

## Algebra 1

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

Curriculum (493 topics + 575 additional topics)

- Arithmetic Readiness (35 topics)
  - Factors, Multiples, and Equivalent Fractions (4 topics)
    - Greatest common factor of 2 numbers
    - Equivalent fractions
    - Simplifying a fraction
    - Division involving zero
  - Addition and Subtraction with Fractions (2 topics)
    - Introduction to addition or subtraction of fractions with different denominators
    - Addition or subtraction of fractions with different denominators
  - Multiplication and Division with Fractions (5 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
  - Rounding, Ordering, and the Number Line (3 topics)
    - Rounding to hundreds or thousands
    - Rounding decimals
    - Using a common denominator to order fractions
  - Addition and Subtraction with Decimals (3 topics)
    - Decimal subtraction: Basic
    - Word problem with addition or subtraction of 2 decimals
    - Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
  - Multiplication and Division with Decimals (5 topics)
    - Multiplication of a decimal by a power of ten
    - Multiplying a decimal by a whole number
    - Word problem with multiple decimal operations: Problem type 1
    - Division of a decimal by a power of ten
    - Division of a decimal by a whole number
  - Converting Between Fractions and Decimals (1 topics)
    - Converting a fraction to a terminating decimal: Basic
  - Ratios and Unit Rates (2 topics)
    - Finding missing values in a table of equivalent ratios
    - Solving a word problem on proportions using a unit rate
  - Percents, Decimals, and Fractions (4 topics)
    - 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
  - Introduction to Percent Applications (1 topics)
    - Finding a percentage of a whole number without a calculator: Basic
  - Units of Measurement (5 topics)
    - U.S. Customary length conversion with whole number values
    - U.S. Customary volume conversion with whole number values
    - U.S. Customary weight conversions with whole number values
    - Time unit conversion with whole number values
    - Converting between metric and U.S. Customary unit systems
- Real Numbers (58 topics)
  - Plotting and Ordering (6 topics)

- Plotting integers on a number line
- Ordering integers
- Writing a signed number for a real-world situation
- Square root of a perfect square
- Using a calculator to approximate a square root
- Absolute value of a number
- Operations with Signed Numbers (13 topics)
  - Integer addition: Problem type 1
  - Integer addition: Problem type 2
  - Integer subtraction: Problem type 1
  - Integer subtraction: Problem type 2
  - Integer subtraction: Problem type 3
  - Addition and subtraction with 3 integers
  - Operations with absolute value: Problem type 1
  - Computing the distance between two integers on a number line
  - Integer multiplication and division
  - Multiplication of 3 or 4 integers
  - Signed fraction addition or subtraction: Basic
  - Signed fraction multiplication: Basic
  - Signed decimal addition and subtraction
- Exponents and Order of Operations (7 topics)
  - Introduction to exponents
  - Order of operations with whole numbers
  - Order of operations with whole numbers and exponents: Basic
  - Exponents and fractions
  - Exponents and integers: Problem type 1
  - Exponents and signed fractions
  - Order of operations with integers
- Evaluating Expressions (5 topics)
  - 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 a linear expression: Integer multiplication with addition or subtraction
  - Evaluating a quadratic expression: Integers
- One-Step Linear Equations (11 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 fractions
  - Multiplicative property of equality with decimals
  - Multiplicative property of equality with integers
  - Multiplicative property of equality with signed fractions
- Properties of Operations (11 topics)
  - Combining like terms: Whole number coefficients
  - Combining like terms: Integer coefficients
  - Combining like terms: Decimal coefficients
  - Multiplying a constant and a linear monomial
  - Distributive property: Whole number coefficients
  - Distributive property: Integer coefficients
  - Factoring a linear binomial
  - Identifying parts in an algebraic expression
  - Identifying equivalent algebraic expressions
  - Using distribution and combining like terms to simplify: Univariate
  - Combining like terms in a quadratic expression
- Geometry (5 topics)
  - Perimeter of a square or a rectangle
  - Writing algebraic expressions for the perimeter of a figure
  - Area of a square or a rectangle
  - Writing algebraic expressions for the area of a figure
  - Volume of a rectangular prism
- Linear Equations (51 topics)
  - Multi-Step Linear Equations (17 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
- Solving a multi-step equation given in fractional form
- Solving a two-step equation with signed decimals
- 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 two-step equation with signed fractions
- Solving equations with zero, one, or infinitely many solutions
- Writing Expressions and Equations (6 topics)
  - Writing a one-step expression for a real-world situation
  - Translating a phrase into a one-step expression
  - Translating a phrase into a two-step expression
  - Translating a sentence into a one-step equation
  - Writing an equation to represent a proportional relationship
  - Translating a sentence into a multi-step equation
- Applications of Linear Equations (6 topics)
  - Writing and solving a one-step equation with decimals that models a real-world situation
  - 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 one-step word problem using the formula  $d = rt$
- Applications Involving Geometry (2 topics)
  - Finding side lengths of rectangles given one dimension and an area or a perimeter
  - Finding the dimensions of a rectangle given its perimeter and a relationship between sides
- Solving for a Variable and Dimensional Analysis (7 topics)
  - Solving for a variable in terms of other variables using addition or subtraction: Basic
  - Solving for a variable in terms of other variables using multiplication or division: Basic
  - Solving for a variable in terms of other variables using addition or subtraction with division
  - Solving for a variable inside parentheses in terms of other variables
  - Solving for a variable in terms of other variables in a linear equation with fractions
  - U.S. Customary length conversions involving dimensional analysis
  - Converting between compound units: Basic
- Proportions (5 topics)
  - Solving a proportion of the form  $x/a=b/c$ : Basic
  - Solving a proportion of the form  $x/a = b/c$
  - Writing a proportion to solve a problem involving rates
  - Writing and solving a proportion to convert between metric and U.S. Customary units
  - Word problem on proportions: Problem type 1
- More on Percents (8 topics)
  - Applying the percent equation: Problem type 1
  - Writing a proportion to solve a multi-step problem involving percentages
  - 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 percentage increase or decrease: Advanced
  - Finding the absolute error and percent error of a measurement
  - Introduction to compound interest
- Linear Inequalities (29 topics)
  - Writing and Graphing Inequalities (6 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

- One-Step Linear Inequalities (6 topics)
  - Identifying solutions to a one-step linear inequality
  - Additive property of inequality with whole numbers
  - Additive property of inequality with integers
  - 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 inequalities with no solution or all real numbers as solutions
- Applications (4 topics)
  - Writing, solving, and graphing the solution to a one-step inequality that models a real-world situation
  - 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
- Compound Inequalities (4 topics)
  - Translating a sentence into a compound inequality
  - Graphing a compound inequality on the number line
  - Solving a compound linear inequality: Graph solution, basic
  - Solving and graphing the solution to a compound inequality that models a real-world situation
- Absolute Value Inequalities (1 topics)
  - Writing and solving an absolute value inequality that models a real-world situation and interpreting the solution
- Functions and Lines (125 topics)
  - Ordered Pairs (5 topics)
    - Reading a point in the coordinate plane
    - Plotting a point in the coordinate plane
    - Finding distances between points that share a common coordinate given the graph
    - Finding the perimeter or area of a rectangle in the coordinate plane NEW
    - Finding the area of a triangle or parallelogram in the coordinate plane NEW
  - 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 the coordinates of a point on a graph given the equation
    - 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 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 a line
    - Finding the slopes 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
  - Direct and Inverse Variation (9 topics)
    - Identifying direct variation equations
    - Identifying direct variation from ordered pairs and writing equations
    - Writing a direct variation equation
    - Word problem on direct variation
    - Interpreting direct variation from a graph

- Writing an inverse variation equation
  - Identifying direct and inverse variation equations
  - Identifying direct and inverse variation from ordered pairs and writing equations
  - Word problem on inverse variation
- Equations of Lines (19 topics)
    - Identifying linear functions given ordered pairs
    - Rewriting a linear equation in the form  $Ax + By = C$
    - Finding the slope and y-intercept of a line given its equation in the form  $y = mx + b$
    - 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
    - Finding the slope and y-intercept given a table for a linear function
    - 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
    - Finding the slope and a point on a line given its equation in point-slope form
    - Writing the equation of a line in point-slope form given the slope and a point
    - Writing the equation of a line in standard form given the slope and a point
    - Writing the equation of a line given the y-intercept and another point
    - Writing the equation of a line through two given points
    - Writing the equation and finding the slope of a line parallel or perpendicular to a vertical or horizontal line
    - Comparing linear functions to the parent function  $y = x$
    - Finding slopes of lines parallel and perpendicular to a line given in slope-intercept form
    - Finding slopes of lines parallel and perpendicular to a line given in the form  $Ax + By = C$
    - Writing equations of lines parallel and perpendicular to a given line through a point
- Applications of Linear Equations with Two Variables (14 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
    - Writing and evaluating a function that models a real-world situation: Basic
    - Writing a linear equation that models a real-world situation given a graph or a table of values
    - Writing an equation and drawing its graph to model a real-world situation: Advanced
    - Finding the intercepts and rate of change given a graph of a linear function
    - Finding the initial amount and rate of change given a table for a linear function
    - Finding the initial amount and rate of change given two points for a linear function
    - Combining functions to write a new function that models a real-world situation
    - Comparing properties of linear functions given in different forms
    - 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 (10 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
    - [Using technology to fit a linear regression model to data and to make a prediction](#) NEW
    - Computing residuals
    - Interpreting residual plots
    - Linear relationship and the correlation coefficient
    - Identifying correlation and causation
- Introduction to Functions (9 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
    - Evaluating a piecewise-defined function
    - Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
    - Finding inputs and outputs of a two-step function that models a real-world situation: Function notation
    - Domain and range of a linear function that models a real-world situation
- 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
- Graphs of Functions (20 topics)
  - Finding an output of a function from its graph
  - Finding and interpreting an output of a linear function given a graph that models a real-world situation
  - Domain and range from the graph of a discrete relation
  - Finding domain and range from a linear graph in context
  - Interpreting the domain and range of a linear function in context
  - Finding where a function is increasing, decreasing, or constant given the graph
  - Choosing a graph to fit a narrative: Basic
  - Choosing a graph to fit a narrative: Advanced
  - Drawing a graph to fit a narrative
  - Graphing an absolute value equation of the form  $y = |x|$
  - Graphing an absolute value equation in the plane: Basic
  - Determining if a function is linear given its graph
  - Graphing a parabola of the form  $y = ax^2$
  - Graphing a parabola of the form  $y = (x-h)^2 + k$
  - Graphing a piecewise-defined function: Problem type 1
  - Introduction to graphing a piecewise-defined function involving lines with non-zero slope
  - Graphing a piecewise-defined function: Problem type 2
  - Finding the average rate of change of a function given its equation
  - Finding the average rate of change of a function given its graph
  - Word problem involving average rate of change
- Transformations (8 topics)
  - Translating the graph of a parabola: One step
  - Translating the graph of a parabola: Two steps
  - How the leading coefficient affects the shape of a parabola
  - Graphing quadratic functions of the form  $y=ax^2$  and  $y=(bx)^2$  by transforming the parent graph  $y=x^2$
  - 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
- Linear Systems (31 topics)
  - Systems of Linear Equations (14 topics)
    - Identifying solutions to a system of linear equations
    - Identifying the solution of systems of linear equations from graphs
    - Classifying systems of linear equations from graphs
    - Graphically solving a system of linear equations both of the form  $y=mx+b$
    - Graphing a system of linear equations and estimating a solution
    - Graphically solving a system of linear equations
    - Using a graphing calculator to solve a system of linear equations: Basic
    - Writing a system of linear equations given its graph
    - 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 systems of linear equations with 0, 1, or infinitely many solutions
    - Identifying the operations used to create equivalent systems of equations
  - Applications (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
    - Writing and solving a system of two linear equations given a table of values
    - 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
  - Linear Inequalities with Two Variables (6 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
    - 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
  - Systems of Linear Inequalities (5 topics)
    - Graphing a system of two linear inequalities: Basic
    - Graphing a system of two linear inequalities: Advanced
    - Writing a linear inequality in two variables given a table of values
    - Writing a multi-step inequality for a real-world situation
    - Writing a system of linear inequalities that models a real-world situation and determining possible solutions

- Exponents and Exponential Functions (66 topics)
  - Product, Power, and Quotient Rules (13 topics)
    - Introduction to the product rule of exponents
    - Product rule with positive exponents: Univariate
    - Product rule with positive exponents: Multivariate
    - Introduction to the power of a power rule of exponents
    - Introduction to the power of a product rule of exponents
    - Power rules with positive exponents: Multivariate products
    - Power rules with positive exponents: Multivariate quotients
    - Simplifying a ratio of multivariate monomials: Basic
    - Introduction to the quotient rule of exponents
    - Simplifying a ratio of univariate monomials
    - Quotient of expressions involving exponents
    - Simplifying a ratio of multivariate monomials: Advanced
    - Power and quotient rules with positive exponents
  - Negative Exponents (11 topics)
    - Evaluating expressions with exponents of zero
    - Evaluating an expression with a negative exponent: Whole number base
    - Evaluating an expression with a negative exponent: Positive fraction base
    - Evaluating an expression with a negative exponent: Negative integer base
    - Rewriting an algebraic expression without a negative exponent
    - Introduction to the product rule with negative exponents
    - Quotient rule with negative exponents: Problem type 1
    - Quotient rule with negative exponents: Problem type 2
    - Power of a power rule with negative exponents
    - Power rules with negative exponents
    - Power and quotient rules with negative exponents: Problem type 1
  - Introduction to Radicals (8 topics)
    - Square root of a rational perfect square
    - Square roots of perfect squares with signs
    - Cube root of an integer
    - Simplifying the square root of a whole number less than 100
    - Simplifying the square root of a whole number greater than 100
    - Introduction to square root addition or subtraction
    - Introduction to square root multiplication
    - Classifying sums and products as rational or irrational
  - Rational Exponents (7 topics)
    - Converting between radical form and exponent form
    - Using the properties of integer exponents to define rational exponents
    - Rational exponents: Unit fraction exponents and whole number bases
    - Rational exponents: Non-unit fraction exponent with a whole number base
    - Rational exponents: Product rule
    - Rational exponents: Quotient rule
    - Rational exponents: Power of a power rule
  - Graphs of Exponential Functions (7 topics)
    - Table for an exponential function
    - Graphing an exponential function:  $f(x) = b^x$
    - Graphing an exponential function:  $f(x) = a(b)^x$
    - Translating the graph of an exponential function
    - Finding domain and range from the graph of an exponential function
    - Finding the domain and range from the graph of an exponential function: Symbolic notation
    - Choosing the graph for an exponential function and identifying key features
  - Applications (11 topics)
    - Using a calculator to evaluate exponential expressions
    - Evaluating an exponential function that models a real-world situation
    - Finding a final amount in a word problem on exponential growth or decay
    - Finding the initial amount and rate of change given an exponential function
    - Writing an equation that models exponential growth or decay
    - Writing an exponential function rule given a table of ordered pairs
    - Finding the initial amount and asymptote given a graph of an exponential function
    - Choosing an exponential model and using it to make a prediction
      - [Using technology to determine the better regression model for a given data set and using that model to make a prediction: Linear and exponential](#)
    - NEW Finding the final amount in a word problem on compound interest
    - 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 geometric sequences and finding the common ratio
  - Finding a specified term of a geometric sequence given the first terms
  - Finding a specified term of a geometric sequence given the common ratio and first term
  - 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
- Polynomials and Factoring (25 topics)
    - Polynomial Addition and Subtraction (2 topics)
      - Degree and leading coefficient of a univariate polynomial
      - Simplifying a sum or difference of two univariate polynomials
    - Polynomial Multiplication (8 topics)
      - Multiplying a univariate polynomial by a monomial with a positive coefficient
      - Multiplying binomials with leading coefficients of 1
      - Multiplying binomials with leading coefficients greater than 1
      - Multiplying binomials in two variables
      - Multiplying conjugate binomials: Univariate
      - Squaring a binomial: Univariate
      - Multiplying binomials with negative coefficients
      - Multiplication involving binomials and trinomials in one variable
    - Factoring Using the GCF (2 topics)
      - Introduction to the GCF of two monomials
      - Factoring out a monomial from a polynomial: Univariate
    - Factoring by Grouping (2 topics)
      - Factoring a univariate polynomial by grouping: Problem type 1
      - Factoring a univariate polynomial by grouping: Problem type 2
    - Factoring Quadratic Trinomials (5 topics)
      - Factoring a quadratic with leading coefficient 1
      - Factoring out a constant before factoring a quadratic
      - Factoring a quadratic with leading coefficient greater than 1: Problem type 1
      - Factoring a quadratic with leading coefficient greater than 1: Problem type 2
      - Factoring a quadratic with a negative leading coefficient
    - Factoring Special Products (5 topics)
      - Factoring a perfect square trinomial with leading coefficient 1
      - Factoring a perfect square trinomial with leading coefficient greater than 1
      - Factoring a difference of squares in one variable: Basic
      - Factoring a difference of squares in one variable: Advanced
      - Factoring a polynomial involving a GCF and a difference of squares: Univariate
    - Polynomial Division (1 topics)
      - Closure properties of integers and polynomials
  - Quadratic Functions and Equations (45 topics)
    - Solving Quadratic Equations by Factoring (6 topics)
      - Solving an equation written in factored form
      - Finding the roots of a quadratic equation of the form  $ax^2 + bx = 0$
      - Finding the roots of a quadratic equation with leading coefficient 1
      - Finding the roots of a quadratic equation with leading coefficient greater than 1
      - Solving a word problem using a quadratic equation with rational roots
      - Writing and solving a quadratic equation for a real-world problem involving area or volume
    - Quadratic Functions (27 topics)
      - Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
      - Graphing a parabola of the form  $y = a(x-h)^2 + k$
      - Completing the square
      - Graphing a parabola of the form  $y = x^2 + bx + c$
      - Graphing a parabola of the form  $y = ax^2 + bx + c$ : Integer coefficients
      - Finding the zeros of a quadratic function given its equation
      - Writing a quadratic function given its zeros
      - Finding the x-intercept(s) and the vertex of a parabola
      - Using a graphing calculator to find the x-intercept(s) and vertex of a quadratic function
      - Writing the equation of a quadratic function given a real-world description
      - Rewriting a quadratic function in standard form

- Rewriting a quadratic function to find its vertex and sketch its graph
  - Rewriting a quadratic function to find its maximum or minimum and axis of symmetry
  - Finding the maximum or minimum of a quadratic function
  - Word problem involving the maximum or minimum of a quadratic function
  - Finding the domain and range from the graph of a parabola
  - Finding the domain and range from the graph of a parabola: Symbolic notation
  - Graphing a quadratic function that models a real-world situation and identifying key features
  - Writing the equation of a quadratic function given a table of values
  - Writing the equation of a quadratic function given its x-intercepts and another point
  - 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
  - Comparing linear, quadratic, and exponential functions given in different forms
  - Choosing a quadratic model and using it to make a prediction
  - [Using technology to determine the better regression model for a given data set and using that model to make a prediction: Exponential and quadratic](#)
- (NEW)
- Square Root Property (3 topics)
    - 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
  - Completing the Square and the Quadratic Formula (3 topics)
    - Solving a quadratic equation by completing the square: Decimal answers
    - Applying the quadratic formula: Decimal answers
    - Solving a word problem using a quadratic equation with irrational roots
  - Quadratic Inequalities and Nonlinear Systems (2 topics)
    - Graphically solving a system of linear and quadratic equations
    - Solving a system of linear and quadratic equations
  - Function Operations and Inverse Functions (4 topics)
    - Introduction to the composition of two functions
    - Composition of two functions: Basic
    - Inverse functions: Linear, discrete
    - Finding, evaluating, and interpreting an inverse function for a given linear relationship
  - Radicals (8 topics)
    - Operations with Radical Expressions (4 topics)
      - Square root addition or subtraction
      - Square root multiplication: Basic
      - Square root multiplication: Advanced
      - Introduction to simplifying a product involving square roots using the distributive property
    - Division and Rationalization (4 topics)
      - Simplifying a quotient of square roots
      - Simplifying a quotient involving a sum or difference with a square root
      - Rationalizing a denominator: Quotient involving square roots
      - Rationalizing a denominator: Square root of a fraction
  - Data Analysis and Probability (20 topics)
    - Collecting Data (2 topics)
      - Classification of variables
      - Classifying samples
    - 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 (2 topics)
      - Constructing a line plot
      - Constructing a frequency distribution and a histogram
    - Measures of Center and Spread (5 topics)
      - 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 (6 topics)
  - Using back-to-back stem-and-leaf plots to compare data sets
  - Five-number summary and interquartile range
  - Interpreting a box-and-whisker plot
  - Interpreting a box-and-whisker plot: Problem type 2
  - Constructing a box-and-whisker plot
  - Using box-and-whisker plots to compare data sets
- Other Topics Available(\*) (575 additional topics)
  - Arithmetic Readiness (83 topics)
    - Factors
    - Prime numbers
    - Prime factorization
    - Prime factorization: Exponent notation
    - Greatest common factor of 3 numbers
    - Least common multiple of 2 numbers
    - Least common multiple of 3 numbers
    - Word problem involving the least common multiple of 2 numbers
    - Finding the LCD of two fractions
    - Addition or subtraction of fractions with the same denominator
    - Word problem involving addition or subtraction of fractions with different denominators
    - Multiplication of 3 fractions
    - Word problem involving fractions and multiplication
    - Multi-step word problem involving fractions and multiplication
    - The reciprocal of a number
    - Division involving a whole number and a fraction
    - Fraction division
    - Complex fraction without variables: Problem type 1
    - Word problem involving fractions and division
    - Writing an improper fraction as a mixed number
    - Writing a mixed number as an improper fraction
    - 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
    - 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
    - Plotting fractions on a number line
    - Reading decimal position on a number line: Tenths
    - Reading decimal position on a number line: Hundredths
    - Introduction to ordering decimals
    - Ordering decimals
    - Using a calculator to convert a fraction to a rounded decimal
    - Ordering fractions and decimals
    - Addition of aligned decimals
    - Decimal addition with 3 numbers
    - Subtraction of aligned decimals
    - Decimal subtraction: Advanced
    - Decimal addition and subtraction with 3 or more numbers
    - Estimating a sum of whole numbers: Problem type 1
    - Estimating a sum of whole numbers: Problem type 2
    - Word problem with addition of 3 or 4 decimals and whole numbers
    - Decimal multiplication: Problem type 1
    - Multiplication of a decimal by a power of 0.1
    - Word problem with multiplication of two decimals
    - Division of a decimal by a 1-digit decimal
    - Division of a decimal by a 2-digit decimal
    - Word problem with multiple decimal operations: Problem type 2
    - Word problem with division of two decimals
    - 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 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: Advanced
- Writing ratios using different notations
- Writing ratios for real-world situations
- Simplifying a ratio of whole numbers: Problem type 1
- Simplifying a ratio of decimals
- Using tables to compare ratios
- Finding a unit price
- Computing unit prices to find the better buy
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- Finding a rate given a pictorial representation of a real-world situation
- Converting a percentage to a fraction in simplest form
- Using a calculator to convert a fraction to a rounded percentage
- Finding a percentage of a total amount: Real-world situations
- Finding a percentage of a total amount without a calculator: Sales tax, commission, discount
- Estimating a tip without a calculator
- Writing a ratio as a percentage
- Writing a ratio as a percentage without a calculator
- Finding the rate of a tax or commission
- U.S. Customary length conversions involving rounding decimals
- Word problem involving a U.S. Customary length conversion
- Metric distance conversion with whole number values
- Metric distance conversion with decimal values
- Conversions with currency
- Real Numbers (100 topics)
  - Plotting opposite integers on a number line
  - Plotting rational numbers on a number line
  - Comparing integers using a number line
  - Using a number line to compare signed numbers in context
  - Approximating the location of irrational numbers on a number line
  - Ordering real numbers
  - Interpreting absolute values in context as distances from zero
  - Finding all numbers with a given absolute value
  - Addition and subtraction with 4 or 5 integers
  - Word problem with addition or subtraction of integers
  - Operations with absolute value: Problem type 2
  - Finding the distance between two rational numbers on a number line in context
  - Word problem with multiplication or division of integers
  - Signed fraction subtraction involving double negation
  - 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
  - Writing expressions using exponents
  - Power of 10: Positive exponent
  - Order of operations with whole numbers and grouping symbols
  - Order of operations with whole numbers and exponents: Advanced
  - Order of operations with fractions: Problem type 1
  - 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
  - Evaluating an algebraic expression: Whole number addition or subtraction
  - Evaluating an algebraic expression: Whole number multiplication or division
  - Evaluating an algebraic expression: Whole number operations 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
  - Additive property of equality with fractions and mixed numbers
  - Multiplicative property of equality with whole numbers: Fractional answers
  - 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

- Interpreting a Venn diagram of 2 sets
  - Interpreting a Venn diagram of 3 sets
  - Constructing a Venn diagram to classify rational numbers
  - Constructing a Venn diagram to describe relationships between sets of rational numbers
  - Constructing a Venn diagram to classify real numbers
  - Constructing a Venn diagram to describe relationships between sets of real numbers
  - Constructing a Venn diagram with 2 sets
  - Interpreting Venn diagram cardinalities with 2 sets for a real-world situation
  - Constructing a Venn diagram with 2 sets to solve a word problem
  - Constructing a Venn diagram with 3 sets
  - Interpreting Venn diagram cardinalities with 3 sets for a real-world situation
  - Constructing a Venn diagram with 3 sets to solve a word problem
  - Properties of addition
  - Introduction to adding fractions with variables and common denominators
  - Combining like terms: Fractional coefficients
  - Understanding the distributive property
  - Distributive property: Fractional coefficients
  - Properties of real numbers
  - Identifying properties used to simplify an algebraic expression
  - Using distribution with double negation and combining like terms to simplify: Multivariate
  - Perimeter of a polygon
  - Finding the missing length in a figure
  - Introduction to area of a piecewise rectangular figure
  - Area of a piecewise rectangular figure
  - Area between two rectangles
  - Word problem involving the area of a rectangle: Problem type 2
  - Word problem involving the area between two rectangles
  - Area of a triangle
  - Circumference of a circle
  - Perimeter involving rectangles and circles
  - Area of a circle
  - Circumference and area of a circle
  - Circumference and area of a circle: Exact answers in terms of pi
  - Area involving rectangles and circles
  - Area between two concentric circles
  - Word problem involving the area between two concentric circles
  - Area involving inscribed figures
  - Word problem involving the volume of a rectangular prism
  - Word problem involving the rate of filling or emptying a rectangular prism
  - Volume of a triangular prism
  - Volume of a pyramid
  - Volume of a cylinder
  - Word problem involving the volume of a cylinder
  - Word problem involving the rate of filling or emptying a cylinder
  - Volume of a cone
  - Volume of a cone: Exact answers in terms of pi
  - Volume of a sphere
  - Surface area of a cube or a rectangular prism
  - Surface area of a triangular prism
  - Surface area of a cylinder
  - Surface area of a cylinder: Exact answers in terms of pi
  - Surface area of a sphere
- Linear Equations (85 topics)
    - Solving an equation to find the value of an expression
    - Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
    - Clearing fractions in an equation
    - Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
    - Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
    - Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
    - Solving a 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 decimal word problem using a linear equation with the variable on both sides
    - Solving a fraction word problem using a linear equation with the variable on both sides
    - Solving a word problem with three unknowns using a linear equation
    - Solving a word problem involving consecutive integers
    - Solving a value mixture problem using a linear equation
    - Solving a word problem involving rates and time conversion
    - Solving a distance, rate, time problem using a linear equation

- Converting a repeating decimal to a fraction
  - Finding side lengths of squares given an area and a perimeter
  - Finding the perimeter or area of a rectangle given one of these values
  - Finding a side length given the perimeter and side lengths with variables
  - Finding supplementary and complementary angles
  - Solving equations involving vertical angles
  - Finding an angle measure of a triangle given two angles
  - Finding angle measures of a triangle given angles with variables
  - Writing an equation to find angle measures of a triangle given angles with variables
  - Finding angle measures of an isosceles triangle given angles with variables
  - 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: Advanced
  - Converting between metric and U.S. Customary unit systems using dimensional analysis: U.S. Customary to metric
  - [Converting between metric and U.S. Customary unit systems using dimensional analysis: Metric to U.S. Customary](#) NEW
  - Word problem involving U.S. Customary length conversions using dimensional analysis
  - Word problem involving a conversion between U.S. Customary units of weight and metric units of mass
  - Converting between compound units: Advanced
  - Word problem involving conversion between compound units using dimensional analysis
  - 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
  - Finding a missing side length given two similar triangles
  - Relationships about ratios within and between similar triangles
  - Similar polygons
  - Similar right triangles
  - Indirect measurement
  - Finding lengths using scale models
  - Using a scale drawing to find actual area
  - Finding the sale price without a calculator given the original price and percent discount
  - Finding the total cost including tax or markup
  - Combined effect of more than one markup or discount
  - Finding the original price given the sale price and percent discount
  - Finding the percentage increase or decrease: Basic
  - Solving a percent mixture problem using a linear equation
  - Finding simple interest without a calculator
  - Finding the interest and future value of a simple interest loan or investment
  - Finding the principal, rate, or time of a simple interest loan or investment
  - Computing the interest and repayment amount for a simple interest loan whose term is given in months or days
  - Finding the principal, rate, or time for a simple interest loan whose term is given in months or days
  - 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
  - Solving an absolute value equation: Problem type 4
  - Writing an absolute value equation to solve a word problem and describing the solution
  - Calculating income tax
  - Comparing discounts
  - Computations involving cost of living and hourly wage
  - Using a family budget estimator to determine the minimum monthly budget and average hourly wage needed for a family
  - Hourly gross pay with overtime
  - Gross pay with commission and salary
  - Gross pay with variable commission scale
  - Calculations involving purchases with debit and credit cards
  - Comparing costs of checking accounts
  - Reading a credit report
  - Understanding the impact of a credit score
  - [Determining the value of credit reports to borrowers and lenders](#) NEW
  - [Deciding when it is applicable to pay with cash or credit and examining the advantages and disadvantages of different payment methods](#) NEW
  - [Calculating and comparing monthly payments using the ALEKS loan calculator](#) NEW
  - 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
  - Using the ALEKS periodic deposit calculator to compute savings which include periodic deposits
- Linear Inequalities (15 topics)
    - Additive property of inequality with signed fractions
    - Additive property of inequality with signed decimals
    - Solving a linear inequality with multiple occurrences of the variable: Problem type 3
    - Solving a word problem involving area using a one-step linear inequality: Area and lengths

- Translating a sentence into a multi-step inequality
  - Solving a word problem using a two-step linear inequality and describing the solution
  - Solving a decimal word problem using a linear inequality with the variable on both sides
  - Writing a compound inequality given a graph on the number line
  - Solving a compound linear inequality: Graph solution, advanced
  - Solving an absolute value inequality: Problem type 1
  - Writing an absolute value inequality given a graph on the number line
  - Solving an absolute value inequality: Problem type 2
  - Solving an absolute value inequality: Problem type 3
  - Solving an absolute value inequality: Problem type 4
  - Solving an absolute value inequality: Problem type 5
- Functions and Lines (55 topics)
    - Finding distances between points that share a common coordinate given their coordinates
    - Plotting points that share a coordinate and using absolute value to find the distance between them
    - Writing a function rule given a table of ordered pairs: Two-step rules
    - Finding x- and y-intercepts of a line given the equation: Advanced
    - Graphing a line given its x- and y-intercepts
    - Identifying proportional relationships in equations
    - Identifying proportional relationships in tables by calculating unit rates: Whole numbers
    - Identifying proportional relationships in tables by calculating unit rates: Fractions
    - Determining whether a relationship is proportional given a real-world situation
    - Identifying proportional relationships in graphs: Basic
    - Identifying proportional relationships in graphs: Advanced
    - Graphing a relationship given a real-world situation to determine if the relationship is proportional
    - Writing an equation and describing a proportional relationship given a graph or table
    - Finding the coordinate that yields a given slope
    - Deriving the slope formula NEW
    - Identifying linear equations: Basic
    - Identifying linear equations: Advanced
    - Writing an equation and graphing a line given its slope and y-intercept
    - Graphing a line given its equation in point-slope form
    - Writing the equations of vertical and horizontal lines through a given point
    - Deriving the equation of a line through the origin NEW
    - Deriving the equation of a line not going through the origin NEW
    - Identifying parallel and perpendicular lines from equations
    - Identifying parallel and perpendicular lines from coordinates
    - 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: Advanced
    - Writing an equation and drawing its graph to model a real-world situation: Basic
    - Graphing a linear function that models a simple interest situation and identifying key features NEW
    - 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
    - Using technology to calculate the correlation coefficients for two sets of bivariate data to compare the linear relationships NEW
    - Identifying outliers and clustering in scatter plots
    - Identifying functions given a verbal description NEW
    - Variable expressions as inputs of functions: Problem type 1
    - Finding outputs of a one-step function that models a real-world situation: Function notation
    - Finding inputs and outputs of a function from its graph
    - Finding intercepts of a nonlinear function given its graph
    - Finding local maxima and minima of a function given the graph
    - 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 in the plane: Advanced
    - Graphing a parabola of the form  $y = ax^2 + c$
    - Graphing a function of the form  $f(x) = ax^2$
    - Graphing a function of the form  $f(x) = ax^2 + c$
    - Graphing a cubic function of the form  $y = ax^3$
    - Classifying function types given graphs of functions: Linear, exponential, and quadratic
    - Classifying function types given graphs of functions: Absolute value, cubic, square root, and cubic root NEW
    - Classifying function types given equations of functions: Problem type 1 NEW
    - Classifying function types given equations of functions: Problem type 2 NEW
    - Translating the graph of a function: One step
    - Translating the graph of a function: Two steps
    - Transforming the graph of a function by reflecting over an axis
    - Writing an equation for a function after a vertical and horizontal translation
- Linear Systems (13 topics)
    - Using a graphing calculator to solve a system of linear equations: Advanced

- Solving a system of linear equations with fractional coefficients
- Solving a system of linear equations with decimal coefficients
- Scalar multiplication of a matrix
- Addition or subtraction of matrices
- Solving a word problem involving a system of linear equations by graphing and estimating a solution
- Solving a word problem using a system of linear equations of the form  $Ax + By = C$
- Writing and solving a system of two linear equations given a verbal description (NEW)
- 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
- Graphing a system of three linear inequalities
- Solving a word problem using a system of linear inequalities: Problem type 1
  
- Exponents and Exponential Functions (43 topics)
  - Understanding the product rule of exponents
  - Ordering numbers with positive exponents
  - Understanding the power rules of exponents
  - Power and product rules with positive exponents
  - Introduction to the LCM of two monomials
  - Least common multiple of two monomials
  - Power of 10: Negative exponent
  - Ordering numbers with negative exponents
  - Product rule with negative exponents
  - Power and quotient rules with negative exponents: Problem type 2
  - Power, product, and quotient rules with negative exponents
  - Finding all square roots of a number
  - Estimating a square root
  - Order of operations with exponents and radicals
  - Finding  $n^{\text{th}}$  roots of perfect  $n^{\text{th}}$  powers with signs
  - Rational exponents: Unit fraction exponents and bases involving signs
  - Rational exponents: Negative exponents and fractional bases
  - Rational exponents: Products and quotients with negative exponents
  - Rational exponents: Powers of powers with negative exponents
  - Introduction to scientific notation with positive exponents
  - Scientific notation with a positive exponent
  - Introduction to scientific notation with negative exponents
  - Scientific notation with a negative exponent
  - Converting between scientific notation and standard form in a real-world situation
  - Expressing calculator notation as scientific notation
  - Multiplying numbers written in scientific notation: Basic
  - Multiplying numbers written in scientific notation: Advanced
  - Multiplying numbers written in decimal form or scientific notation in a real-world situation
  - Dividing numbers written in scientific notation: Basic
  - Dividing numbers written in scientific notation: Advanced
  - Finding powers of numbers written in scientific notation
  - 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
  - Graphing an exponential function and its asymptote:  $f(x)=b^x$
  - Graphing an exponential function and its asymptote:  $f(x) = a(b)^x$
  - Graphing an exponential function and its asymptote:  $f(x) = b^{-x}$  or  $f(x) = -b^x$  or  $f(x) = -b^{-x}$
  - Finding the future value and interest for an investment earning compound interest
  - Finding the present value of an investment earning compound interest
  - Solving an exponential equation by finding common bases: Linear exponents
  - Identifying arithmetic and geometric sequences
  
- Polynomials and Factoring (35 topics)
  - Degree of a multivariate polynomial
  - 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 negative coefficient
  - Multiplying a multivariate polynomial by a monomial
  - Multiplying conjugate binomials: Multivariate
  - Squaring a binomial: Multivariate
  - Multiplication involving binomials and trinomials in two variables
  - Greatest common factor of three univariate monomials
  - Greatest common factor of two multivariate monomials
  - Factoring out a monomial from a polynomial: Multivariate
  - Factoring out a binomial from a polynomial: GCF factoring, basic
  - Factoring a multivariate polynomial by grouping: Problem type 1
  - Factoring a quadratic in two variables with leading coefficient 1

- Factoring a quadratic with leading coefficient greater than 1: Problem type 3
  - Factoring a quadratic in two variables with leading coefficient greater than 1
  - Factoring a perfect square trinomial in two variables
  - Factoring a difference of squares in two variables
  - Factoring a polynomial involving a GCF and a difference of squares: 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
  - Dividing a polynomial by a monomial: Univariate
  - Dividing a polynomial by a monomial: Multivariate
  - Simplifying a ratio of factored polynomials: Linear factors
  - Simplifying a ratio of polynomials using GCF factoring
  - Polynomial long division: Problem type 1
  - Polynomial long division: Problem type 2
  - Simplifying a ratio of factored polynomials: Factors with exponents
  - Simplifying a ratio of linear polynomials: 1, -1, and no simplification
  - Simplifying a ratio of polynomials 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
- Quadratic Functions and Equations (18 topics)
    - Solving a quadratic equation needing simplification
    - Writing a quadratic equation given the roots and the leading coefficient
    - Graphing a parabola of the form  $y = ax^2 + bx + c$ : Rational coefficients
    - Finding the linear factors of a quadratic function given its zeros and describing the general relationship between linear factors and zeros
    - Finding the zeros of a quadratic function given its linear factors and describing the general relationship between linear factors and zeros
    - Using a graphing calculator to find the zeros of a quadratic function
    - Range of a quadratic function
    - Determining whether a given situation is best modeled by a linear, exponential, or quadratic function
    - Solving a quadratic equation by completing the square: Exact answers
    - Applying the quadratic formula: Exact answers
    - Deriving the quadratic formula NEW
    - Discriminant of a quadratic equation
    - Solving a quadratic inequality written in factored form NEW
    - Solving a quadratic inequality NEW
    - Graphing a quadratic inequality: Problem type 1
    - Graphing a quadratic inequality: Problem type 2
    - Using a graphing calculator to solve a nonlinear system of equations: Basic
    - Sum, difference, and product of two functions
- Radicals (47 topics)
    - 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
    - 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
    - Graphing a square root function: Problem type 1
    - Graphing a square root function: Problem type 2
    - Graphing a square root function: Problem type 3
    - Simplifying a radical expression with an even exponent
    - Introduction to simplifying a radical expression with an odd exponent
    - Simplifying a radical expression with an odd exponent
    - Simplifying a radical expression with two variables
    - Simplifying a higher root of a whole number
    - Introduction to simplifying a higher radical expression
    - Simplifying a higher radical expression: Univariate
    - Simplifying a higher radical expression: Multivariate
    - Square root addition or subtraction with three terms
    - Introduction to simplifying a sum or difference of radical expressions: Univariate
    - Simplifying a sum or difference of radical expressions: Univariate
    - 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
    - Simplifying a product involving square roots using the distributive property: Basic
    - Simplifying a product involving square roots using the distributive property: Advanced

- Rationalizing a denominator: Quotient involving a monomial
  - Rationalizing a denominator using conjugates: Integer numerator
  - Introduction to solving a radical equation
  - Solving a radical equation that simplifies to a linear equation: One radical, basic
  - Word problem involving radical equations: Basic
  - Word problem involving radical equations: Advanced
  - Solving an equation of the form  $x^3 = a$  using integers
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem
  - Identifying side lengths that give right triangles
  - Informal proof of the Pythagorean Theorem
  - Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
  - Distance between two points in the plane: Exact answers
  - Distance between two points in the plane: Decimal answers
  - Deriving the distance formula using the Pythagorean Theorem (NEW)
  - Finding the perimeter of a triangle, trapezoid, or parallelogram in the coordinate plane (NEW)
  - Midpoint of a line segment in the plane
  - Finding an endpoint of a line segment given the other endpoint and the midpoint
  - Deriving the midpoint formula on the coordinate plane using previous knowledge about midpoint on a number line (NEW)
- Data Analysis and Probability (81 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
    - Constructing a frequency distribution for grouped data
    - Constructing a frequency distribution for non-grouped data
    - Constructing a relative frequency distribution for grouped data
    - Making a reasonable inference based on proportion statistics
    - Finding if a question can be answered by the data
    - Constructing a line plot with fractional values: Fourths
    - Constructing a bar graph for non-numerical data
    - Interpreting a bar graph
    - Interpreting a histogram
    - Interpreting a stem-and-leaf plot
    - Interpreting a circle graph or pie chart
    - Finding a percentage of a total amount in a circle graph
    - Angle measure in a circle graph
    - Constructing a percent bar graph
    - Mode of a data set
    - Finding the mode and range from a line plot
    - How changing a value affects the range and IQR
    - Finding the mean of a symmetric distribution
    - Computations involving the mean, sample size, and sum of a data set
    - Finding the value for a new score that will yield a given mean
    - Weighted mean
    - Finding outliers in a data set
    - Identifying peaks, symmetry, gaps, and clusters in a line plot
    - Identifying the center, spread, and shape of a data set
    - Computing mean absolute deviation from a list of numerical values
    - Computing mean absolute deviation from a bar graph (NEW)
    - Assessing the degree of overlap of two distributions (NEW)
    - Comparing measures of center and variation
    - Finding sample size and comparing samples for estimating the mean
    - Interpreting a tree diagram
    - Introduction to the counting principle
    - Counting principle
    - Counting principle with repetition allowed
    - Factorial expressions
    - Counting arrangements of objects that are not all distinct
    - Computing permutations and combinations
    - Word problem involving permutations
    - Word problem involving combinations
    - Introduction to permutations and combinations
    - Permutations, combinations, and the multiplication principle for counting
    - Determining a sample space and outcomes for an event: Experiment involving a single selection
    - Introduction to the probability of an event
    - Probability involving one die or choosing from  $n$  distinct objects
    - Probability involving choosing from objects that are not distinct
    - Probabilities of an event and its complement
    - Experimental and theoretical probability
    - Finding the odds in favor and against
    - Determining a sample space and outcomes for an event: Experiment involving multiple selections

- Outcomes and event probability
- Experimental and theoretical probability for compound events
- Probabilities involving two rolls of a die
- Probabilities of a permutation and a combination
- Identifying independent events given descriptions of experiments
- Probability of independent events
- Probability of dependent events
- Probability of dependent events involving a survey
- Determining outcomes for unions, intersections, and complements of events
- Using a Venn diagram to understand the addition rule for probability
- Outcomes and event probability: Addition rule
- Probability of the union of two events
- Word problem involving the probability of a union
- Probability of intersection or union: Word problems
- Computing conditional probability using a sample space
- 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
- Identifying outcomes in a random number table used to simulate a simple event
- Using a random number table to simulate a simple event
- Generating a random number table with technology to simulate a simple event
- Identifying outcomes in a random number table used to simulate a compound event
- Using a random number table to simulate a compound event
- Generating a random number table with technology to simulate a compound event
- Generating random samples from a population with known characteristics
- Population standard deviation
- Using the empirical rule to identify values and percentages of a normal distribution
- Word problem involving calculations from a normal distribution

**\*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.