

## *Integrated Mathematics I*

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 (589 topics + 874 additional topics)

- Arithmetic Readiness (69 topics)
  - ◆ Equivalent Fractions and Least Common Multiples (6 topics)
    - ◇ Simplifying a fraction
    - ◇ Equivalent fractions
    - ◇ Division involving zero
    - ◇ Word problem on unit rates associated with ratios of whole numbers: Whole number answers
    - ◇ Least common multiple of 2 numbers
    - ◇ Least common multiple of 3 numbers
  - ◆ Fraction Addition and Subtraction (5 topics)
    - ◇ Finding the LCD of two fractions
    - ◇ Addition or subtraction of fractions with the same denominator
    - ◇ Addition or subtraction of fractions with the same denominator and simplification
    - ◇ Introduction to addition or subtraction of fractions with different denominators
    - ◇ Addition or subtraction of fractions with different denominators
  - ◆ Fraction Multiplication and Division (8 topics)
    - ◇ Product of a unit fraction and a whole number
    - ◇ Product of a fraction and a whole number: Problem type 1
    - ◇ Introduction to fraction multiplication
    - ◇ 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
  - ◆ Mixed Numbers (2 topics)
    - ◇ Writing an improper fraction as a mixed number
    - ◇ Writing a mixed number as an improper fraction
  - ◆ Rounding and Ordering (6 topics)
    - ◇ Decimal place value: Tenths and hundredths
    - ◇ Rounding to tens or hundreds
    - ◇ Rounding to hundreds or thousands
    - ◇ Rounding decimals
    - ◇ Introduction to ordering decimals
    - ◇ Using a calculator to convert a fraction to a rounded decimal
  - ◆ Decimal Addition and Subtraction (6 topics)
    - ◇ Addition of aligned decimals
    - ◇ Decimal addition with 3 numbers
    - ◇ Decimal subtraction: Basic
    - ◇ Decimal subtraction: Advanced
    - ◇ Word problem with addition of 3 or 4 decimals and whole numbers

- ◇ Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
- ◆ Decimal Multiplication and Division (11 topics)
  - ◇ Introduction to decimal multiplication
  - ◇ Multiplying a decimal by a whole number
  - ◇ Decimal multiplication: Problem type 1
  - ◇ Multiplication of a decimal by a power of ten
  - ◇ Word problem with multiplication of a decimal and a whole number
  - ◇ Word problem with multiple decimal operations: Problem type 1
  - ◇ Division of a decimal by a whole number
  - ◇ Division of a decimal by a 1–digit decimal
  - ◇ Division of a decimal by a 2–digit decimal
  - ◇ Division of a decimal by a power of ten
  - ◇ Average of two numbers
- ◆ Converting Fractions to Decimals (2 topics)
  - ◇ Converting a proper fraction with a denominator of 2, 4, or 5 to a decimal
  - ◇ Converting a fraction to a terminating decimal: Basic
- ◆ Ratios and Unit Rates (3 topics)
  - ◇ 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
- ◆ Converting Between Fractions, Decimals, and Percents (9 topics)
  - ◇ Converting a fraction with a denominator of 100 to a percentage
  - ◇ Converting a percentage to a fraction with a denominator of 100
  - ◇ Introduction to converting a percentage to a decimal
  - ◇ Introduction to converting a decimal to a percentage
  - ◇ Converting between percentages and decimals
  - ◇ Converting a fraction to a percentage: Denominator of 4, 5, or 10
  - ◇ Converting a fraction to a percentage: Denominator of 20, 25, or 50
  - ◇ Using a calculator to convert a fraction to a rounded percentage
  - ◇ Converting a fraction to a percentage in a real–world situation
- ◆ Introduction to Percent Applications (7 topics)
  - ◇ Finding a percentage of a whole number
  - ◇ Finding a percentage of a whole number without a calculator: Basic
  - ◇ 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
  - ◇ Writing a ratio as a percentage without a calculator
  - ◇ Finding the rate of a tax or commission
- ◆ Units of Measurement (4 topics)
  - ◇ U.S. Customary unit conversion with whole number values
  - ◇ Metric distance conversion with whole number values
  - ◇ Time unit conversion with whole number values
  - ◇ Converting between metric and U.S. Customary unit systems
- Real Numbers (73 topics)
  - ◆ Plotting and Ordering (9 topics)
    - ◇ Plotting integers on a number line
    - ◇ Ordering integers
    - ◇ Writing a signed number for a real–world situation
    - ◇ Plotting opposite integers on a number line
    - ◇ Finding opposites of 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 (16 topics)
  - ◇ Integer addition: Problem type 1
  - ◇ Integer addition: Problem type 2
  - ◇ Identifying relative change when combining two quantities
  - ◇ Integer subtraction: Problem type 1
  - ◇ Integer subtraction: Problem type 2
  - ◇ Integer subtraction: Problem type 3
  - ◇ Addition and subtraction with 3 integers
  - ◇ Word problem with addition or subtraction of 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 multiplication: Basic
  - ◇ Signed decimal addition and subtraction
  - ◇ Operations with absolute value: Problem type 1
  - ◇ Computing the distance between two integers on a number line
- ◆ Exponents and Order of Operations (12 topics)
  - ◇ Writing expressions using exponents
  - ◇ Introduction to exponents
  - ◇ Power of 10: Positive exponent
  - ◇ 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
  - ◇ 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 (20 topics)
  - ◇ Combining like terms: Whole number coefficients
  - ◇ Combining like terms: Integer coefficients
  - ◇ Introduction to properties of addition
  - ◇ Properties of addition
  - ◇ Combining like terms: Fractional coefficients
  - ◇ Combining like terms: Decimal coefficients
  - ◇ Introduction to the distributive property
  - ◇ Multiplying a constant and a linear monomial
  - ◇ Distributive property: Whole number coefficients
  - ◇ Distributive property: Integer coefficients
  - ◇ Distributive property: Fractional coefficients
  - ◇ Factors

- ◇ Introduction to factoring with numbers
- ◇ Identifying parts in an algebraic expression
- ◇ Identifying equivalent algebraic expressions
- ◇ Introduction to properties of multiplication
- ◇ Properties of real numbers
- ◇ 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
- ◆ Introduction to Perimeter and Area (8 topics)
  - ◇ Perimeter of a polygon
  - ◇ Perimeter of a square or a rectangle
  - ◇ Finding the missing length in a figure
  - ◇ Writing algebraic expressions for the perimeter of a figure
  - ◇ Area of a square or a rectangle
  - ◇ Perimeter and area on a grid
  - ◇ Distinguishing between the area and perimeter of a rectangle
  - ◇ Area of a piecewise rectangular figure
- Linear Equations and Inequalities (95 topics)
  - ◆ One–Step Linear Equations (12 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
  - ◆ Multi–Step Linear Equations (16 topics)
    - ◇ 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
    - ◇ Identifying properties used to solve a linear equation
    - ◇ 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 two–step equation with signed fractions
  - ◆ Solving Formulas for a Variable (4 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 addition or subtraction with division
- ◆ Absolute Value Equations (4 topics)
  - ◇ Introduction to solving an absolute value equation
  - ◇ Solving an absolute value equation: Problem type 1
  - ◇ Solving an absolute value equation: Problem type 2
  - ◇ Solving an absolute value equation: Problem type 3
- ◆ Writing Expressions and Equations (5 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
  - ◇ Writing an equation to represent a proportional relationship
- ◆ Applications Involving Linear Equations (12 topics)
  - ◇ 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  $Ax + B = C$
  - ◇ Solving a word problem with two unknowns using a linear equation
  - ◇ Writing an equation to represent a real–world problem: Variable on both sides
  - ◇ Solving a decimal word problem using a linear equation with the variable on both sides
  - ◇ Solving a word problem involving consecutive integers
  - ◇ 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
  - ◇ Converting between compound units: Basic
  - ◇ Finding side lengths of rectangles given one dimension and an area or a perimeter
  - ◇ Finding a side length given the perimeter and side lengths with variables
- ◆ Proportions and More on Percents (12 topics)
  - ◇ Solving a proportion of the form  $x/a=b/c$ : Basic
  - ◇ Solving a proportion of the form  $x/a = b/c$
  - ◇ Word problem on proportions: Problem type 1
  - ◇ Applying the percent equation: Problem type 1
  - ◇ 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
  - ◇ Finding the percentage increase or decrease: Basic
  - ◇ Finding the percentage increase or decrease: Advanced
  - ◇ Finding the absolute error and percent error of a measurement
  - ◇ Introduction to compound interest
- ◆ Writing and Graphing Inequalities (7 topics)
  - ◇ Translating a sentence by using an inequality symbol
  - ◇ Translating a sentence into a one–step inequality
  - ◇ Introduction to identifying solutions to an inequality
  - ◇ Writing an inequality for a real–world situation
  - ◇ Graphing a linear inequality on the number line
  - ◇ Writing an inequality given a graph on the number line
  - ◇ Graphing a compound inequality on the number line
- ◆ One–Step Linear Inequalities (7 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
- ◇ Multiplicative property of inequality with signed fractions
- ◆ Multi-Step Linear Inequalities (8 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 two-step linear inequality with a fractional coefficient
  - ◇ Solving a linear inequality with multiple occurrences of the variable: Problem type 1
  - ◇ Solving a linear inequality with multiple occurrences of the variable: Problem type 2
  - ◇ Solving a compound linear inequality: Graph solution, basic
- ◆ 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
- ◆ Absolute Value Inequalities (4 topics)
  - ◇ Solving an absolute value inequality: Problem type 1
  - ◇ Solving an absolute value inequality: Problem type 2
  - ◇ Solving an absolute value inequality: Problem type 3
  - ◇ Solving an absolute value inequality: Problem type 4
- Graphing, Functions, and Linear Systems (129 topics)
  - ◆ Ordered Pairs (6 topics)
    - ◇ Reading a point in quadrant 1
    - ◇ Plotting a point in quadrant 1
    - ◇ 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
    - ◇ Finding distances between points that share a common coordinate given their coordinates
  - ◆ Tables and Graphs of Lines (15 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
    - ◇ Graphing a line given its x- and y-intercepts
    - ◇ Graphing a line by first finding its x- and y-intercepts
    - ◇ Interpreting a line graph
  - ◆ Slope (7 topics)
    - ◇ Finding slope given the graph of a line in quadrant 1 that models a real-world situation
    - ◇ Classifying slopes given graphs of lines
    - ◇ Finding slope given the graph of a line on a grid
    - ◇ Finding slope given two points on the line
    - ◇ Finding the slope of horizontal and vertical lines
    - ◇ Graphing a line given its slope and y-intercept

- ◇ Graphing a line through a given point with a given slope
- ◆ Equations of Lines (20 topics)
  - ◇ Identifying linear equations: Basic
  - ◇ Identifying linear functions given ordered pairs
  - ◇ Finding the slope and y–intercept of a line given its equation in the form  $y = mx + b$
  - ◇ Finding the slope and y–intercept of a line given its equation in the form  $Ax + By = C$
  - ◇ Graphing a line by first finding its slope and y–intercept
  - ◇ Writing an equation of a line given its slope and y–intercept
  - ◇ Writing an equation 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
  - ◇ Writing an equation in slope–intercept form given the slope and a point
  - ◇ Writing an equation in point–slope form given the slope and a point
  - ◇ Writing an equation of a line given the y–intercept and another point
  - ◇ Writing the equation of the line through two given points
  - ◇ Writing the equations of vertical and horizontal lines through a given point
  - ◇ Comparing linear functions to the parent function  $y=x$
  - ◇ Identifying parallel and perpendicular lines
  - ◇ 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
- ◆ Applications Involving Linear Equations with Two Variables (15 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
  - ◇ 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
  - ◇ Solving a linear equation by graphing
- ◆ Scatter Plots and Lines of Best Fit (9 topics)
  - ◇ 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
  - ◇ Linear relationship and the correlation coefficient
  - ◇ Identifying correlation and causation
- ◆ Introduction to Functions (8 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
- ◇ 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
- ◇ Domain and range of a linear function that models a real–world situation
- ◆ Graphs of Functions (17 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
  - ◇ Finding where a function is increasing, decreasing, or constant given the graph
  - ◇ 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 an integer function and finding its range for a given domain
  - ◇ 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 a parabola of the form  $y = ax^2$
  - ◇ Graphing a parabola of the form  $y = ax^2 + c$
  - ◇ Graphing a function of the form  $f(x) = ax^2$
  - ◇ Finding the average rate of change of a function given its graph
- ◆ Transforming the Graphs of Functions (3 topics)
  - ◇ Translating the graph of a parabola: One step
  - ◇ Translating the graph of a function: One step
  - ◇ Translating the graph of a function: Two steps
- ◆ Arithmetic Sequences (9 topics)
  - ◇ Finding the first terms of an arithmetic sequence using an explicit rule
  - ◇ Finding the next terms of an arithmetic sequence with whole numbers
  - ◇ Finding the next terms of an arithmetic sequence with integers
  - ◇ Finding the first terms of a sequence using a recursive rule
  - ◇ Identifying arithmetic sequences and finding the common difference
  - ◇ Finding a specified term of an arithmetic sequence given the first terms
  - ◇ Finding a specified term of an arithmetic sequence given the common difference and first term
  - ◇ Writing an explicit rule for an arithmetic sequence
  - ◇ Writing a recursive rule for an arithmetic sequence
- ◆ Systems of Linear Equations (9 topics)
  - ◇ Identifying solutions to a system of linear equations
  - ◇ Graphically solving a system of linear equations
  - ◇ 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
  - ◇ Solving a system of linear equations with fractional coefficients
  - ◇ Solving a system of linear equations with decimal coefficients
  - ◇ Identifying the operations used to create equivalent systems of equations
- ◆ 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 word problem using a system of linear equations of the form  $y = mx + b$
- ◇ Solving a value mixture problem using a system of linear equations
- ◇ Solving a 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 (1 topics)
  - ◇ Graphing a system of two linear inequalities: Basic
- Exponents and Exponential Functions (67 topics)
  - ◆ Product, Power, and Quotient Rules (19 topics)
    - ◇ Introduction to the product rule with positive exponents: Whole number base
    - ◇ Understanding the product rule of exponents
    - ◇ 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 with positive exponents: Whole number base
    - ◇ Understanding the power rules of exponents
    - ◇ 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
    - ◇ Power and product rules with positive exponents
    - ◇ Simplifying a ratio of multivariate monomials: Basic
    - ◇ Introduction to the quotient rule with positive exponents: Whole number base
    - ◇ 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
    - ◇ Power and quotient rules with positive exponents
  - ◆ Negative Exponents (16 topics)
    - ◇ Evaluating expressions with exponents of zero
    - ◇ Power of 10: Negative exponent
    - ◇ Evaluating an expression with a negative exponent: Whole number base
    - ◇ Evaluating an expression with a negative exponent: Positive fraction base
    - ◇ Evaluating an expression with a negative exponent: Negative integer base
    - ◇ Rewriting an algebraic expression without a negative exponent
    - ◇ Introduction to the product rule with negative exponents: Whole number base
    - ◇ Introduction to the product rule with negative exponents
    - ◇ Introduction to the quotient rule with negative exponents: Whole number base
    - ◇ Quotient rule with negative exponents: Problem type 1
    - ◇ Quotient rule with negative exponents: Problem type 2
    - ◇ Introduction to the power of a power rule with negative exponents: Whole number base
    - ◇ 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
  - ◆ Scientific Notation (9 topics)
    - ◇ 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
- ◇ Multiplying numbers written in scientific notation: Basic
- ◇ Multiplying numbers written in scientific notation: Advanced
- ◇ Dividing numbers written in scientific notation: Basic
- ◇ Dividing numbers written in scientific notation: Advanced
- ◆ Exponential Functions (14 topics)
  - ◇ Table for an exponential function
  - ◇ Graphing an exponential function:  $f(x) = a^x$
  - ◇ Graphing an exponential function:  $f(x) = a(b)^x$
  - ◇ 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
  - ◇ Evaluating an exponential function that models a real–world situation
  - ◇ Solving an exponential equation by finding common bases: Linear exponents
  - ◇ Finding a final amount in a word problem on exponential growth or decay
  - ◇ Finding the final amount in a word problem on compound interest
  - ◇ Finding the initial amount and rate of change given an exponential function
  - ◇ Writing an equation that models exponential growth or decay
  - ◇ Writing an exponential function rule given a table of ordered pairs
  - ◇ Comparing linear, polynomial, and exponential functions
- ◆ Geometric Sequences (9 topics)
  - ◇ Finding the first terms of a geometric sequence using an explicit rule
  - ◇ Finding the next terms of a geometric sequence with whole numbers
  - ◇ Finding the next terms of a geometric sequence with signed numbers
  - ◇ Identifying arithmetic and geometric sequences
  - ◇ Identifying geometric sequences and finding the common ratio
  - ◇ Finding a specified term of a geometric sequence given the first terms
  - ◇ Arithmetic and geometric sequences: Identifying and writing an explicit rule
  - ◇ Writing recursive rules for arithmetic and geometric sequences
  - ◇ Identifying linear, quadratic, and exponential functions given ordered pairs
- Data Analysis and Probability (27 topics)
  - ◆ Frequency Tables (5 topics)
    - ◇ Constructing a two–way frequency table: Basic
    - ◇ Constructing a two–way frequency table: Advanced
    - ◇ Computing a percentage from a table of values
    - ◇ Making an inference using a two–way frequency table
    - ◇ Calculating relative frequencies in a contingency table
  - ◆ Graphs of Data (7 topics)
    - ◇ Constructing a line plot
    - ◇ Constructing a bar graph for non–numerical data
    - ◇ Constructing a histogram for numerical data
    - ◇ Interpreting a bar graph
    - ◇ Interpreting a double bar graph
    - ◇ Interpreting a stem–and–leaf plot
    - ◇ Measuring an angle with the protractor
  - ◆ Measures of Center (6 topics)
    - ◇ Mode of a data set
    - ◇ Finding the mode and range of a data set
    - ◇ Mean of a data set
    - ◇ Mean and median of a data set
    - ◇ How changing a value affects the mean and median
    - ◇ Choosing the best measure to describe data

- ◆ Comparing Data (4 topics)
  - ◇ 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
- ◆ Counting (3 topics)
  - ◇ Interpreting a Venn diagram of 2 sets
  - ◇ Introduction to the counting principle
  - ◇ Counting principle
- ◆ Probability (2 topics)
  - ◇ Introduction to the probability of an event
  - ◇ Probability of an event
- Segments, Lines, and Angles (34 topics)
  - ◆ Points, Lines, and Planes (4 topics)
    - ◇ Naming segments, rays, and lines
    - ◇ Analyzing relationships between points, lines, and planes given a figure
    - ◇ Identifying congruent shapes on a grid
    - ◇ Matching basic geometric terms with their definitions
  - ◆ Distances and Midpoints on a Number Line (3 topics)
    - ◇ Introduction to segment addition
    - ◇ Midpoint of a number line segment: Integers
    - ◇ Segment addition and midpoints
  - ◆ Introduction to Radical Expressions (1 topics)
    - ◇ Introduction to square root addition or subtraction
  - ◆ Distances and Midpoints in the Coordinate Plane (3 topics)
    - ◇ Distance between two points in the plane: Exact answers
    - ◇ Identifying congruent segments in the plane
    - ◇ Midpoint of a line segment in the plane
  - ◆ Angles (13 topics)
    - ◇ Drawing an angle with the protractor
    - ◇ Acute, obtuse, and right angles
    - ◇ Naming angles, sides of angles, and vertices
    - ◇ Finding supplementary and complementary angles
    - ◇ Introduction to angle addition
    - ◇ Finding the complement or supplement of an angle given a figure
    - ◇ 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
    - ◇ Finding an angle measure of a triangle given two angles
  - ◆ Segment and Angle Constructions (4 topics)
    - ◇ Constructing congruent line segments
    - ◇ Constructing an angle bisector
    - ◇ Constructing congruent angles
    - ◇ Constructing the perpendicular bisector of a line segment
  - ◆ Parallel Lines and Transversals (6 topics)
    - ◇ 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
    - ◇ Constructing a pair of perpendicular lines
    - ◇ Constructing a pair of parallel lines

- ◇ Introduction to proofs involving parallel lines
- Triangles, Quadrilaterals, and Polygons (38 topics)
  - ◆ Classifying Triangles (5 topics)
    - ◇ Acute, obtuse, and right triangles
    - ◇ 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
  - ◆ Angles of Triangles (3 topics)
    - ◇ Finding an angle measure for a triangle with an extended side
    - ◇ Finding an angle measure given extended triangles
    - ◇ Finding angle measures of a triangle given angles with variables
  - ◆ Congruent Triangles (5 topics)
    - ◇ Identifying and naming congruent parts of congruent triangles
    - ◇ Identifying transformations
    - ◇ Determining if figures are related by rigid motions
    - ◇ Examining triangle congruence in terms of rigid motion
    - ◇ Exploring the triangle congruence theorems
  - ◆ Proving Triangle Congruence (10 topics)
    - ◇ 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
    - ◇ 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
  - ◆ Isosceles and Equilateral Triangles (2 topics)
    - ◇ Finding side lengths and angle measures of isosceles and equilateral triangles
    - ◇ Finding angle measures of an isosceles triangle given angles with variables
  - ◆ The Pythagorean Theorem (2 topics)
    - ◇ Introduction to the Pythagorean Theorem
    - ◇ Pythagorean Theorem
  - ◆ Triangle Constructions and Triangle Inequalities (1 topics)
    - ◇ Drawing a circle with a given radius or diameter
  - ◆ Angles of Polygons (2 topics)
    - ◇ Naming polygons
    - ◇ Sum of the angle measures of a quadrilateral
  - ◆ Parallelograms and Trapezoids (8 topics)
    - ◇ Identifying parallelograms, rectangles, and squares
    - ◇ Properties of quadrilaterals
    - ◇ Classifying parallelograms
    - ◇ Finding angle measures involving diagonals of a rhombus
    - ◇ Drawing and identifying a polygon in the coordinate plane
    - ◇ Finding the coordinates of a point to make a parallelogram
    - ◇ Proving that a quadrilateral with given vertices is a parallelogram
    - ◇ Classifying parallelograms in the coordinate plane
- Similarity and Transformations (38 topics)
  - ◆ Similar Figures (1 topics)
    - ◇ Identifying similar or congruent shapes on a grid
  - ◆ Proving Triangle Similarity (1 topics)

- ◇ Proving the slope criterion for parallel or perpendicular lines
- ◆ Translations (7 topics)
  - ◇ 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
- ◆ Reflections (9 topics)
  - ◇ Reflecting a point across an axis
  - ◇ Reflecting a point across an axis and giving its coordinates
  - ◇ Finding the coordinates of a point reflected across an axis
  - ◇ 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 a point reflected across an axis and translated
  - ◇ Understanding the definition of a reflection
- ◆ Rotations (5 topics)
  - ◇ 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
- ◆ Symmetry (3 topics)
  - ◇ Drawing lines of symmetry
  - ◇ Finding an angle of rotation
  - ◇ Identifying rotational symmetry and angles of rotation
- ◆ Congruence Transformations (7 topics)
  - ◇ 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
- ◆ Dilations (5 topics)
  - ◇ 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
  - ◇ Dilating a figure
  - ◇ Writing a rule to describe a dilation
- Area, Volume, and Circles (19 topics)
  - ◆ Areas of Parallelograms and Triangles (7 topics)
    - ◇ Area of a parallelogram
    - ◇ Finding the area of a right triangle on a grid
    - ◇ Finding the area of a right triangle or its corresponding rectangle
    - ◇ Area of a triangle
    - ◇ 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
  - ◆ Areas of Trapezoids, Rhombi, and Kites (3 topics)

- ◇ Area of a trapezoid
  - ◇ Area of a rhombus
  - ◇ Finding the area of a trapezoid, rhombus, or kite in the coordinate plane
- ◆ Circumferences and Areas of Circles (6 topics)
  - ◇ Circumference of a circle
  - ◇ Perimeter involving rectangles and circles
  - ◇ Area of a circle
  - ◇ Circumference and area of a circle
  - ◇ Distinguishing between the area and circumference of a circle
  - ◇ Area involving rectangles and circles
- ◆ Volumes of Prisms and Cylinders (1 topics)
  - ◇ Volume of a rectangular prism
- ◆ Inscribed Angles and Polygons (2 topics)
  - ◇ Inscribing an equilateral triangle or a regular hexagon in a circle
  - ◇ Inscribing a square in a circle
  
- Other Topics Available(\*) (874 additional topics)
  - ◆ Arithmetic Readiness (75 topics)
    - ◇ Word problem involving the least common multiple of 2 numbers
    - ◇ Word problem with common multiples
    - ◇ Addition and subtraction of 3 fractions with different denominators
    - ◇ Word problem involving addition or subtraction of fractions with different denominators
    - ◇ Fractional part of a circle
    - ◇ Determining if a quantity is increased or decreased when multiplied by a fraction
    - ◇ Multiplication of 3 fractions
    - ◇ Word problem involving fractions and multiplication
    - ◇ Multi-step word problem involving fractions and multiplication
    - ◇ Complex fraction without variables: Problem type 1
    - ◇ Word problem involving fractions and division
    - ◇ Mixed number addition with the same denominator and renaming
    - ◇ Mixed number subtraction with the same denominator and renaming
    - ◇ Addition or subtraction of mixed numbers with different denominators without renaming
    - ◇ 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
    - ◇ Word problem involving addition or subtraction of mixed numbers with different denominators
    - ◇ Mixed number multiplication
    - ◇ Multiplication of a mixed number and a whole number
    - ◇ Division with a mixed number and a whole number
    - ◇ Mixed number division
    - ◇ Word problem involving multiplication or division with mixed numbers
    - ◇ Fractional position on a number line
    - ◇ Using a common denominator to order fractions
    - ◇ Reading decimal position on a number line: Tenths
    - ◇ Reading decimal position on a number line: Hundredths
    - ◇ Ordering decimals
    - ◇ Ordering fractions and decimals
    - ◇ Converting a decimal to a proper fraction in simplest form: Basic
    - ◇ Converting a decimal to a proper fraction in simplest form: Advanced
    - ◇ Converting a decimal to a mixed number and an improper fraction in simplest form: Basic
    - ◇ Converting a decimal to a mixed number and an improper fraction in simplest form: Advanced
    - ◇ Decimal addition and subtraction with 3 or more numbers

- ◇ Estimating a sum of whole numbers: Problem type 2
- ◇ Estimating a decimal sum or difference
- ◇ Estimating a product of decimals
- ◇ Word problem with multiplication of two decimals
- ◇ Word problem with division of two decimals
- ◇ Word problem with multiple decimal operations: Problem type 2
- ◇ Converting a mixed number with a denominator of 2, 4, or 5 to a decimal
- ◇ Converting a fraction to a terminating decimal: Advanced
- ◇ Converting a fraction to a repeating decimal: Basic
- ◇ Converting a fraction to a repeating decimal: Advanced
- ◇ Converting a mixed number to a terminating decimal: Basic
- ◇ Converting a mixed number to a terminating decimal: Advanced
- ◇ 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 1
- ◇ Simplifying a ratio of decimals
- ◇ Finding a unit price
- ◇ Using tables to compare ratios
- ◇ Computing unit prices to find the better buy
- ◇ Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- ◇ Word problem on unit rates associated with ratios of fractions
- ◇ Word problem on unit rates associated with ratios of mixed numbers
- ◇ Representing benchmark percentages on a grid
- ◇ Converting a mixed number percentage to a decimal
- ◇ Converting between percentages and decimals in a real–world situation
- ◇ Converting a percentage to a fraction in simplest form
- ◇ Converting a decimal percentage to a fraction
- ◇ Finding a percentage of a whole number without a calculator: Advanced
- ◇ Estimating a tip without a calculator
- ◇ Measuring length to the nearest inch
- ◇ Measuring length to the nearest quarter or half inch
- ◇ 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 mass or volume conversion with whole number values
- ◇ Metric distance conversion with decimal values
- ◇ Metric conversion with decimal values: Two–step problem
- ◇ Simplifying a ratio of whole numbers: Problem type 2
- ◆ Real Numbers (61 topics)
  - ◇ Using a number line to compare integers
  - ◇ Reading the temperature from a thermometer
  - ◇ Interpreting a table of signed numbers that relate to a real–world situation: Problem type 1
  - ◇ Interpreting a table of signed numbers that relate to a real–world situation: Problem type 2
  - ◇ Comparing signed numbers relating to a real–world situation
  - ◇ Plotting fractions on a number line
  - ◇ Plotting rational numbers on a number line
  - ◇ Approximating the location of irrational numbers on a number line
  - ◇ Ordering real numbers
  - ◇ Identifying a sum as a point located a given distance from another point
  - ◇ Addition and subtraction with 4 or 5 integers

- ◇ Word problem with multiplication or division of integers
- ◇ Identifying equivalent signed fractions
- ◇ Signed fraction addition or subtraction: Advanced
- ◇ Addition and subtraction of 3 fractions involving signs
- ◇ Signed fraction multiplication: Advanced
- ◇ Signed fraction division
- ◇ Signed decimal addition and subtraction with 3 numbers
- ◇ Signed decimal multiplication
- ◇ Signed decimal division
- ◇ Operations with absolute value: Problem type 2
- ◇ Computing and understanding distances between integers on a number line
- ◇ Order of operations with fractions: Problem type 2
- ◇ Order of operations with fractions: Problem type 3
- ◇ Squaring decimal bases: Products greater than 0.1
- ◇ Exponents and decimals: Products less 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
- ◇ Identifying like terms
- ◇ Introduction to adding fractions with variables and common denominators
- ◇ Understanding the distributive property
- ◇ Prime numbers
- ◇ Prime factorization
- ◇ Greatest common factor of 2 numbers
- ◇ Greatest common factor of 3 numbers
- ◇ Factoring a linear binomial
- ◇ Identifying properties used to simplify an algebraic expression
- ◇ Perimeter of a polygon involving mixed numbers and fractions
- ◇ Perimeter of a piecewise rectangular figure
- ◇ Sides of polygons having the same perimeter
- ◇ Area of a rectangle involving fractions
- ◇ Area of a rectangle involving mixed numbers and fractions
- ◇ Areas of rectangles with the same perimeter
- ◇ Area between two rectangles
- ◇ Estimates and exact answers
- ◇ Writing algebraic expressions for the area of a figure
- ◇ Word problem involving the area of a rectangle: Problem type 2
- ◇ Word problem involving the area between two rectangles
- ◇ U.S. Customary area unit conversion with whole number values
- ◇ Metric area unit conversion with decimal values
- ◆ Linear Equations and Inequalities (73 topics)
  - ◇ Additive property of equality with fractions and mixed numbers
  - ◇ Solving an equation to find the value of an expression



- ◇ Solving a multi–step equation given in fractional form
- ◇ Solving a two–step equation with signed decimals
- ◇ Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
- ◇ 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 equations with zero, one, or infinitely many solutions
- ◇ Solving for a variable in terms of other variables using multiplication or division: Advanced
- ◇ 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
- ◇ Solving an absolute value equation: Problem type 4
- ◇ Translating a sentence into a multi–step equation
- ◇ Solving a fraction word problem using a linear equation of the form  $Ax = B$
- ◇ 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 an equation of the form  $A(x + B) = C$  to solve a word problem
- ◇ Writing and solving a real–world problem given an equation with the variable on both sides
- ◇ Writing a multi–step equation for a real–world situation
- ◇ Solving a fraction word problem using a linear equation with the variable on both sides
- ◇ Solving a word problem with three unknowns using a linear equation
- ◇ Solving a word problem involving rates and time conversion
- ◇ Converting between compound units: Advanced
- ◇ Finding side lengths of squares given an area and 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
- ◇ Converting a repeating decimal to a fraction
- ◇ Solving a proportion of the form  $(x+a)/b = c/d$
- ◇ Solving a proportion of the form  $a/(x+b) = c/x$
- ◇ Introduction to solving a rational equation
- ◇ Solving a rational equation that simplifies to linear: Denominator  $x$
- ◇ Word problem on proportions: Problem type 2
- ◇ Applying the percent equation: Problem type 2
- ◇ 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
- ◇ Computing a percent mixture
- ◇ Solving a percent mixture problem using a linear equation
- ◇ Finding simple interest without a calculator
- ◇ Calculating income tax
- ◇ Comparing discounts
- ◇ Examining a savings plan for college
- ◇ Calculations involving paying for college
- ◇ Comparing total costs for attending different colleges
- ◇ Distinguishing between fixed and variable expenses
- ◇ Computing percentages for categories of a budget
- ◇ Computations involving cost of living and hourly wage
- ◇ Comparing annual salaries of different occupations
- ◇ Calculations involving purchases with debit and credit cards

- ◇ Comparing costs of checking accounts
- ◇ Balancing a check register
- ◇ Reading a credit report
- ◇ Understanding the impact of a credit score
- ◇ Computing a person's net worth
- ◇ Calculating and comparing monthly payments using the ALEKS loan calculator
- ◇ Calculating monthly payment, total payment, and interest using the ALEKS loan calculator
- ◇ Calculating and comparing total loan payments using the ALEKS loan calculator
- ◇ Calculating and comparing simple interest and compound interest
- ◇ 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
- ◇ Additive property of inequality with signed fractions
- ◇ 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, advanced
- ◇ Translating a sentence into a multi-step inequality
- ◇ Solving a word problem using a two-step linear inequality and describing the solution
- ◇ Writing an absolute value inequality given a graph on the number line
- ◇ Solving an absolute value inequality: Problem type 5
- ◆ Graphing, Functions, and Linear Systems (66 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
  - ◇ Writing a function rule given a table of ordered pairs: Two-step rules
  - ◇ Making a table and plotting points given a unit rate
  - ◇ Finding x- and y-intercepts of a line given the equation: Advanced
  - ◇ Finding the coordinate that yields a given slope
  - ◇ Identifying linear equations: Advanced
  - ◇ Rewriting a linear equation in the form  $Ax + By = C$
  - ◇ 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 standard form given the slope and a point
  - ◇ Graphing ordered pairs and writing an equation from a table of values in context
  - ◇ Identifying independent and dependent quantities from tables and graphs
  - ◇ Identifying independent and dependent variables from equations or real-world situations
  - ◇ Classifying linear and nonlinear relationships from scatter plots
  - ◇ Identifying outliers and clustering in scatter plots
  - ◇ Identifying proportional relationships in tables by calculating unit rates: Whole numbers
  - ◇ Identifying proportional relationships in tables by calculating unit rates: Fractions
  - ◇ Identifying proportional relationships in graphs: Basic
  - ◇ Identifying proportional relationships in graphs: Advanced
  - ◇ Finding outputs and rate of increase given the graph of a line that models a real-world situation
  - ◇ Comparing proportional relationships given in different forms
  - ◇ 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
  - ◇ Variable expressions as inputs of functions: Problem type 1
  - ◇ Evaluating a piecewise-defined function

- ◇ Finding inputs and outputs of a two–step function that models a real–world situation: Function notation
- ◇ Finding intercepts of a nonlinear function given its graph
- ◇ Graphing an absolute value equation in the plane: Advanced
- ◇ 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
- ◇ 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
- ◇ Transforming the graph of a function by reflecting over an axis
- ◇ Transforming the graph of a function by shrinking or stretching
- ◇ Transforming the graph of a function using more than one transformation
- ◇ Writing an equation for a function after a vertical and horizontal translation
- ◇ Finding patterns in shapes
- ◇ Classifying systems of linear equations from graphs
- ◇ Writing a system of linear equations given its graph
- ◇ Solving systems of linear equations with 0, 1, or infinitely many solutions
- ◇ Solving a 3x3 system of linear equations: Problem type 1
- ◇ Scalar multiplication of a matrix
- ◇ Addition or subtraction of matrices
- ◇ Linear combination of matrices
- ◇ Gauss–Jordan elimination with a 2x2 matrix
- ◇ Solving a percent mixture problem using a system of linear equations
- ◇ 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
- ◇ 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 Exponential Functions (15 topics)
  - ◇ Ordering numbers with positive exponents
  - ◇ Ordering numbers with negative exponents
  - ◇ Product rule with negative exponents
  - ◇ Power, product, and quotient rules with negative exponents
  - ◇ Estimating numbers using scientific notation
  - ◇ Choosing metric units and converting to the base unit in scientific notation
  - ◇ Expressing calculator notation as scientific notation
  - ◇ Multiplying numbers written in decimal form or scientific notation in a real–world situation
  - ◇ Finding the scale factor between numbers given in scientific notation in a real–world situation
  - ◇ Adding or subtracting numbers written in scientific notation: Same exponents, basic
  - ◇ Adding or subtracting numbers written in scientific notation: Same exponents, advanced
  - ◇ Adding or subtracting numbers written in scientific notation: Different exponents
  - ◇ Estimating the sum or difference of two numbers written in scientific notation
  - ◇ Choosing an exponential model and using it to make a prediction
  - ◇ Finding a specified term of a geometric sequence given the common ratio and first term
- ◆ Data Analysis and Probability (62 topics)

- ◇ Identifying statistical questions
- ◇ Choosing an appropriate method for gathering data: Problem type 1
- ◇ Choosing an appropriate method for gathering data: Problem type 2
- ◇ Introduction to expectation
- ◇ Finding if a question can be answered by the data
- ◇ Making a reasonable inference based on proportion statistics
- ◇ Interpreting a circle graph or pie chart
- ◇ Finding a percentage of a total amount in a circle graph
- ◇ Computations from a circle graph
- ◇ Angle measure in a circle graph
- ◇ Finding the mode and range from a line plot
- ◇ Using a model to find the mean
- ◇ Understanding the mean graphically: Two bars
- ◇ Understanding the mean graphically: Four or more bars
- ◇ Finding the mean of a symmetric distribution
- ◇ Finding sample size and comparing samples for estimating the mean
- ◇ 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
- ◇ Rejecting unreasonable claims based on average statistics
- ◇ Weighted mean
- ◇ Finding outliers in a data set
- ◇ Percentiles
- ◇ Comparing measures of center and variation
- ◇ Comparing sample means
- ◇ Computing mean absolute deviation from a list of numerical values
- ◇ Computing mean absolute deviation from a bar graph
- ◇ Assessing the degree of overlap of two distributions
- ◇ Interpreting a Venn diagram of 3 sets
- ◇ Interpreting a tree diagram
- ◇ Factorial expressions
- ◇ Computing permutations and combinations
- ◇ Word problem involving permutations
- ◇ Word problem involving combinations
- ◇ Permutations, combinations, and the multiplication principle for counting
- ◇ Determining a sample space and outcomes for a simple event
- ◇ Determining a sample space and outcomes for a compound event
- ◇ Experimental and theoretical probability
- ◇ Outcomes and event probability
- ◇ Probabilities involving two rolls of a die
- ◇ Probabilities of a permutation and a combination
- ◇ Odds of an event
- ◇ 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
- ◇ Computing conditional probability using a two-way frequency table
- ◇ Computing conditional probability to make an inference using a two-way frequency table
- ◇ Conditional probability: Basic

- ◇ 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
- ◇ Identifying outcomes in a random number table used to simulate a compound event
- ◇ Using a random number table to simulate a compound event
- ◇ Using a random number table to make a fair decision
- ◇ Population standard deviation
- ◇ Word problem involving calculations from a normal distribution
- ◆ Segments, Lines, and Angles (35 topics)
  - ◇ 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
  - ◇ 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
  - ◇ Square root of a rational perfect square
  - ◇ Square roots of perfect squares with signs
  - ◇ Simplifying the square root of a whole number less than 100
  - ◇ Simplifying the square root of a whole number greater than 100
  - ◇ Square root addition or subtraction
  - ◇ Square root addition or subtraction with three terms
  - ◇ Introduction to square root multiplication
  - ◇ Square root multiplication: Basic
  - ◇ Square root multiplication: Advanced
  - ◇ Simplifying a quotient of square roots
  - ◇ Rationalizing a denominator: Quotient involving square roots
  - ◇ Distance between two points in the plane: Decimal answers
  - ◇ 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
  - ◇ 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
  - ◇ Solving equations involving angles and two pairs of parallel lines
  - ◇ Establishing facts about the angles created when parallel lines are cut by a transversal
  - ◇ Proofs involving parallel lines
- ◆ Triangles, Quadrilaterals, and Polygons (47 topics)
  - ◇ Finding an angle measure given a triangle and parallel lines
  - ◇ Establishing facts about the interior angles of a triangle
  - ◇ Establishing facts about the interior and exterior angles of a triangle
  - ◇ Separating overlapping triangles and identifying common features
  - ◇ Proofs involving congruent triangles that overlap: Basic

- ◇ Proofs involving congruent triangles, parallel or perpendicular segments, and CPCTC
- ◇ Proofs involving congruent triangles that overlap: Advanced
- ◇ Finding an angle measure for a triangle sharing a side with another triangle
- ◇ Proofs of theorems involving isosceles triangles
- ◇ Using the Pythagorean Theorem to find distance on a grid
- ◇ Word problem involving the Pythagorean Theorem
- ◇ Using the Pythagorean Theorem repeatedly
- ◇ Identifying side lengths that give right triangles
- ◇ Demonstrating the converse 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 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)
- ◇ 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
- ◇ Finding measures involving diagonals of parallelograms
- ◇ Conditions for parallelograms
- ◇ Finding measures involving diagonals of rectangles
- ◇ Conditions for quadrilaterals
- ◇ Completing proofs of theorems involving sides of a parallelogram
- ◇ Completing proofs of theorems involving angles of a parallelogram
- ◇ Finding coordinates of vertices of polygons
- ◇ Congruence in the coordinate plane
- ◆ Similarity and Transformations (30 topics)
  - ◇ Finding angle measures of a triangle given two angles of a similar triangle
  - ◇ 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
- ◇ 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
- ◇ Reflecting a point across both coordinate axes
- ◇ Finding the coordinates of a point reflected across both axes
- ◇ Finding the coordinates of three points reflected over an axis
- ◇ Rotational and point symmetries
- ◇ The effect of dilation on area
- ◇ 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 (103 topics)
  - ◇ Word problem on population density
  - ◇ Finding the area of a right triangle using the Pythagorean Theorem
  - ◇ Computing an area using the Pythagorean Theorem
  - ◇ Informal proof of 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
  - ◇ Finding the area of a rhombus using the Pythagorean Theorem
  - ◇ Area of a regular polygon
  - ◇ Finding the area of a regular polygon using special right triangles
  - ◇ Side lengths, perimeters, and areas of similar polygons
  - ◇ Introduction to a circle: Diameter, radius, and chord
  - ◇ 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
  - ◇ Circumference and area of a circle: Exact answers in terms of pi
  - ◇ Informal argument for the formula of the area of a circle
  - ◇ 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
  - ◇ Area of a sector of a circle: Exact answer in terms of pi
  - ◇ Informal argument for the formula of the area of a sector
  - ◇ Area as probability
  - ◇ Classifying solids
  - ◇ 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 horizontal and vertical cross sections of solids

- ◇ Identifying solids generated by rotations of two–dimensional regions
- ◇ Identifying geometric shapes that model real–world objects
- ◇ 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 volume of a rectangular prism
- ◇ Word problem involving the rate of filling or emptying a rectangular prism
- ◇ Computations involving density, mass, and volume
- ◇ Word problem on density involving the volume of a rectangular solid
- ◇ 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
- ◇ Converting between degree and radian measure: Problem type 1
- ◇ 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 a circle in a triangle
- ◇ Circumscribing a circle about a triangle
- ◇ Angles of intersecting secants and tangents
- ◇ Lengths of chords, secants, and tangents
- ◆ Polynomials and Quadratic Functions (113 topics)
  - ◇ Degree and leading coefficient of a univariate polynomial
  - ◇ Degree of a multivariate polynomial
  - ◇ Simplifying a sum or difference of two univariate polynomials
  - ◇ Simplifying a sum or difference of three univariate polynomials
  - ◇ Simplifying a sum or difference of multivariate 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
  - ◇ Dividing a polynomial by a monomial: Univariate
  - ◇ Dividing a polynomial by a monomial: Multivariate
  - ◇ Polynomial long division: Problem type 1
  - ◇ Polynomial long division: Problem type 2
  - ◇ Polynomial long division: Problem type 3
  - ◇ Closure properties of integers and polynomials
  - ◇ Introduction to the GCF of two monomials
  - ◇ Greatest common factor of three univariate monomials
  - ◇ Greatest common factor of two multivariate monomials
  - ◇ Factoring out a monomial from a polynomial: Univariate
  - ◇ Factoring out a monomial from a polynomial: Multivariate
  - ◇ Factoring out a binomial from a polynomial: GCF factoring, basic
  - ◇ Factoring a univariate polynomial by grouping: Problem type 1
  - ◇ Factoring a 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 with leading coefficient 1
- ◇ Factoring a quadratic in two variables 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 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 quadratic with a negative leading coefficient
- ◇ Factoring a perfect square trinomial with leading coefficient 1
- ◇ Factoring a perfect square trinomial with leading coefficient greater than 1
- ◇ Factoring a perfect square trinomial in two variables
- ◇ Factoring a difference of squares in one variable: Basic
- ◇ Factoring a difference of squares in one variable: Advanced
- ◇ 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
- ◇ Solving an equation written in factored form
- ◇ Finding the roots of a quadratic equation of the form  $ax^2 + bx = 0$
- ◇ Finding the roots of a quadratic equation with leading coefficient 1
- ◇ Finding the roots of a quadratic equation with leading coefficient greater than 1
- ◇ Solving a quadratic equation needing simplification
- ◇ 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
- ◇ Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
- ◇ Solving an equation of the form  $x^2 = a$  using the square root property
- ◇ 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, basic
- ◇ Solving a quadratic equation using the square root property: Exact answers, advanced
- ◇ Completing the square
- ◇ Solving a quadratic equation by completing the square: Decimal answers
- ◇ Solving a quadratic equation by completing the square: Exact answers
- ◇ Applying the quadratic formula: Exact answers
- ◇ Applying the quadratic formula: Decimal answers
- ◇ Discriminant of a quadratic equation
- ◇ Solving a word problem using a quadratic equation with irrational roots
- ◇ 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
- ◇ Graphing a parabola of the form  $y = ax^2 + bx + c$ : Rational coefficients
- ◇ Writing a quadratic function given its zeros
- ◇ Finding the x–intercept(s) and the vertex of a parabola
- ◇ Rewriting a quadratic function in standard form
- ◇ 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
- ◇ Range of a quadratic function

- ◇ Writing the equation of a quadratic function given its graph
- ◇ Solving a quadratic equation by graphing
- ◇ Comparing properties of quadratic functions given in different forms
- ◇ Classifying the graph of a function
- ◇ Choosing a quadratic model and using it to make a prediction
- ◇ Graphing a parabola of the form  $y^2 = ax$  or  $x^2 = ay$
- ◇ Deriving the equation of a parabola given its focus and directrix
- ◇ 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
- ◇ 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
- ◇ Sum, difference, and product of two functions
- ◇ Introduction to the composition of two functions
- ◇ Composition of two functions: Basic
- ◇ Horizontal line test
- ◇ Inverse functions: Linear, discrete
- ◇ Even and odd functions: Problem type 1
- ◆ Radicals, Trigonometry, and Rational Expressions (194 topics)
  - ◇ Finding all square roots of a number
  - ◇ Estimating a square root
  - ◇ Using numerical methods to approximate a square root to the nearest tenth
  - ◇ Using numerical methods to approximate a square root to the nearest hundredth
  - ◇ Square roots of integers raised to even exponents
  - ◇ Introduction to simplifying a radical expression with an even exponent
  - ◇ Square root of a perfect square monomial
  - ◇ Using absolute value to simplify square roots of perfect square monomials
  - ◇ Cube root of an integer
  - ◇ Finding  $n^{\text{th}}$  roots of perfect  $n^{\text{th}}$  powers with signs
  - ◇ Finding the  $n^{\text{th}}$  root of a perfect  $n^{\text{th}}$  power fraction
  - ◇ Finding the  $n^{\text{th}}$  root of a perfect  $n^{\text{th}}$  power monomial
  - ◇ Table for a square 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 square root function: Problem type 3
  - ◇ Converting between radical form and exponent form
  - ◇ Rational exponents: Unit fraction exponents and whole number bases
  - ◇ Rational exponents: Unit fraction exponents and bases involving signs
  - ◇ Rational exponents: Non–unit fraction exponent with a whole number base
  - ◇ Rational exponents: Negative exponents and fractional bases
  - ◇ Rational exponents: Product rule
  - ◇ Rational exponents: Quotient rule
  - ◇ Rational exponents: Products and quotients with negative exponents

- ◇ Rational exponents: Power of a power rule
- ◇ Rational exponents: Powers of powers with negative exponents
- ◇ Simplifying 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
- ◇ Introduction to simplifying a sum or difference of radical expressions: Univariate
- ◇ Simplifying a sum or difference of radical expressions: Univariate
- ◇ Simplifying a sum or difference of radical expressions: Multivariate
- ◇ Introduction to simplifying a product of radical expressions: Univariate
- ◇ Simplifying a product of radical expressions: Univariate
- ◇ Simplifying a product of radical expressions: Multivariate
- ◇ Introduction to simplifying a product of higher roots
- ◇ Simplifying a product of higher radical expressions
- ◇ 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
- ◇ 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
- ◇ 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
- ◇ 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
- ◇ 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
- ◇ Sine, cosine, and tangent ratios: Numbers for side lengths
- ◇ Sine, cosine, and tangent ratios: Variables for side lengths
- ◇ Using a calculator to approximate sine, cosine, and tangent values
- ◇ 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
- ◇ 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
- ◇ 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
- ◇ Heron's formula
- ◇ Magnitude of a vector given in component form
- ◇ 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
- ◇ 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
- ◇ Evaluating functions: Absolute value, rational, radical
- ◇ 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
- ◇ Simplifying a ratio of polynomials: Problem type 3
- ◇ Simplifying a ratio of multivariate polynomials
- ◇ Multiplying rational expressions involving multivariate monomials
- ◇ Multiplying rational expressions made up of linear expressions
- ◇ Multiplying rational expressions involving quadratics with leading coefficients of 1
- ◇ Multiplying rational expressions involving quadratics with leading coefficients greater than 1
- ◇ Multiplying rational expressions involving multivariate quadratics
- ◇ Dividing rational expressions involving multivariate monomials
- ◇ Dividing rational expressions involving linear expressions
- ◇ Dividing rational expressions involving quadratics with leading coefficients of 1
- ◇ Dividing rational expressions involving quadratics with leading coefficients greater than 1
- ◇ Dividing rational expressions involving multivariate quadratics
- ◇ Multiplication and division of 3 rational expressions
- ◇ Introduction to the LCM of two monomials
- ◇ Least common multiple 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 monomial denominators
- ◇ Writing equivalent rational expressions with polynomial denominators
- ◇ Writing equivalent rational expressions involving opposite factors
- ◇ 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 denominators  $ax^n$  and  $bx^m$
- ◇ Adding rational expressions with multivariate monomial denominators: Basic
- ◇ Adding rational expressions with multivariate monomial denominators: Advanced
- ◇ Adding rational expressions with linear denominators without common factors: 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 with denominators  $ax-b$  and  $b-ax$
- ◇ Adding rational expressions involving different quadratic denominators
- ◇ Adding 3 rational expressions with different quadratic denominators
- ◇ Complex fraction without variables: Problem type 2
- ◇ Complex fraction involving univariate monomials
- ◇ 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
- ◇ 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: Proportional form, basic
- ◇ 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
- ◇ 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 1
- ◇ Solving for a variable in terms of other variables in a rational equation: Problem type 2
- ◇ Solving for a variable in terms of other variables in a rational equation: Problem type 3
- ◇ Word problem involving multiple rates
- ◇ Solving a work problem using a rational equation
- ◇ Solving a distance, rate, time problem using a rational equation
- ◇ Ordering fractions with variables
- ◇ 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
- ◇ Graphing a rational function: Constant over linear
- ◇ Graphing a rational function: Linear over linear

**\*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.*