sequences, Probability, and Conics (37 topics)
- ♦ Evaluating Sequences (3 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
- ♦ Arithmetic Sequences and Series (5 topics)
  - ◊ Finding the next terms of an arithmetic sequence with whole numbers
  - ◊ Finding the next terms of an arithmetic sequence with integers
  - ◊ 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
- ♦ Geometric Sequences and Series (7 topics)
  - ◊ Finding the next terms of a geometric sequence with whole numbers
  - ◊ Finding the next terms of a geometric sequence with signed numbers
  - ◊ 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
  - ◊ Sum of the first n terms of a geometric sequence
- ♦ Gathering and Displaying Data (6 topics)
  - ◊ Choosing an appropriate method for gathering data: Problem type 1
  - ◊ Choosing an appropriate method for gathering data: Problem type 2
  - ◊ Introduction to expectation
  - ◊ Constructing a two−way frequency table: Basic
  - ◊ Computing a percentage from a table of values
  - ◊ Making a reasonable inference based on proportion statistics
- ♦ Measures of Center (3 topics)
  - ◊ Mean of a data set
  - ◊ Rejecting unreasonable claims based on average statistics
  - ◊ Mean and median of a data set
- ♦ Counting (3 topics)
  - ◊ Factorial expressions
  - ◊ Computing permutations and combinations
  - ◊ Binomial formula
- ♦ Probability (7 topics)
  - ◊ Determining a sample space and outcomes for a simple event
  - ◊ Introduction to the probability of an event
  - ◊ Probability of an event
  - ◊ Outcomes and event probability
  - ◊ Computing conditional probability using a two−way frequency table
  - ◊ Computing conditional probability to make an inference using a two−way frequency table
  - ◊ Using a random number table to make a fair decision
- ♦ Measures of Variation (2 topics)
  - ◊ Population standard deviation
  - ◊ Word problem involving calculations from a normal distribution

- ♦ Nonlinear Systems (1 topics)
  - ◊ Using a graphing calculator to solve a system of linear and quadratic equations: Basic

• Trigonometry (29 topics)
- ♦ Right Triangle Trigonometry (7 topics)
  - ◊ Sine, cosine, and tangent ratios: Numbers for side lengths
  - ◊ Using a calculator to approximate sine, cosine, and tangent values
  - ◊ 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
- ♦ Angles and Their Measure (2 topics)
  - ◊ Converting between degree and radian measure: Problem type 1
  - ◊ Sketching an angle in standard position
- ♦ The Unit Circle (3 topics)
  - ◊ Finding coordinates on the unit circle for special angles
  - ◊ Trigonometric functions and special angles: Problem type 1
  - ◊ Trigonometric functions and special angles: Problem type 2
- ♦ Laws of Sines and Cosines (10 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
  - ◊ Proving the law of sines
  - ◊ Solving a triangle with the law of cosines
  - ◊ Solving a word problem using the law of cosines
  - ◊ 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
- ♦ Graphs of Sine and Cosine Functions (4 topics)
  - ◊ Sketching the graph of $y= a \sin(x+c)$ or $y= a \cos(x+c)$
  - ◊ Sketching the graph of $y= a \sin(bx)$ or $y= a \cos(bx)$
  - ◊ Amplitude and period of sine and cosine functions
  - ◊ Word problem involving a sine or cosine function: Problem type 1
- ♦ Graphs of Other Trigonometric Functions (3 topics)
  - ◊ 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 tangent or cotangent function: Problem type 2

• Other Topics Available(*) (936 additional topics)
- ♦ Real Numbers (88 topics)
  - ◊ Addition and subtraction of 3 fractions with different denominators
  - ◊ Multiplication of 3 fractions
  - ◊ Writing a mixed number as an improper fraction
  - ◊ Addition of mixed numbers with different denominators and renaming
  - ◊ Subtraction of mixed numbers with different denominators and renaming
  - ◊ Addition and subtraction of 3 mixed numbers with different denominators
  - ◊ Mixed number multiplication
  - ◊ Multiplication of a mixed number and a whole number
  - ◊ Mixed number division
  - ◊ Decimal multiplication: Problem type 1
  - ◊ Plotting fractions on a number line

◊ Reading decimal position on a number line: Hundredths
◊ Finding opposites of integers
◊ Plotting rational numbers on a number line
◊ Ordering fractions and decimals
◊ Approximating the location of irrational numbers on a number line
◊ Ordering real numbers
◊ Addition and subtraction of 3 fractions involving signs
◊ Signed fraction multiplication: Advanced
◊ Signed decimal addition and subtraction with 3 numbers
◊ Signed decimal multiplication
◊ Signed decimal division
◊ Operations with absolute value: Problem type 1
◊ Operations with absolute value: Problem type 2
◊ Squaring decimal bases: Products greater than 0.1
◊ Order of operations with decimals: Problem type 1
◊ Order of operations with decimals: Problem type 2
◊ Order of operations with decimals: Problem type 3
◊ Exponents and integers: Problem type 2
◊ Order of operations with integers and exponents
◊ Converting between temperatures in Fahrenheit and Celsius
◊ Evaluating a linear expression: Signed fraction multiplication with addition or subtraction
◊ Evaluating a linear expression: Signed decimal addition and subtraction
◊ Evaluating a linear expression: Signed decimal multiplication with addition or subtraction
◊ Identifying numbers as integers or non−integers
◊ Identifying rational decimal numbers
◊ Identifying true statements about rational and irrational numbers
◊ Identifying numbers as rational or irrational
◊ Properties of addition
◊ Identifying parts in an algebraic expression
◊ Identifying equivalent algebraic expressions
◊ Properties of real numbers
◊ Identifying properties used to simplify an algebraic expression
◊ Naming segments, rays, and lines
◊ Measuring an angle with the protractor
◊ Acute, obtuse, and right triangles
◊ Naming angles, sides of angles, and vertices
◊ Identifying congruent shapes on a grid
◊ Identifying similar or congruent shapes on a grid
◊ Identifying and naming congruent parts of congruent triangles
◊ Perimeter of a polygon involving mixed numbers and fractions
◊ Finding the missing length in a figure
◊ Perimeter of a piecewise rectangular figure
◊ Sides of polygons having the same perimeter
◊ Perimeter and area on a grid
◊ Area of a rectangle involving fractions
◊ Area of a rectangle involving mixed numbers and fractions
◊ Area of a piecewise rectangular figure
◊ Area between two rectangles
◊ Estimates and exact answers
◊ Writing algebraic expressions for the area of a figure
◊ Word problem involving the area between two rectangles
◊ Finding the area of a right triangle on a grid
◊ Introduction to a circle: Diameter, radius, and chord

- ◊ Area of a circle
- ◊ Circumference and area of a circle
- ◊ Circumference and area of a circle: Exact answers in terms of pi
- ◊ Measuring length to the nearest inch
- ◊ Measuring length to the nearest quarter or half inch
- ◊ U.S. Customary unit conversion with whole number values
- ◊ Conversions involving measurements in feet and inches
- ◊ Adding measurements in feet and inches
- ◊ U.S. Customary unit conversion with whole number values: Two−step conversion
- ◊ Measuring length to the nearest centimeter
- ◊ Measuring length to the nearest millimeter
- ◊ Metric distance conversion with whole number values
- ◊ Metric mass or volume conversion with whole number values
- ◊ Metric distance conversion with decimal values
- ◊ Metric conversion with decimal values: Two−step problem
- ◊ Time unit conversion with whole number values
- ◊ Converting between metric and U.S. Customary unit systems
- ◊ U.S. Customary area unit conversion with whole number values
- ◊ Metric area unit conversion with decimal values
- ◊ Writing ratios using different notations
- ◊ Writing ratios for real−world situations
- ◊ Identifying statements that describe a ratio
- ◊ Simplifying a ratio of whole numbers: Problem type 2
- ◊ Simplifying a ratio of decimals

♦ Linear Equations and Inequalities (66 topics)

- ◊ Solving an equation to find the value of an expression
- ◊ Identifying properties used to solve a linear equation
- ◊ Solving a two−step equation with signed decimals
- ◊ Solving equations with zero, one, or infinitely many solutions
- ◊ Solving an absolute value equation: Problem type 1
- ◊ Solving an absolute value equation: Problem type 2
- ◊ Solving an absolute value equation: Problem type 3
- ◊ Solving an absolute value equation: Problem type 4
- ◊ Solving an absolute value equation of the form $|ax+b| = |cx+d|$
- ◊ Choosing stories that can be represented by given one−step equations
- ◊ Comparing arithmetic and algebraic solutions to a word problem
- ◊ Choosing stories that can be represented by given two−step equations
- ◊ Writing and solving a real−world problem given an equation with the variable on both sides
- ◊ 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
- ◊ Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- ◊ Solving a word problem involving rates and time conversion
- ◊ Converting between compound units: Basic
- ◊ Converting between compound units: Advanced
- ◊ Converting a repeating decimal to a fraction
- ◊ Finding supplementary and complementary angles
- ◊ Introduction to angle addition
- ◊ Finding the complement or supplement of an angle given a figure
- ◊ Finding angle measures of a triangle given two angles of a similar triangle
- ◊ Finding a side length given the perimeter and side lengths with variables
- ◊ Word problem on proportions: Problem type 2
- ◊ Using a calculator to convert a fraction to a rounded percentage

- ◊ Finding a percentage of a whole number without a calculator: Advanced
- ◊ Applying the percent equation: Problem type 2
- ◊ Estimating a tip without a calculator
- ◊ Writing a ratio as a percentage without a calculator
- ◊ Finding the rate of a tax or commission
- ◊ Finding the total amount given the percentage of a partial amount
- ◊ Finding the total cost including tax or markup
- ◊ Finding the original amount given the result of a percentage increase or decrease
- ◊ Finding the original price given the sale price and percent discount
- ◊ Finding the percentage increase or decrease: Basic
- ◊ Finding the percentage increase or decrease: Advanced
- ◊ Finding the absolute error and percent error of a measurement
- ◊ Computing a percent mixture
- ◊ Solving a percent mixture problem using a linear equation
- ◊ Finding simple interest without a calculator
- ◊ 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: Graph solution, advanced
- ◊ Solving a compound linear inequality: Interval notation
- ◊ Translating a sentence into a multi−step inequality
- ◊ Solving a word problem using a two−step linear inequality and describing the solution
- ◊ 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

♦ Graphing, Functions, and Systems (82 topics)

- ◊ Plotting a point in the coordinate plane: Mixed number coordinates
- ◊ Naming the quadrant or axis of a point given its graph
- ◊ 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
- ◊ Finding distances between points that share a common coordinate given their coordinates
- ◊ Writing a function rule given a table of ordered pairs: Two−step rules
- ◊ Finding x− and y−intercepts of a line given the equation: Advanced
- ◊ Graphing a line given its x− and y−intercepts
- ◊ Graphing a line by first finding its x− and y−intercepts
- ◊ Classifying slopes given graphs of lines
- ◊ Finding the slope of horizontal and vertical lines
- ◊ Finding the coordinate that yields a given slope
- ◊ Graphing a line given its slope and y−intercept
- ◊ Graphing a line through a given point with a given slope

◊ Identifying linear equations: Basic
◊ Identifying linear equations: Advanced
◊ Identifying linear functions given ordered pairs
◊ Rewriting a linear equation in the form Ax + By = C
◊ 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 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
◊ Finding the slope and a point on a line given its equation in point−slope form
◊ Graphing 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 in standard form given the slope and a 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
◊ Identifying parallel and perpendicular lines from equations
◊ Writing equations of lines parallel and perpendicular to a given line through a point
◊ Identifying parallel and perpendicular lines from coordinates
◊ Application problem with a linear function: Finding a coordinate given the slope and a point
◊ Application problem with a linear function: Finding a coordinate given two points
◊ Identifying independent and dependent quantities from tables and graphs
◊ Identifying independent and dependent variables from equations or real−world situations
◊ 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
◊ Identifying correlation and causation
◊ Domain and range from the graph of a piecewise function
◊ Graphing an integer function and finding its range for a given domain
◊ Transforming the graph of a function using more than one transformation
◊ Classifying systems of linear equations from graphs
◊ Writing a system of linear equations given its graph
◊ Solving a system of linear equations with fractional coefficients
◊ Solving a system of linear equations with decimal coefficients
◊ Solving systems of linear equations with 0, 1, or infinitely many solutions
◊ Creating an inconsistent system of linear equations
◊ Identifying the operations used to create equivalent systems of equations
◊ Solving a 3x3 system of linear equations: Problem type 1
◊ Solving a word problem using a system of linear equations of the form y = mx + b
◊ Solving a tax rate or interest rate problem using a system of linear equations
◊ Solving a word problem using a 3x3 system of linear equations: Problem type 1
◊ 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 system of two linear inequalities: Advanced
◊ Linear programming

- ◊ Solving a word problem using linear programming
- ◊ Scalar multiplication of a matrix
- ◊ Addition or subtraction of matrices
- ◊ Linear combination of matrices
- ◊ Multiplication of matrices: Basic
- ◊ Multiplication of matrices: Advanced
- ◊ Gauss−Jordan elimination with a 2x2 matrix
- ◊ Solving a system of linear equations given its augmented matrix
- ◊ Finding the inverse of a 2x2 matrix
- ◊ Finding the inverse of a 3x3 matrix
- ◊ Finding the determinant of a 2x2 matrix
- ◊ Using the inverse of a matrix to solve a 3x3 system of linear equations
- ◊ Finding the determinant of a 3x3 matrix
- ◊ Using Cramer's rule to solve a 2x2 system of linear equations
- ◊ Using Cramer's rule to solve a 3x3 system of linear equations

♦ Exponents and Polynomials (56 topics)

- ◊ Understanding the product rule of exponents
- ◊ Ordering numbers with positive exponents
- ◊ Understanding the power rules of exponents
- ◊ Power and product rules with positive exponents
- ◊ Power and quotient rules with positive exponents
- ◊ Power of 10: Negative exponent
- ◊ Ordering numbers with negative exponents
- ◊ Introduction to the product rule with negative exponents
- ◊ Product rule with negative exponents
- ◊ Quotient rule with negative exponents: Problem type 1
- ◊ Quotient rule with negative exponents: Problem type 2
- ◊ Power of a power rule with negative exponents
- ◊ Power rules with negative exponents
- ◊ 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
- ◊ Introduction to scientific notation with positive exponents
- ◊ Scientific notation with positive exponent
- ◊ Introduction to scientific notation with negative exponents
- ◊ Scientific notation with negative exponent
- ◊ Converting between scientific notation and standard form in a real−world situation
- ◊ Expressing calculator notation as scientific notation
- ◊ 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
- ◊ Degree of a multivariate polynomial
- ◊ Simplifying a sum or difference of three univariate polynomials
- ◊ Simplifying a sum or difference of multivariate polynomials
- ◊ Dividing a polynomial by a monomial: Multivariate
- ◊ Polynomial long division: Problem type 3
- ◊ Prime numbers
- ◊ Prime factorization
- ◊ Greatest common factor of 3 numbers
- ◊ Greatest common factor of three univariate monomials
- ◊ Greatest common factor of two multivariate monomials

- ◊ 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 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 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
- ◊ Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- ◊ Word problem involving the Pythagorean Theorem
- ◊ Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle

♦ Rational Expressions (56 topics)

- ◊ Simplifying a ratio of polynomials: Problem type 3
- ◊ Simplifying a ratio of multivariate polynomials
- ◊ Multiplying rational expressions involving quadratics with leading coefficients greater than 1
- ◊ Multiplying rational expressions involving multivariate quadratics
- ◊ 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
- ◊ 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 denominators ax−b and b−ax
- ◊ Adding 3 rational expressions with different quadratic denominators
- ◊ Complex fraction involving multivariate monomials
- ◊ Complex fraction: GCF factoring
- ◊ Complex fraction: Quadratic factoring
- ◊ Complex fraction made of sums involving rational expressions: Problem type 1
- ◊ 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
- ◊ Solving a rational equation that simplifies to quadratic: Proportional form, basic
- ◊ Solving a rational equation that simplifies to quadratic: Proportional form, advanced
- ◊ Solving for a variable in terms of other variables in a rational equation: Problem type 3
- ◊ Ordering fractions with variables
- ◊ 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
- ◊ 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
- ◊ Graphing a rational function: Constant over linear
- ◊ Graphing a rational function: Linear over linear
- ◊ Graphing a rational function: Quadratic over linear
- ◊ Graphing rational functions with holes
- ◊ Matching graphs with rational functions: Two vertical asymptotes
- ◊ Solving a quadratic inequality written in factored form
- ◊ Solving a quadratic inequality
- ◊ Solving a rational inequality: Problem type 1
- ◊ Solving a rational inequality: Problem type 2

♦ Radicals (58 topics)

- ◊ Finding all square roots of a number
- ◊ Estimating a square root
- ◊ Square roots of integers raised to even exponents
- ◊ Using absolute value to simplify square roots of perfect square monomials
- ◊ Finding n^{th} roots of perfect n^{th} powers with signs
- ◊ 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
- ◊ Domains of higher root functions
- ◊ Graphing a square root function: Problem type 3
- ◊ Converting between radical form and exponent form
- ◊ 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
- ◊ Evaluating functions: Absolute value, rational, radical
- ◊ 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 radical expression with two variables
- ◊ Simplifying a higher root of a whole number
- ◊ 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
- ◊ 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
- ◊ Classifying sums and products as rational or irrational
- ◊ Simplifying a quotient involving a sum or difference with a square root
- ◊ Rationalizing a denominator: Square root of a fraction
- ◊ Rationalizing a denominator: Quotient involving a monomial
- ◊ Rationalizing a denominator using conjugates: Integer numerator
- ◊ 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
- ◊ Solving a radical equation with a quadratic expression under the radical
- ◊ Solving a radical equation with two radicals that simplifies to sqrt(x) = a
- ◊ Solving a radical equation that simplifies to a quadratic equation: Two 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 using the odd−root property: Problem type 2
- ◊ Solving an equation with exponent 1/a: Problem type 1
- ◊ Solving an equation with exponent 1/a: Problem type 2
- ◊ Simplifying a product and quotient involving square roots of negative numbers
- ◊ Dividing complex numbers
- ◊ Simplifying a power of *i*

♦ Polynomial, Exponential, and Logarithmic Functions (53 topics)

- ◊ Solving a quadratic equation using the square root property: Decimal answers, basic
- ◊ Solving a quadratic equation using the square root property: Decimal answers, advanced
- ◊ Solving a quadratic equation using the square root property: Exact answers, advanced
- ◊ Solving a quadratic equation by completing the square: Decimal answers
- ◊ Solving a quadratic equation by completing the square: Exact answers
- ◊ Discriminant of a quadratic equation
- ◊ Discriminant of a quadratic equation with parameter
- ◊ Solving an equation that can be written in quadratic form: Problem type 1
- ◊ Solving an equation that can be written in quadratic form: Problem type 2
- ◊ Solving an equation with positive rational exponent
- ◊ Solving an equation with negative rational exponent
- ◊ Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
- ◊ Using a graphing calculator to find the zeros of a quadratic function
- ◊ Using a graphing calculator to find the x−intercept(s) and vertex of a quadratic function
- ◊ Rewriting a quadratic function in standard form
- ◊ Range of a quadratic function
- ◊ Writing the equation of a quadratic function given its graph
- ◊ Choosing a quadratic model and using it to make a prediction
- ◊ Expressing a function as a composition of two functions
- ◊ Composition of two functions: Domain and range
- ◊ Composition of two functions: Advanced
- ◊ Determining whether an equation defines a function: Basic

- ◊ Determining whether an equation defines a function: Advanced
- ◊ Horizontal line test
- ◊ Determining whether two functions are inverses of each other
- ◊ Inverse functions: Rational
- ◊ Inverse functions: Quadratic, cubic, radical
- ◊ Graphing an exponential function: $f(x) = a(b)^x$
- ◊ Graphing an exponential function and its asymptote: $f(x) = a(e)^{x-b} + c$
- ◊ Finding the final amount in a word problem on compound interest
- ◊ Choosing an exponential model and using it to make a prediction
- ◊ Comparing linear, polynomial, and exponential functions
- ◊ Inferring properties of a polynomial function from its graph
- ◊ 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
- ◊ Descartes' Rule of Signs
- ◊ 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
- ◊ Using the rational zeros theorem to find all zeros of a polynomial: Complex zeros
- ◊ The graph, domain, and range of a logarithmic function
- ◊ Graphing a logarithmic function: Advanced
- ◊ Expanding a logarithmic expression: Problem type 2
- ◊ Writing an expression as a single logarithm
- ◊ Change of base for logarithms: Problem type 1
- ◊ Change of base for logarithms: Problem type 2
- ◊ Solving a multi−step equation involving natural logarithms
- ◊ Solving an equation involving logarithms on both sides: Problem type 2
- ◊ Solving an equation involving logarithms on both sides: Problem type 1
- ◊ Solving an exponential equation by finding common bases: Linear exponents
- ◊ Solving an exponential equation by finding common bases: Linear and quadratic exponents
- ◊ Using a graphing calculator to solve an exponential or logarithmic equation

♦ Sequences, Probability, and Conics (109 topics)

- ◊ Finding the first terms of a sequence using a recursive rule
- ◊ Identifying arithmetic sequences and finding the common difference
- ◊ 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 patterns in shapes
- ◊ Identifying arithmetic and geometric sequences
- ◊ Arithmetic and geometric sequences: Identifying and writing an explicit rule
- ◊ Writing recursive rules for arithmetic and geometric sequences
- ◊ Sum of an infinite geometric series
- ◊ Identifying linear, quadratic, and exponential functions given ordered pairs
- ◊ Identifying statistical questions
- ◊ Constructing a two−way frequency table: Advanced
- ◊ Making an inference using a two−way frequency table
- ◊ Calculating relative frequencies in a contingency table
- ◊ Constructing a line plot
- ◊ Constructing a histogram for numerical data
- ◊ Interpreting a bar graph
- ◊ Interpreting a double bar graph
- ◊ Interpreting a stem−and−leaf plot
- ◊ Finding a percentage of a total amount in a circle graph

◊ Computations from a circle graph
◊ Angle measure in a circle graph
◊ Mode of a data set
◊ Finding the mode and range of a data set
◊ Computations involving the mean, sample size, and sum of a data set
◊ Finding the value for a new score that will yield a given mean
◊ Weighted mean
◊ How changing a value affects the mean and median
◊ Finding outliers in a data set
◊ Choosing the best measure to describe data
◊ Percentiles
◊ Interpreting a Venn diagram of 2 sets
◊ Interpreting a Venn diagram of 3 sets
◊ Venn diagrams: Two events
◊ Venn diagrams: Word problems
◊ Interpreting a tree diagram
◊ Introduction to the counting principle
◊ Counting principle
◊ Introduction to permutations and combinations
◊ Permutations and combinations: Problem type 1
◊ Permutations and combinations: Problem type 2
◊ Permutations and combinations: Problem type 3
◊ Determining a sample space and outcomes for a compound event
◊ Experimental and theoretical probability
◊ Probabilities involving two dice
◊ Probabilities of a permutation and a combination
◊ Odds of an event
◊ Area as probability
◊ Identifying independent events given descriptions of experiments
◊ Probability of independent events
◊ Probability of dependent events
◊ Probabilities of draws with replacement
◊ Probabilities of draws without replacement
◊ Determining outcomes for compound events and complements of events
◊ Using a Venn diagram to understand the multiplication rule for probability
◊ Outcomes and event probability: Conditional probability
◊ Identifying independent events given values of probabilities
◊ Conditional probability: Basic
◊ Using a Venn diagram to understand the addition rule for probability
◊ Outcomes and event probability: Addition rule
◊ Probability of the union of two events
◊ Probability of intersection or union: Word problems
◊ Binomial problems: Basic
◊ Binomial problems: Advanced
◊ Identifying outcomes in a random number table used to simulate a compound event
◊ Using a random number table to simulate a compound event
◊ Using back−to−back stem−and−leaf plots to compare data sets
◊ Five−number summary and interquartile range
◊ Constructing a box−and−whisker plot
◊ Using box−and−whisker plots to compare data sets
◊ Computing mean absolute deviation from a list of numerical values
◊ Distance between two points in the plane: Exact answers
◊ Distance between two points in the plane: Decimal answers

- ◊ Midpoint of a number line segment: Integers
- ◊ Midpoint of a line segment in the plane
- ◊ Graphing a parabola of the form $y^2 = ax$ or $x^2 = ay$
- ◊ Graphing a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$
- ◊ Deriving the equation of a parabola given its focus and directrix
- ◊ Writing an equation of a parabola given the vertex and the focus
- ◊ Finding the focus of a parabola of the form $ay^2 + by + cx + d = 0$ or $ax^2 + bx + cy + d = 0$
- ◊ 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
- ◊ Identifying the center and radius to graph a circle given its equation in general form: Advanced
- ◊ 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 and identifying points that lie on the circle
- ◊ Writing an equation of a circle given its center and radius or diameter
- ◊ Deriving the equation of a circle using the Pythagorean Theorem
- ◊ 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
- ◊ 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 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
- ◊ 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 foci of a hyperbola given its equation in general form
- ◊ Writing an equation of a hyperbola given the foci and the vertices
- ◊ Classifying conics given their equations
- ◊ Graphing a quadratic inequality: Problem type 1
- ◊ Graphing a quadratic inequality: Problem type 2
- ◊ Graphically solving a system of linear and quadratic equations
- ◊ Solving a system of linear and quadratic equations
- ◊ Using a graphing calculator to solve a system of equations
- ◊ Solving a system of nonlinear equations: Problem type 1
- ◊ Graphing a system of nonlinear inequalities: Problem type 1
- ◊ Graphing a system of nonlinear inequalities: Problem type 2

♦ Trigonometry (75 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
- ◊ Understanding trigonometric ratios through similar right triangles
- ◊ Relationship between the sines and cosines of complementary angles
- ◊ Using similar right triangles to find trigonometric ratios
- ◊ Converting degrees−minutes−seconds to decimal degrees
- ◊ Converting a decimal degree to degrees−minutes−seconds
- ◊ Converting between degree and radian measure: Problem type 2
- ◊ Coterminal angles
- ◊ Arc length and central angle measure
- ◊ Area of a sector of a circle: Exact answer in terms of pi
- ◊ Area of a sector of a circle
- ◊ Finding trigonometric ratios from a point on the unit circle
- ◊ Trigonometric functions and special angles: Problem type 3
- ◊ 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
◊ Values of inverse trigonometric functions
◊ Heron's formula
◊ Sketching the graph of $y= a \sin(bx+c)$ or $y= a \cos(bx+c)$
◊ 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 2
◊ Sketching the graph of a secant or cosecant function: Problem type 2
◊ Sketching the graph of a tangent or cotangent function: Problem type 1
◊ 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
◊ Proving trigonometric identities using odd and even properties
◊ Sum and difference identities: Problem type 1
◊ Sum and difference identities: Problem type 2
◊ Sum and difference identities: Problem type 3
◊ Proving trigonometric identities using sum and difference properties
◊ Double−angle identities: Problem type 1
◊ Double−angle identities: Problem type 2
◊ Half−angle identities: Problem type 1
◊ Half−angle identities: Problem type 2
◊ Proving trigonometric identities using double−angle properties
◊ 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
◊ Using a graphing calculator to solve a trigonometric equation
◊ 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 using double−angle identities
◊ Magnitude of a vector given in component form
◊ Scalar multiplication of a vector: Geometric Approach
◊ Multiplication of a vector by a scalar: Geometric approach
◊ Translation of a vector
◊ Vector addition and scalar multiplication: Component form
◊ Linear combination of vectors: Component form

- ◊ 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
- ◊ Dot product of vectors given in component form
- ◊ Using the dot product to find perpendicular vectors
- ◊ Finding the angle between two vectors given in component form

♦ Segments, Angles, and Triangles (102 topics)

- ◊ Analyzing relationships between points, lines, and planes given a figure
- ◊ Matching basic geometric terms with their definitions
- ◊ Computing distances between decimals on a number line
- ◊ Finding a point on a number line given the length of a segment and another point
- ◊ Midpoint of a number line segment: Decimals
- ◊ Using a segment's midpoint and endpoint to locate the other endpoint
- ◊ Segment addition and midpoints
- ◊ Finding a point that partitions a number line segment in a given fractional relationship
- ◊ Finding a point that partitions a number line segment in a given ratio
- ◊ Identifying congruent segments in the plane
- ◊ Finding an endpoint of a line segment given the other endpoint and the midpoint
- ◊ Finding a point that partitions a segment in the plane in a given fractional relationship
- ◊ Finding a point that partitions a segment in the plane in a given ratio
- ◊ Drawing an angle with the protractor
- ◊ Solving an equation involving complementary or supplementary angles
- ◊ Angle addition with relationships between angles
- ◊ Angle addition and angle bisectors
- ◊ Identifying linear pairs and vertical angles
- ◊ Finding angle measures given two intersecting lines
- ◊ Solving equations involving vertical angles and linear pairs
- ◊ Constructing congruent line segments
- ◊ Constructing an angle bisector
- ◊ Constructing congruent angles
- ◊ Constructing the perpendicular bisector of a line segment
- ◊ Making conjectures given a geometric construction
- ◊ Conditional statements and negations
- ◊ The converse, inverse, and contrapositive of a conditional statement
- ◊ Writing the converse, inverse, and contrapositive of a conditional statement and determining their truth values
- ◊ Writing a biconditional statement as a conditional statement and its converse and determining truth values
- ◊ Finding counterexamples to conjectures
- ◊ Conditional statements and deductive reasoning
- ◊ Distinguishing between undefined terms, definitions, postulates, conjectures, and theorems
- ◊ Introduction to proofs: Justifying statements
- ◊ Proofs involving segment congruence
- ◊ Proofs involving angle congruence
- ◊ Identifying corresponding and alternate angles
- ◊ Finding angle measures given two parallel lines cut by a transversal
- ◊ Solving equations involving angles and a pair of parallel lines
- ◊ Solving equations involving angles and two pairs of parallel lines
- ◊ Establishing facts about the angles created when parallel lines are cut by a transversal
- ◊ Constructing a pair of perpendicular lines
- ◊ Constructing a pair of parallel lines
- ◊ Introduction to proofs involving parallel lines

◊ Proofs involving parallel lines
◊ Classifying scalene, isosceles, and equilateral triangles by side lengths
◊ Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
◊ Identifying coordinates that give right triangles
◊ Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
◊ Finding an angle measure for a triangle with an extended side
◊ Finding an angle measure given extended triangles
◊ Finding an angle measure given a triangle and parallel lines
◊ Finding angle measures of a triangle given angles with variables
◊ Establishing facts about the interior angles of a triangle
◊ Establishing facts about the interior and exterior angles of a triangle
◊ Identifying transformations
◊ Determining if figures are related by rigid motions
◊ Examining triangle congruence in terms of rigid motion
◊ Exploring the triangle congruence theorems
◊ Completing proofs involving congruent triangles using SSS or SAS
◊ Introduction to proving triangles congruent using SSS or SAS
◊ Identifying and naming congruent triangles
◊ Completing proofs involving congruent triangles using ASA or AAS
◊ Introduction to proving triangles congruent using ASA or AAS
◊ Proofs involving congruent triangles and segment or angle bisectors
◊ Separating overlapping triangles and identifying common features
◊ Proofs involving congruent triangles that overlap: Basic
◊ Proofs involving congruent triangles with parallel or perpendicular segments
◊ Determining when to apply the HL congruence property
◊ Introduction to proving triangles congruent using the HL property
◊ Introduction to proofs involving congruent triangles and CPCTC
◊ Proofs involving congruent triangles, parallel or perpendicular segments, and CPCTC
◊ Proofs involving congruent triangles that overlap: Advanced
◊ Finding side lengths and angle measures of isosceles and equilateral triangles
◊ Finding an angle measure for a triangle sharing a side with another triangle
◊ Finding angle measures of an isosceles triangle given angles with variables
◊ Proofs of theorems involving isosceles triangles
◊ Using the Pythagorean Theorem repeatedly
◊ Using the Pythagorean Theorem to find distance on a grid
◊ Identifying side lengths that give right triangles
◊ Demonstrating the converse of the Pythagorean Theorem
◊ Informal proof of the Pythagorean Theorem
◊ Classifying segments inside triangles
◊ Using the circumcenter of a triangle to find segment lengths
◊ Using the incenter of a triangle to find segment lengths and angle measures
◊ Using the centroid of a triangle to find segment lengths
◊ Introduction to the triangle midsegment theorem
◊ Proving the triangle midsegment theorem in the coordinate plane
◊ Proof involving points on the perpendicular bisector of a line segment
◊ Creating triangles from given side lengths: Problem type 1
◊ Creating triangles from given side lengths: Problem type 2
◊ Using triangle inequality to determine if side lengths form a triangle
◊ Using triangle inequality to determine possible lengths of a third side
◊ Determining if a triangle is possible based on given angle measures
◊ Determining if given measurements define a unique triangle, more than one triangle, or no triangle
◊ Drawing triangles with given conditions: Angle measures
◊ Drawing triangles with given conditions: Side lengths and angle measures

- ◊ Drawing a circle with a given radius or diameter
- ◊ Drawing triangles with given side lengths using a compass
- ◊ Relationship between angle measures and side lengths in a triangle
- ◊ Relationship between angle measures and side lengths in two triangles
- ◊ Using the hinge theorem
- ◊ Indirect proof (proof by contradiction)

♦ Polygons, Similarity, and Transformations (89 topics)

- ◊ Naming polygons
- ◊ Sum of the angle measures of a quadrilateral
- ◊ Finding the sum of the interior angle measures of a convex polygon given the number of sides
- ◊ Finding the number of sides of a convex polygon given the sum of the measures of the interior angles
- ◊ Finding a missing interior angle measure in a convex polygon
- ◊ Finding the measures of an interior angle and an exterior angle of a regular polygon
- ◊ Finding the number of sides of a regular polygon given the measure of an interior angle
- ◊ Identifying parallelograms, rectangles, and squares
- ◊ Properties of quadrilaterals
- ◊ Classifying parallelograms
- ◊ Finding measures involving diagonals of parallelograms
- ◊ Conditions for parallelograms
- ◊ Finding measures involving diagonals of rectangles
- ◊ Finding angle measures involving diagonals of a rhombus
- ◊ Conditions for quadrilaterals
- ◊ Completing proofs of theorems involving sides of a parallelogram
- ◊ Completing proofs of theorems involving angles of a parallelogram
- ◊ Drawing and identifying a polygon in the coordinate plane
- ◊ Finding the coordinates of a point to make a parallelogram
- ◊ Finding coordinates of vertices of polygons
- ◊ Proving that a quadrilateral with given vertices is a parallelogram
- ◊ Classifying parallelograms in the coordinate plane
- ◊ Congruence in the coordinate plane
- ◊ Finding angle measures and side ratios to determine if two triangles are similar
- ◊ Similar polygons
- ◊ Similar right triangles
- ◊ Indirect measurement
- ◊ Triangles and parallel lines
- ◊ Triangles and angle bisectors
- ◊ Determining if figures are related by similarity transformations
- ◊ Examining triangle similarity in terms of similarity transformations
- ◊ Identifying and naming similar triangles
- ◊ Proofs involving similar triangles
- ◊ Completing proofs involving the triangle proportionality theorem
- ◊ Proving the slope criterion for parallel or perpendicular lines
- ◊ Finding lengths using scale models
- ◊ Finding a scale factor: Same units
- ◊ Using a scale drawing to find actual area
- ◊ Reproducing a scale drawing at a different scale
- ◊ Identifying similar right triangles that overlap
- ◊ Using right triangles to find the slope of a line
- ◊ Right triangles and geometric mean
- ◊ Proving the Pythagorean Theorem using similar triangles
- ◊ Special right triangles: Decimal answers
- ◊ Special right triangles: Exact answers
- ◊ Translating a point and giving its coordinates: One step

- ◊ Translating a point and giving its coordinates: Two steps
- ◊ Properties of translated figures
- ◊ Determining if figures are related by a translation
- ◊ Translating a polygon
- ◊ Using a translated point to find coordinates of other translated points
- ◊ Understanding the definition of a translation
- ◊ Reflecting a point across an axis
- ◊ Reflecting a point across both coordinate axes
- ◊ Reflecting a point across an axis and giving its coordinates
- ◊ Finding the coordinates of a point reflected across an axis
- ◊ Finding the coordinates of a point reflected across both axes
- ◊ Reflecting a polygon across the x−axis or y−axis
- ◊ Properties of reflected figures
- ◊ Determining if figures are related by a reflection
- ◊ Reflecting a polygon over a vertical or horizontal line
- ◊ Finding the coordinates of three points reflected over an axis
- ◊ Finding the coordinates of a point reflected across an axis and translated
- ◊ Understanding the definition of a reflection
- ◊ Rotating a point and giving its coordinates
- ◊ Properties of rotated figures
- ◊ Determining if figures are related by a rotation
- ◊ Rotating a figure about the origin
- ◊ Understanding the definition of a rotation
- ◊ Drawing lines of symmetry
- ◊ Finding an angle of rotation
- ◊ Identifying rotational symmetry and angles of rotation
- ◊ Rotational and point symmetries
- ◊ Writing a rule to describe a translation
- ◊ Writing a rule to describe a reflection
- ◊ Writing a rule to describe a rotation
- ◊ Identifying transformations that map a quadrilateral onto itself
- ◊ Identifying transformations that map a regular polygon onto itself
- ◊ Determining if figures are congruent and related by a transformation
- ◊ Determining if figures are congruent and related by a sequence of transformations
- ◊ Dilating a segment and giving the coordinates of its endpoints
- ◊ The effect of dilation on side length
- ◊ Determining if figures are related by a dilation
- ◊ The effect of dilation on area
- ◊ Dilating a figure
- ◊ Writing a rule to describe a dilation
- ◊ Determining if figures are similar and related by a sequence of transformations
- ◊ Exploring similarity of circles
- ◊ Exploring the effect of dilation on lines

♦ Area, Volume, and Circles (102 topics)

- ◊ Area of a parallelogram
- ◊ Finding the area of a right triangle or its corresponding rectangle
- ◊ Finding the perimeter or area of a rectangle in the coordinate plane
- ◊ Finding the perimeter of a triangle, trapezoid, or parallelogram in the coordinate plane
- ◊ Finding the area of a triangle or parallelogram in the coordinate plane
- ◊ Finding the area of a right triangle using the Pythagorean Theorem
- ◊ Computing an area using the Pythagorean Theorem
- ◊ Area involving rectangles and triangles
- ◊ Finding an area in terms of variables

◊ Finding the area of a trapezoid on a grid by using triangles and rectangles
◊ Area of a trapezoid
◊ Area of a rhombus
◊ Finding the area of a rhombus using the Pythagorean Theorem
◊ Finding the area of a trapezoid, rhombus, or kite in the coordinate plane
◊ Area of a regular polygon
◊ Finding the area of a regular polygon using special right triangles
◊ Side lengths, perimeters, and areas of similar polygons
◊ Finding the radius or the diameter of a circle given its circumference
◊ Informal argument for the formula of the circumference of a circle
◊ Circumference ratios
◊ Perimeter involving rectangles and circles
◊ Distinguishing between the area and circumference of a circle
◊ Informal argument for the formula of the area of a circle
◊ Area involving rectangles and circles
◊ Area between two concentric circles
◊ Word problem involving the area between two concentric circles
◊ Area involving inscribed figures
◊ Area involving multiple inscribed figures
◊ Circles inscribed in and circumscribed about regular polygons
◊ Informal argument for the formula of the area of a sector
◊ Vertices, edges, and faces of a solid
◊ Nets of solids
◊ Nets of solids: Advanced
◊ Counting the cubes in a solid made of cubes
◊ Side views of a solid made of cubes
◊ Identifying properties of Euclidean and spherical geometries
◊ Surface area of a cube or a rectangular prism
◊ Surface area of a rectangular prism made of unit cubes
◊ Using a net to find the surface area of a rectangular prism
◊ Word problem involving the surface area of a rectangular prism
◊ Surface area of a piecewise rectangular prism made of unit cubes
◊ Surface area of a triangular prism
◊ Using a net to find the surface area of a triangular prism
◊ Surface area of a cylinder
◊ Surface area of a cylinder: Exact answers in terms of pi
◊ Word problem involving the surface area of a cylinder
◊ Word problem involving the surface area of rectangular prisms and cylinders
◊ Word problem involving the surface area of rectangular prisms and pyramids
◊ Volume of a rectangular prism made of unit cubes
◊ Distinguishing between surface area and volume
◊ Volume of a solid made of cubes with unit fraction edge lengths
◊ Volume of a rectangular prism with fractional edge lengths
◊ Measuring the net of a solid to find surface area or volume
◊ Volume of an oblique rectangular prism
◊ Writing equivalent expressions for the volume of a rectangular prism
◊ Word problem involving the rate of filling or emptying a rectangular prism
◊ Volume of a piecewise rectangular prism
◊ Volume of a triangular prism
◊ Word problem involving the volume of a triangular prism
◊ Volume of a cylinder
◊ Informal argument for the formula of the volume of a cylinder
◊ Volume of an oblique cylinder

◊ Word problem involving the volume of a cylinder
◊ Word problem involving the rate of filling or emptying a cylinder
◊ Word problem on density involving the volume of a cylindrical solid
◊ Using cross sections to identify solids with the same volume
◊ Ratio of volumes
◊ Volume of a pyramid
◊ Relating the volumes of a rectangular prism and a rectangular pyramid
◊ Relating the volumes of a triangular prism and a triangular pyramid
◊ Volume of a cone
◊ Volume of a cone: Exact answers in terms of pi
◊ Relating the volumes of a cylinder and a cone
◊ Word problem involving the volume of a cone
◊ Surface area of a sphere
◊ Volume of a sphere
◊ Word problem involving the volume of a sphere
◊ Identifying similar solids
◊ Computing ratios of side lengths, surface areas, and volumes for similar solids
◊ Computing side length, surface area, and volume for similar solids
◊ Informal argument for the formula of the volume of a cone
◊ Word problem involving volumes of similar solids
◊ Identifying chords, secants, and tangents of a circle
◊ Tangents of a circle: Problem type 1
◊ Tangents of a circle: Problem type 2
◊ Constructing a tangent of a circle
◊ Naming and finding measures of central angles, inscribed angles, and arcs of a circle
◊ Applying properties of radii, diameters, and chords
◊ Arc length
◊ Arc length and area of a sector of a circle
◊ Computing ratios of arc lengths to radii and describing the result
◊ Central angles and inscribed angles of a circle
◊ Central angles and angles involving chords and tangents of a circle
◊ Inscribed angles in relation to a diameter or a polygon inscribed in a circle
◊ Inscribed angles and angles involving chords and tangents of a circle
◊ Establishing facts about a quadrilateral inscribed in a circle
◊ Inscribing an equilateral triangle or a regular hexagon in a circle
◊ Inscribing a square in a circle
◊ Inscribing a circle in a triangle
◊ Circumscribing a circle about a triangle
◊ Angles of intersecting secants and tangents
◊ Lengths of chords, secants, and tangents

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.*

