

## Beginning Algebra

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 (375 topics + 443 additional topics)

- Arithmetic Readiness (89 topics)
  - Whole Numbers (15 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
    - Evaluating an algebraic expression: Whole numbers with two operations
    - Evaluating an algebraic expression: Whole number operations and exponents
    - Prime numbers
    - Prime factorization
    - Greatest common factor of 2 numbers
    - Least common multiple of 2 numbers
    - Least common multiple of 3 numbers
    - Solving a word problem on proportions using a unit rate
  - Fractions (21 topics)
    - Equivalent fractions
    - Simplifying a fraction
    - Addition or subtraction of fractions with the same denominator
    - Addition or subtraction of fractions with the same denominator and simplification
    - Finding the LCD of two fractions
    - Introduction to addition or subtraction of fractions with different denominators
    - Addition or subtraction of fractions with different denominators
    - Word problem involving addition or subtraction of fractions with different denominators
    - Product of a unit fraction and a whole number
    - Product of a fraction and a whole number: Problem type 1
    - Introduction to fraction multiplication
    - Fraction multiplication
    - Product of a fraction and a whole number: Problem type 2
    - Multiplication of 3 fractions
    - Exponents and fractions
    - Word problem involving fractions and multiplication
    - The reciprocal of a number
    - Division involving a whole number and a fraction
    - Fraction division
    - Word problem involving fractions and division
    - Order of operations with fractions: Problem type 1
  - Mixed Numbers (13 topics)
    - 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
  - Decimals (24 topics)
    - Decimal place value: Tenths and hundredths
    - Rounding decimals
    - Converting a decimal to a proper fraction in simplest form: Basic
    - Converting a decimal to a proper fraction in simplest form: Advanced
    - Decimal addition with 3 numbers

- Decimal subtraction: Basic
- Decimal subtraction: Advanced
- Decimal addition and subtraction with 3 or more numbers
- 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
- 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 two decimals
- Word problem with decimal addition and multiplication
- 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
- Word problem with division of two decimals
- Word problem with decimal subtraction and division
- Converting a fraction to a terminating decimal: Basic
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Basic
- Converting Between Fractions, Decimals, and Percentages (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 percentage to a fraction in simplest form
  - 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
- Geometry (7 topics)
  - Perimeter of a polygon
  - Perimeter of a square or a rectangle
  - Area of a square or a rectangle
  - Area of a triangle
  - Circumference of a circle
  - Circumference and area of a circle
  - Volume of a rectangular prism
- Real Numbers and Algebraic Expressions (48 topics)
  - Plotting and Ordering (7 topics)
    - Plotting integers on a number line
    - Writing a signed number for a real-world situation
    - Introduction to ordering decimals
    - Ordering integers
    - Square root of a perfect square
    - Using a calculator to approximate a square root
    - Absolute value of a number
  - Operations with Rational Numbers (22 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
    - Addition and subtraction with 4 or 5 integers
    - Word problem with addition or subtraction of integers
    - Integer multiplication and division
    - Multiplication of 3 or 4 integers
    - Division involving zero
    - Identifying numbers as integers or non-integers
    - Identifying numbers as rational or irrational
    - Signed fraction addition or subtraction: Basic
    - Signed fraction subtraction involving double negation
    - Signed fraction multiplication: Basic
    - Signed fraction multiplication: Advanced
    - Signed fraction division
    - Signed decimal addition and subtraction
    - Signed decimal addition and subtraction with 3 numbers
    - Signed decimal multiplication
    - Signed decimal division

- Exponents and Order of Operations (5 topics)
  - Exponents and integers: Problem type 1
  - Exponents and integers: Problem type 2
  - Exponents and signed fractions
  - Order of operations with integers
  - Order of operations with integers and exponents
- Evaluating Expressions (2 topics)
  - Evaluating a linear expression: Integer multiplication with addition or subtraction
  - Evaluating a quadratic expression: Integers
- Properties of Real Numbers (12 topics)
  - Combining like terms: Whole number coefficients
  - Combining like terms: Integer coefficients
  - Introduction to properties of addition
  - Properties of addition
  - Multiplying a constant and a linear monomial
  - Distributive property: Whole number coefficients
  - Distributive property: Integer coefficients
  - 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
- Linear Equations (73 topics)
  - One-Step Linear Equations (9 topics)
    - 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
  - Multi-Step Linear Equations (19 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 solving an equation with parentheses
    - Solving a multi-step equation given in fractional form
    - Solving a two-step equation with signed decimals
    - 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
    - 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
    - Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
    - Solving a two-step equation with signed fractions
    - Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
    - Solving equations with zero, one, or infinitely many solutions
    - Solving a proportion of the form  $x/a = b/c$
    - Solving a proportion of the form  $(x+a)/b = c/d$
  - Solving Formulas for a Variable (7 topics)
    - Solving for a variable in terms of other variables using addition or subtraction: Basic
    - Solving for a variable in terms of other variables using addition or subtraction: Advanced
    - Solving for a variable in terms of other variables using multiplication or division: Basic
    - Solving for a variable in terms of other variables using multiplication or division: Advanced
    - Solving for a variable in terms of other variables using addition or subtraction with division
    - Solving for a variable inside parentheses in terms of other variables
    - Solving for a variable in terms of other variables in a linear equation with fractions
  - 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
    - Translating a sentence into a multi-step equation

- Applications (14 topics)
  - Solving a fraction word problem using a linear equation of the form  $Ax = B$
  - Solving a word problem with two unknowns using a linear equation
  - Solving a decimal word problem using a linear equation of the form  $Ax + B = C$
  - Solving a 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 temperatures in Fahrenheit and Celsius
  - Finding the side length of a rectangle given its perimeter or area
  - Finding a side length given the perimeter and side lengths with variables
  - Finding the perimeter or area of a rectangle given one of these values
  - Finding an angle measure of a triangle given two angles
  - Finding angle measures of a triangle given angles with variables
- Applications Involving Percentages (19 topics)
  - Finding a percentage of a whole number
  - Finding a percentage of a whole number without a calculator: Basic
  - Finding a percentage of a whole number without a calculator: Advanced
  - Applying the percent equation: Problem type 1
  - Applying the percent equation: Problem type 2
  - 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 without a calculator
  - Finding the rate of a tax or commission
  - Finding the total amount given the percentage of a partial amount
  - 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 total cost including tax or markup
  - Finding the original price given the sale price and percent discount
  - Finding the percentage increase or decrease: Basic
  - Finding the percentage increase or decrease: Advanced
  - Finding a percentage of a total amount in a circle graph
  - Finding simple interest without a calculator
- Linear Inequalities (18 topics)
  - Writing and Graphing Inequalities (5 topics)
    - Translating a sentence by using an inequality symbol
    - Translating a sentence into a one-step 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
  - Linear Inequalities and Applications (13 topics)
    - Additive property of inequality with whole numbers
    - Additive property of inequality with integers
    - Additive property of inequality with signed fractions
    - Additive property of inequality with signed decimals
    - Multiplicative property of inequality with integers
    - Multiplicative property of inequality with signed fractions
    - 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 linear inequality with multiple occurrences of the variable: Problem type 3
    - Solving a decimal word problem using a two-step linear inequality
- Lines and Functions (46 topics)
  - Ordered Pairs (5 topics)
    - Reading a point in the coordinate plane
    - Plotting a point in the coordinate plane
    - Table for a linear equation
    - Identifying solutions to a linear equation in two variables
    - Finding a solution to a linear equation in two variables
  - Graphing and Intercepts (9 topics)
    - Graphing a linear equation of the form  $y = mx$
    - Graphing a line given its equation in slope-intercept form: Integer slope
    - Graphing a line given its equation in slope-intercept form: Fractional slope

- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts given the graph of a line on a grid
- Finding x- and y-intercepts of a line given the equation: Basic
- Graphing a line given its x- and y-intercepts
- Graphing a line by first finding its x- and y-intercepts
- Slope (6 topics)
  - 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
- Equations of Lines (14 topics)
  - 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
  - Writing an equation in slope-intercept form given the slope and a point
  - Writing the equation of a line in point-slope 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 equations of vertical and horizontal lines through a given point
  - Finding slopes of lines parallel and perpendicular to a line given in slope-intercept form
  - Finding slopes of lines parallel and perpendicular to a line given in the form  $Ax + By = C$
  - Identifying parallel and perpendicular lines from equations
  - Writing equations of lines parallel and perpendicular to a given line through a point
- Applications (5 topics)
  - Writing and evaluating a function that models a real-world situation: Advanced
  - Writing an equation and drawing its graph to model a real-world situation: Advanced
  - 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
- Identifying Functions, Domain, and Range (3 topics)
  - Identifying functions from relations
  - Vertical line test
  - Domain and range from ordered pairs
- Function Evaluation and Applications (4 topics)
  - 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
- Systems (12 topics)
  - Systems of Linear Equations (7 topics)
    - Identifying solutions to a system of linear equations
    - Classifying systems of linear equations from graphs
    - Graphically solving a system of linear equations
    - 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 2x2 system of linear equations that is inconsistent or consistent dependent
  - Applications (5 topics)
    - Interpreting the graphs of two functions
    - Solving a word problem involving a sum and another basic relationship using a system of linear equations
    - Solving a word problem using a system of linear equations of the form  $Ax + By = C$
    - Solving a value mixture problem using a system of linear equations
    - Solving a distance, rate, time problem using a system of linear equations
- Exponents (53 topics)
  - Product, Power, and Quotient Rules (53 topics)
    - 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

- 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 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 (14 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
  - Product rule with negative exponents
  - Quotient rule with negative exponents: Problem type 1
  - Quotient rule with negative exponents: Problem type 2
  - Power of a power rule with negative exponents
  - Power rules with negative exponents
  - Power and quotient rules with negative exponents: Problem type 1
  - Power and quotient rules with negative exponents: Problem type 2
- Scientific Notation (7 topics)
  - Scientific notation with a positive exponent
  - Scientific notation with a 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
- Polynomials and Factoring (52 topics)
  - Polynomial Addition, Subtraction, and Multiplication (15 topics)
    - Degree and leading coefficient of a univariate 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
    - Multiplication involving binomials and trinomials in one variable
  - Polynomial Division (3 topics)
    - Dividing a polynomial by a monomial: Univariate
    - Dividing a polynomial by a monomial: Multivariate
    - Polynomial long division: Problem type 1
  - Factoring Using the GCF (6 topics)
    - Factoring a linear binomial
    - 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 by Grouping (4 topics)
    - 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 Quadratic Trinomials (6 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 leading coefficient greater than 1: Problem type 3
  - Factoring a quadratic by the ac-method
- Factoring Special Products (8 topics)
  - 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 product of a quadratic trinomial and a monomial
- 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 quadratic equation needing simplification
  - Solving a word problem using a quadratic equation with rational roots
- Pythagorean Theorem (4 topics)
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem
  - Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
- Other Topics Available(\*) (443 additional topics)
  - Arithmetic Readiness (59 topics)
    - Factors
    - Word problem with common multiples
    - Addition and subtraction of 3 fractions with different denominators
    - Fractional part of a circle
    - Multi-step word problem involving fractions and multiplication
    - Order of operations with fractions: Problem type 2
    - Order of operations with fractions: Problem type 3
    - Addition and subtraction of 3 mixed numbers with different denominators
    - 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
    - Estimating a decimal sum or difference
    - Estimating a product of decimals
    - Squaring decimal bases: Products greater than 0.1
    - Exponents and decimals: Products less than 0.1
    - 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
    - Order of operations with decimals: Problem type 1
    - Order of operations with decimals: Problem type 2
    - Order of operations with decimals: Problem type 3
    - Converting a mixed number percentage to a decimal
    - Converting between percentages and decimals in a real-world situation
    - Converting a decimal percentage to a fraction
    - Converting a fraction to a percentage in a real-world situation
    - Mode of a data set
    - Average of two numbers
    - Mean of a data set
    - Mean and median of a data set
    - Weighted mean
    - Interpreting a bar graph
    - Interpreting a line graph
    - Perimeter of a polygon involving mixed numbers and fractions
    - Sides of polygons having the same perimeter
    - Distinguishing between the area and perimeter of a rectangle
    - Area of a rectangle involving fractions

- Area of a rectangle involving mixed numbers and fractions
  - Finding the missing length in a figure
  - Area of a piecewise rectangular figure
  - Word problem involving the area between two rectangles
  - Area of a parallelogram
  - Area of a trapezoid
  - Perimeter involving rectangles and circles
  - Area involving rectangles and circles
  - Word problem involving the area between two concentric circles
  - Area involving inscribed figures
  - Volume of a triangular prism
  - Volume of a pyramid
  - Volume of a cylinder
  - Word problem involving the rate of filling or emptying a cylinder
  - Volume of a cone
  - Volume of a 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 sphere
  - Acute, obtuse, and right angles
  - Finding supplementary and complementary angles
  - Acute, obtuse, and right triangles
  - Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
- Real Numbers and Algebraic Expressions (17 topics)
    - Fractional position on a number line
    - Reading decimal position on a number line: Tenths
    - Reading decimal position on a number line: Hundredths
    - Plotting rational numbers on a number line
    - Using a common denominator to order fractions
    - Ordering decimals
    - Ordering fractions and decimals
    - Estimating a square root
    - Ordering real numbers
    - Signed fraction addition or subtraction: Advanced
    - Addition and subtraction of 3 fractions involving signs
    - Operations with absolute value: Problem type 2
    - Computing distances between decimals on the number line
    - 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
    - Understanding the distributive property
- Linear Equations (25 topics)
    - Additive property of equality with fractions and mixed numbers
    - Solving an equation to find the value of an expression
    - Identifying properties used to solve a linear equation
    - Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
    - Introduction to solving an absolute value equation
    - Solving an absolute value equation: Problem type 1
    - 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
    - Writing a multi-step equation for a real-world situation
    - Solving a word problem involving rates and time conversion
    - Finding the radius or the diameter of a circle given its circumference
    - Solving equations involving vertical angles
    - Finding angle measures of a right or isosceles triangle given angles with variables
    - Finding an angle measure given extended triangles
    - Finding an angle measure given a triangle and parallel lines
    - Finding the value for a new score that will yield a given mean
    - Estimating a tip without a calculator
    - Computing a percentage from a table of values
    - Finding the multiplier to give a final amount after a percentage increase or decrease
    - Finding the original amount given the result of a percentage increase or decrease
    - Finding the absolute error and percent error of a measurement
    - Computing a percent mixture
    - Solving a percent mixture problem using a linear equation
    - Interpreting a circle graph or pie chart
    - Computations from a circle graph
- Linear Inequalities (13 topics)
    - Translating a sentence into a multi-step inequality
    - Translating a sentence into a compound inequality



- Graphing a compound inequality on the number line
  - Writing a compound inequality given a graph on the number line
  - Set-builder notation
  - Set-builder and interval notation
  - Union and intersection of finite sets
  - Identifying solutions to a two-step linear inequality in one variable
  - Solving inequalities with no solution or all real numbers as solutions
  - Solving a compound linear inequality: Graph solution, basic
  - Solving a compound linear inequality: Interval notation
  - Solving an absolute value inequality: Problem type 1
  - Solving a decimal word problem using a linear inequality with the variable on both sides
- Lines and Functions (46 topics)
    - Midpoint of a line segment in the plane
    - Finding x- and y-intercepts of a line given the equation: Advanced
    - Finding the coordinate that yields a given slope
    - Identifying linear equations: Advanced
    - Identifying linear functions given ordered pairs
    - Writing an equation and graphing a line given its slope and y-intercept
    - Graphing a line given its equation in point-slope form
    - Writing a function rule given a table of ordered pairs: One-step rules
    - Writing a function rule given a table of ordered pairs: Two-step rules
    - Combining functions to write a new function that models a real-world situation
    - Comparing properties of linear functions given in different forms
    - Identifying independent and dependent variables from equations or real-world situations
    - Solving a linear equation by graphing
    - 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
    - Translating the graph of an absolute value function: One step
    - Translating the graph of an absolute value function: Two steps
    - Graphing an absolute value equation of the form  $y = |x|$
    - Graphing an absolute value equation in the plane: Basic
    - Graphing an absolute value equation in the plane: Advanced
    - How the leading coefficient affects the graph of an absolute value function
    - Variable expressions as inputs of functions: Problem type 1
    - 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
    - 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
    - Domain and range from the graph of a continuous function
    - 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 a parabola of the form  $y = ax^2$
    - Graphing a parabola of the form  $y = ax^2 + c$
    - Graphing a function of the form  $f(x) = ax^2$
    - Graphing a function of the form  $f(x) = ax^2 + c$
    - Finding intercepts of a nonlinear function given its graph
    - Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
    - Finding local maxima and minima of a function given the graph
    - Choosing a graph to fit a narrative: Basic
    - Choosing a graph to fit a narrative: Advanced
  - Systems (17 topics)
    - 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
    - Solving a 3x3 system of linear equations: Problem type 1
    - Solving a word problem using a system of linear equations of the form  $y = mx + b$
    - Solving a 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
    - 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

- Graphing a system of two linear inequalities: Basic
  - 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 (15 topics)
    - Ordering numbers with positive exponents
    - Ordering numbers with negative exponents
    - Power, product, and quotient rules with negative exponents
    - Table for an exponential function
    - Evaluating an exponential function that models a real-world situation
    - Introduction to compound interest
    - Finding a final amount in a word problem on exponential growth or decay
    - Finding the final amount in a word problem on compound interest
    - Finding the initial amount and rate of change given an exponential function
    - Writing an equation that models exponential growth or decay
    - Solving an exponential equation by finding common bases: Linear exponents
    - Graphing an exponential function:  $f(x) = b^x$
    - Graphing an exponential function:  $f(x) = a(b)^x$
    - Writing an exponential function rule given a table of ordered pairs
    - Comparing linear, polynomial, and exponential functions
- Polynomials and Factoring (13 topics)
    - Degree of a multivariate polynomial
    - Multiplying binomials with negative coefficients
    - Multiplication involving binomials and trinomials in two variables
    - Polynomial long division: Problem type 2
    - Polynomial long division: Problem type 3
    - Closure properties of integers and polynomials
    - Factoring a multivariate polynomial by grouping: Problem type 2
    - Factoring a quadratic in two variables with leading coefficient 1
    - Factoring a quadratic in two variables with leading coefficient greater than 1
    - Factoring a quadratic with a negative leading coefficient
    - Factoring a polynomial involving a GCF and a difference of squares: Multivariate
    - Factoring with repeated use of the difference of squares formula
    - Factoring a sum or difference of two cubes
- Rational Expressions (119 topics)
    - Restriction on a variable in a denominator: Linear
    - Restriction on a variable in a denominator: Quadratic
    - Evaluating a rational function: Problem type 1
    - Evaluating a rational function: Problem type 2
    - Domain of a rational function: Excluded values
    - Simplifying a ratio of factored polynomials: Linear factors
    - Simplifying a ratio of factored polynomials: Factors with exponents
    - Simplifying a ratio of polynomials using GCF factoring
    - Simplifying a ratio of linear polynomials: 1, -1, and no simplification
    - Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
    - Simplifying a ratio of polynomials: Problem type 1
    - Simplifying a ratio of polynomials: Problem type 2
    - Simplifying a ratio of polynomials: Problem type 3
    - Simplifying a ratio of multivariate polynomials
    - Multiplying rational expressions involving multivariate monomials
    - Multiplying rational expressions involving 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
    - Introduction to adding fractions with variables and common denominators
    - Adding rational expressions with common denominators and monomial numerators

- Adding rational expressions with common denominators and binomial numerators
- Adding rational expressions with common denominators and GCF factoring
- Adding rational expressions with common denominators and quadratic factoring
- Adding rational expressions with different denominators and a single occurrence of a variable
- Adding rational expressions with denominators  $ax$  and  $bx$ : Basic
- Adding rational expressions with denominators  $ax$  and  $bx$ : Advanced
- Adding rational expressions with 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 1
- 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
- Complex fraction with negative exponents: Problem type 1
- Complex fraction with negative exponents: Problem type 2
- Complex fraction that contains a complex fraction
- Solving a proportion of the form  $\frac{a}{x+b} = \frac{c}{x}$
- Solving a rational equation that simplifies to linear: Denominator  $x$
- Solving a rational equation that simplifies to linear: Denominator  $x+a$
- Solving a rational equation that simplifies to linear: Denominators  $a$ ,  $x$ , or  $ax$
- Solving a rational equation that simplifies to linear: Denominators  $ax$  and  $bx$
- Solving a rational equation that simplifies to linear: Like binomial denominators
- Solving a rational equation that simplifies to linear: Unlike binomial denominators
- Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: 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
- Writing ratios using different notations
- Writing ratios for real-world situations
- Simplifying a ratio of whole numbers: Problem type 1
- Simplifying a ratio of whole numbers: Problem type 2
- Simplifying a ratio of decimals
- 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
- U.S. Customary unit conversion with whole number values
- Metric distance conversion with whole number values
- Converting between metric and U.S. Customary unit systems
- Converting between compound units: Basic
- Converting between compound units: 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 on proportions: Problem type 1
- Word problem on proportions: Problem type 2
- Similar polygons
- Similar right triangles
- Indirect measurement
- Circumference ratios
- 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
- Identifying direct variation equations
- Identifying direct variation from ordered pairs and writing equations

- Writing a direct variation equation
- Word problem on direct variation
- Interpreting direct variation from a graph
- Writing an inverse variation equation
- Identifying direct and inverse variation equations
- Identifying direct and inverse variation from ordered pairs and writing equations
- Word problem on inverse variation
- Word problem on inverse variation involving the completion of a task
- Writing an equation that models variation
- Word problem on combined variation
  
- Radicals (80 topics)
  - Finding all square roots of a number
  - Square root of a rational perfect square
  - Square roots of perfect squares with signs
  - Introduction to simplifying a radical expression with an even exponent
  - Square root of a perfect square monomial
  - Cube root of an integer
  - 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
  - Simplifying the square root of a whole number less than 100
  - Simplifying the square root of a whole number greater than 100
  - Simplifying a radical expression with an even exponent
  - Introduction to simplifying a radical expression with an odd exponent
  - Simplifying a radical expression with an odd exponent
  - Simplifying a 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 square root addition or subtraction
  - Square root addition or subtraction
  - Square root addition or subtraction with three terms
  - Introduction to simplifying a sum or difference of radical expressions: Univariate
  - Simplifying a sum or difference of radical expressions: Univariate
  - Simplifying a sum or difference of radical expressions: Multivariate
  - Simplifying a sum or difference of higher roots
  - Simplifying a sum or difference of higher radical expressions
  - Introduction to square root multiplication
  - Square root multiplication: Basic
  - Square root multiplication: Advanced
  - 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 of square roots
  - Simplifying a quotient involving a sum or difference with a square root
  - Rationalizing a denominator: Quotient involving square roots
  - Rationalizing a denominator: Square root of a fraction
  - Rationalizing a denominator: Quotient involving a monomial
  - Rationalizing a denominator using conjugates: Integer numerator
  - Rationalizing a denominator using conjugates: Square root in numerator
  - Rationalizing a denominator using conjugates: Variable in denominator
  - Rationalizing a denominator: Quotient involving a higher radical
  - 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 with two radicals that simplifies to  $\sqrt{x} = a$
  - 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 that simplifies to a quadratic equation: Two radicals
  - Solving an equation with a root index greater than 2: Problem type 1
  - Solving an equation with a root index greater than 2: Problem type 2
  - Solving for a variable in terms of other variables in an equation involving radicals
  - Word problem involving radical equations: Basic

- Word problem involving radical equations: Advanced
  - Distance between two points in the plane: Exact answers
  - 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
  - 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 products or quotients of higher radicals with different indices: Univariate
- Complex Numbers and Quadratic Equations (39 topics)
    - Using  $i$  to rewrite square roots of negative numbers
    - Simplifying a product and quotient involving square roots of negative numbers
    - Adding or subtracting complex numbers
    - Multiplying complex numbers
    - Dividing complex numbers
    - Simplifying a power of  $i$
    - Solving an equation of the form  $x^2 = a$  using the square root property
    - Solving a quadratic equation using the square root property: Exact answers, basic
    - Solving a quadratic equation using the square root property: Exact answers, advanced
    - Completing the square
    - Solving a quadratic equation by completing the square: Exact answers
    - Applying the quadratic formula: Exact answers
    - Applying the quadratic formula: Decimal answers
    - Solving a quadratic equation with complex roots
    - Discriminant of a quadratic equation
    - Solving a word problem using a quadratic equation with irrational roots
    - Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
    - Translating the graph of a parabola: One step
    - Graphing a parabola of the form  $y = (x-h)^2 + k$
    - 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
    - Finding the  $x$ -intercept(s) and the vertex of a parabola
    - Rewriting a quadratic function to find the vertex of its graph
    - Finding the maximum or minimum of a quadratic function
    - Word problem involving the maximum or minimum of a quadratic function
    - Finding the domain and range from the graph of a parabola
    - Range of a quadratic function
    - Solving a quadratic equation by graphing
    - Comparing properties of quadratic functions given in different forms
    - Classifying the graph of a function
    - How the leading coefficient affects the shape of a parabola
    - Identifying linear, quadratic, and exponential functions given ordered pairs
    - Graphing a cubic function of the form  $y = ax^3$
    - Sum, difference, and product of two functions
    - Composition of two functions: Basic
    - Expressing a function as a composition of two functions
    - Determining whether an equation defines a function: Basic
    - Determining whether an equation defines a function: Advanced

**\*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.