

## Pre-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 (643 topics + 619 additional topics)

- Whole Numbers and Integers (79 topics)
  - Addition and Subtraction with Whole Numbers (8 topics)
    - Adding 2-digit numbers with regrouping a hundred
    - Adding 3 or 4 numbers with two-digits with regrouping
    - Adding 3-digit numbers with regrouping
    - Subtraction of 2-digit numbers with regrouping
    - Subtraction with multiple regrouping steps involving 3-digit numbers
    - Subtraction and regrouping with zeros
    - Describing an increasing or decreasing pattern from a table of values
    - Perimeter of a square or a rectangle
  - Multiplication and Division with Whole Numbers (18 topics)
    - Multiplying 2-digit and 1-digit numbers with regrouping: Problem type 2
    - Multiplying multi-digit and 1-digit numbers with regrouping
    - Area of a rectangle with two-digit by one-digit side lengths
    - Introduction to multiplication of large numbers
    - Multiplication of large numbers
    - Multiples: Problem type 1
    - Multiples: Problem type 2
    - Division of whole numbers given in fractional form
    - Division involving zero
    - Division with regrouping: 1-digit divisor, 2-digit dividend
    - Quotient with remainder: 1-digit divisor, 2-digit dividend
    - Whole number division: 2-digit by 2-digit, no remainder
    - Word problem with multiplication or division of whole numbers
    - Word problem with multiplication and addition or subtraction of whole numbers
    - Word problem on unit rates associated with ratios of whole numbers: Whole number answers
    - Division with regrouping: 1-digit divisor, 3-digit or 4-digit dividend
    - Whole number division: 3-digit by 2-digit, no remainder
    - Division with no remainder and a two-digit divisor: Problem type 2
  - Ordering and Estimation (2 topics)
    - Introduction to inequalities
    - Estimating a product
  - Exponents and Order of Operations (5 topics)
    - Introduction to exponents
    - Introduction to parentheses
    - Introduction to order of operations
    - Order of operations with whole numbers
    - Order of operations with whole numbers and exponents: Basic
  - Prime Numbers, Factors, and Multiples (2 topics)
    - Factors
    - Greatest common factor of 2 numbers
  - Plotting and Comparing Integers (5 topics)
    - Plotting integers on a number line
    - Plotting opposite integers on a number line
    - Ordering integers
    - Writing a signed number for a real-world situation
    - Absolute value of a number
  - Addition and Subtraction with Integers (17 topics)
    - Using integer chips to add integers
    - Using a number line to add integers
    - Integer addition: Problem type 1
    - Integer addition: Problem type 2
    - Identifying a sum as a point located a given distance from another point
    - Identifying relative change when combining two quantities
    - Using integer chips to subtract integers
    - Using a number line to subtract integers

- Understanding that subtracting an integer is the same as adding its additive inverse
- Integer subtraction: Problem type 1
- Integer subtraction: Problem type 2
- Integer subtraction: Problem type 3
- Addition and subtraction with 3 integers
- Word problem with addition or subtraction of integers
- Operations with absolute value: Problem type 1
- Computing the distance between two integers on a number line
- Computing and understanding distances between integers on a number line
- Multiplication and Division with Integers (5 topics)
  - Integer multiplication and division
  - Multiplication of 3 or 4 integers
  - Word problem with multiplication or division of integers
  - Exponents and integers: Problem type 1
  - Order of operations with integers
- Evaluating and Writing Expressions (8 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
  - 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
- One-Step Equations (9 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 integers
  - Introduction to solving an equation with multiplication or division
  - Writing an equation and solving a multiplicative comparison word problem
  - Multiplicative property of equality with whole numbers
  - Multiplicative property of equality with integers
  - Translating a sentence into a one-step equation
- Fractions (40 topics)
  - Equivalent Fractions (6 topics)
    - Introduction to non-unit fractions
    - Conversions involving division in fractional form and whole numbers
    - Equivalent fractions
    - Introduction to simplifying a fraction
    - Simplifying a fraction
    - Identifying equivalent signed fractions
  - Plotting and Ordering Fractions (3 topics)
    - Plotting fractions using a number line
    - Comparing fractions with the same denominator
    - Comparing fractions by finding a common denominator
  - Mixed Numbers and Improper Fractions (4 topics)
    - Writing an improper fraction as a mixed number
    - Writing a mixed number as an improper fraction
    - Plotting mixed numbers on a number line
    - Plotting rational numbers on a number line
  - Addition and Subtraction with Fractions (8 topics)
    - Addition or subtraction of fractions with the same denominator and simplification
    - Word problem involving addition or subtraction of fractions with the same denominator
    - Finding the LCD of two fractions
    - Writing fractions with a common denominator to add or subtract
    - Addition or subtraction of fractions with different denominators
    - Signed fraction addition or subtraction: Basic
    - Signed fraction subtraction involving double negation
    - Word problem involving addition or subtraction of fractions with different denominators
  - Multiplication and Division with Fractions (15 topics)
    - Product of a unit fraction and a whole number
    - Product of a fraction and a whole number: Problem type 1
    - Product of a fraction and a whole number: Problem type 2
    - Word problem involving multiplying a fraction and a whole number

- Introduction to fraction multiplication
- Fraction multiplication
- Signed fraction multiplication: Basic
- Word problem involving fractions and multiplication
- The reciprocal of a number
- Division involving a whole number and a unit fraction
- Using a model to solve a word problem involving division by a unit fraction
- Division involving a whole number and a fraction
- Fraction division
- Signed fraction division
- Word problem involving fractions and division
- Multiplication and Division with Mixed Numbers (2 topics)
  - Multiplying a mixed number and a whole number: Problem type 1
  - Division with a mixed number and a whole number
- Exponents and Order of Operations (1 topics)
  - Exponents and fractions
- Expressions and One-Step Equations (5 topics)
  - Multiplicative property of equality with signed fractions
- Decimals (47 topics)
  - Place Value and Ordering (2 topics)
    - Decimal place value: Tenths and hundredths
    - Introduction to ordering decimals
  - Converting Decimals to Fractions (4 topics)
    - Converting a decimal to a proper fraction without simplifying: Basic
    - Converting a decimal to a proper fraction in simplest form: Basic
    - Converting a decimal to a mixed number and an improper fraction without simplifying
    - Converting a decimal to a mixed number and an improper fraction in simplest form: Basic
  - Addition and Subtraction (7 topics)
    - Decimal addition with 2 numbers
    - Decimal subtraction: Basic
    - Decimal subtraction: Advanced
    - Rounding decimals
    - Signed decimal addition and subtraction
    - Word problem with addition or subtraction of 2 decimals
    - Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
  - Multiplication (9 topics)
    - Multiplication of a decimal by a power of ten
    - Multiplying a decimal less than 1 by a whole number
    - Multiplying a decimal by a whole number
    - Multiplying decimals less than 1: Problem type 1
    - Decimal multiplication: Problem type 1
    - Multiplication of a decimal by a power of 0.1
    - Signed decimal multiplication
    - Word problem with multiplication of a decimal and a whole number
    - Word problem with multiple decimal operations: Problem type 1
  - Division (4 topics)
    - Division of a decimal by a power of ten
    - Division of a decimal by a whole number
    - Word problem with division of a decimal and a whole number
    - Word problem with multiple decimal operations: Problem type 2
  - Converting Fractions to Decimals (7 topics)
    - Converting a fraction with a denominator of 10 or 100 to a decimal
    - Converting a proper fraction with a denominator of 2, 4, or 5 to a decimal
    - Converting a mixed number with a denominator of 2, 4, or 5 to a decimal
    - 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 a mixed number to a terminating decimal: Basic
  - Venn Diagrams and Sets of Rational Numbers (5 topics)
    - Identifying numbers as integers or non-integers
    - Identifying rational decimal numbers
    - Interpreting a Venn diagram of 2 sets
    - Constructing a Venn diagram to classify rational numbers

- Constructing a Venn diagram to describe relationships between sets of rational numbers
- Exponents and Order of Operations (4 topics)
  - 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
- Expressions and One-Step Equations (5 topics)
  - 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 decimals
  - Multiplicative property of equality with decimals
  - Writing and solving a one-step equation with decimals that models a real-world situation
- Ratios, Proportions, and Measurement (41 topics)
  - Ratios and Unit Rates (15 topics)
    - Using a tape diagram to model ratios
    - Using a tape diagram to solve a problem involving ratios
    - Using tables to compare ratios
    - Finding missing values in a table of equivalent ratios
    - Using a table of equivalent ratios to find a missing quantity in a ratio
    - 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
    - Word problem on unit rates associated with ratios of fractions
    - Word problem on unit rates associated with ratios of mixed numbers
    - Using a tape diagram to solve a problem on unit rates: Problem type 1
    - Solving a word problem on proportions using a unit rate
    - Using a tape diagram to solve a problem on unit rates: Problem type 2
    - Writing and using unit rates in context
    - Solving a one-step word problem using the formula  $d = rt$
  - Proportions (4 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
    - Word problem on proportions: Problem type 1
  - Similar Figures (7 topics)
    - Identifying congruent shapes on a grid
    - Identifying similar or congruent shapes on a grid
    - Finding a missing side length given two similar triangles
    - Relationships about ratios within and between similar triangles
    - Similar polygons
    - Similar right triangles
    - Indirect measurement
  - Scale Factors and Scale Drawings (4 topics)
    - Finding lengths using scale models
    - Finding a scale factor: Same units
    - Using a scale drawing to find actual area
    - Reproducing a scale drawing at a different scale
  - U.S. Customary Units of Measurement (5 topics)
    - Using a double number line to convert U.S. Customary units with whole numbers
    - Using a double number line to convert U.S. Customary units with decimals
    - 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
  - Metric Units of Measurement (1 topics)
    - Finding a rate given a pictorial representation of a real-world situation
  - Time and Temperature (1 topics)
    - Time unit conversion with whole number values
  - Converting Between Systems and Dimensional Analysis (4 topics)
    - Writing and solving a proportion to convert between metric and U.S. Customary units
    - Converting between metric and U.S. Customary unit systems
    - U.S. Customary length conversions involving dimensional analysis
    - Converting between compound units: Basic

- Percents (38 topics)
  - Understanding Percents (2 topics)
    - Converting a fraction with a denominator of 100 to a percentage
    - Converting a percentage to a fraction with a denominator of 100
  - Percents, Decimals, and Fractions (11 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
    - Finding benchmark fractions and percentages for a figure
    - Converting a fraction to a percentage: Denominator of 20, 25, or 50
    - Converting a fraction to a percentage in a real-world situation
    - Using a double number line to find a percentage
    - Writing a ratio as a percentage without a calculator
    - Finding the rate of a tax or commission
    - Making a reasonable inference based on proportion statistics
  - Percent of a Number (10 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
    - Using a double number line to find the part or the whole in a percentage problem
    - Finding a percentage of a total amount: Real-world situations
    - Writing a proportion to solve a multi-step problem involving percentages
    - Finding a percentage of a total amount without a calculator: Sales tax, commission, discount
    - Estimating a tip without a calculator
    - Finding a percentage of a total amount in a circle graph
    - Making part-to-part and equivalence comparisons given a circle graph
  - Percent Equations (2 topics)
    - Applying the percent equation: Problem type 1
    - Finding the total amount given the percentage of a partial amount
  - Percent Increase and Decrease (6 topics)
    - 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 percentage increase or decrease: Basic
    - Finding the percentage increase or decrease: Advanced
  - Interest (3 topics)
    - Finding simple interest without a calculator
    - Finding the interest and future value of a simple interest loan or investment
    - Introduction to compound interest
  - Personal Financial Literacy (4 topics)
    - Calculating income tax
    - Examining a savings plan for college
    - Using the ALEKS periodic deposit calculator to compute savings which include periodic deposits
    - Calculating and comparing simple interest and compound interest
- Equations and Inequalities (60 topics)
  - The Distributive Property (5 topics)
    - Multiplying a constant and a linear monomial
    - Distributive property: Whole number coefficients
    - Distributive property: Integer coefficients
    - Distributive property: Fractional coefficients
    - Factoring a linear binomial
  - Simplifying Algebraic Expressions (7 topics)
    - Introduction to properties of addition
    - Combining like terms: Whole number coefficients
    - Using a number line to add opposite fractions and describing the result
    - Introduction to properties of multiplication
    - Combining like terms: Integer coefficients
    - Using distribution and combining like terms to simplify: Univariate
    - Identifying properties used to simplify an algebraic expression
  - Multi-Step Equations (10 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
- Plotting the solution for a two-step equation on a number line
- Introduction to solving an equation with parentheses
- 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
- Equations with Variables on Both Sides (5 topics)
  - 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 equations with zero, one, or infinitely many solutions
- Solving Formulas for a Variable (2 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
- Applications of Equations (11 topics)
  - Choosing stories that can be represented by given one-step equations
  - Translating a sentence into a multi-step equation
  - Writing an equation of the form  $Ax + B = C$  to solve a word problem
  - Comparing arithmetic and algebraic solutions to a word problem
  - Choosing stories that can be represented by given two-step equations
  - Solving a decimal word problem using a linear equation of the form  $Ax + B = C$
  - Writing an equation of the form  $A(x + B) = C$  to solve a word problem
  - Solving a word problem with two unknowns using a linear equation
  - Writing an equation to represent a real-world problem: Variable on both sides
  - Writing and solving a real-world problem given an equation with the variable on both sides
  - Solving a decimal word problem using a linear equation with the variable on both sides
- Writing and Graphing Inequalities (5 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
- One-Step Inequalities (5 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
- Multi-Step Inequalities (4 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
- Applications of Inequalities (6 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
  - Translating a sentence into a multi-step inequality
  - Solving a word problem using a two-step linear inequality and describing the solution
  - Solving a word problem using a two-step linear inequality
  - Solving a decimal word problem using a two-step linear inequality
- Graphs, Functions, and Sequences (83 topics)
  - Ordered Pairs (3 topics)
    - Reading a point in the coordinate plane
    - Plotting a point in the coordinate plane
    - Finding distances between points that share a common coordinate given the graph
  - Tables and Graphs of Lines (13 topics)
    - Function tables with two-step rules
    - Table for a linear equation
    - Writing a function rule given a table of ordered pairs: Two-step rules
    - Identifying solutions to a linear equation in two variables

- Graphing a line in quadrant 1
  - 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
  - Identifying parallel and perpendicular lines
- Proportional Relationships (12 topics)
    - Making a table and plotting points given a unit rate
    - Writing an equation to represent a proportional relationship
    - 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 outputs and rate of increase given the graph of a line that models a real-world situation
    - Comparing proportional relationships given in different forms
- Slope (6 topics)
    - Finding slope given the graph of a line in quadrant 1 that models a real-world situation
    - Finding slope given the graph of a line on a grid
    - Finding slope given two points on a line
    - Finding the slopes of horizontal and vertical lines
    - Using right triangles to find the slope of a line
    - Graphing a line given its slope and y-intercept
- Direct and Inverse Variation (4 topics)
    - 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
- Equations of Lines (10 topics)
    - Identifying linear equations: Basic
    - Identifying linear functions given ordered pairs
    - Finding the slope and y-intercept of a line given its equation in the form  $y = mx + b$
    - Finding the slope and y-intercept of a line given its equation in the form  $Ax + By = C$
    - Writing an equation of a line given its slope and y-intercept
    - Writing an equation in slope-intercept form given the slope and a point
    - Finding the slope and a point on a line given its equation in point-slope form
    - Writing 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
- Applications (11 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 and evaluating a function that models a real-world situation: Advanced
    - Writing an equation and drawing its graph to model a real-world situation: Basic
    - Writing an equation and drawing its graph to model a real-world situation: Advanced
    - Finding the 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
    - Comparing properties of linear functions given in different forms
    - Interpreting the parameters of a linear function that models a real-world situation
- Introduction to Functions (4 topics)
    - Identifying functions from relations
    - Vertical line test
    - Domain and range from ordered pairs
    - Table for a linear function
- Graphs of Functions (7 topics)
    - 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
- Determining if a function is linear given its graph
- Systems of Equations (13 topics)
  - Identifying solutions to a system of linear equations
  - Identifying the solution of 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
  - Introduction to using substitution to solve a linear equation
  - 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 systems of linear equations with 0, 1, or infinitely many solutions
  - 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  $y = mx + b$
- Exponents, Polynomials, and Radicals (62 topics)
  - Product, Power, and Quotient Rules (10 topics)
    - Introduction to the product rule with positive exponents: Whole number base
    - Understanding the product rule of exponents
    - Introduction to the product rule of exponents
    - Product rule with positive exponents: Univariate
    - Introduction to the power of a power rule with positive exponents: Whole number base
    - Understanding the power rules of exponents
    - Introduction to the power of a power rule of exponents
    - Introduction to the power of a product rule of exponents
    - Introduction to the quotient rule with positive exponents: Whole number base
    - Introduction to the quotient rule of exponents
  - Negative Exponents (9 topics)
    - 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
    - Introduction to the product rule with negative exponents: Whole number base
    - Introduction to the product rule with negative exponents
    - Introduction to the quotient rule with negative exponents: Whole number base
    - Quotient rule with negative exponents: Problem type 1
    - Introduction to the power of a power rule with negative exponents: Whole number base
  - Scientific Notation (16 topics)
    - 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
    - Estimating numbers using scientific notation
    - Choosing metric units and converting to the base unit in scientific notation
    - Expressing calculator notation as scientific notation
    - Multiplying numbers written in scientific notation: Basic
    - Multiplying numbers written in scientific notation: Advanced
    - Multiplying numbers written in decimal form or scientific notation in a real-world situation
    - Dividing numbers written in scientific notation: Basic
    - Dividing numbers written in scientific notation: Advanced
    - Finding the scale factor between numbers given in scientific notation in a real-world situation
    - Adding or subtracting numbers written in scientific notation: Same exponents, basic
    - Adding or subtracting numbers written in scientific notation: Different exponents
  - Square Roots and Irrational Numbers (16 topics)
    - Square root of a perfect square
    - Finding all square roots of a number
    - Square root of a rational perfect square
    - Square roots of perfect squares with signs
    - Using a calculator to approximate a square root
    - Estimating a square root
    - Using numerical methods to approximate a square root to the nearest tenth
    - Using numerical methods to approximate a square root to the nearest hundredth
    - Approximating the location of irrational numbers on a number line
    - Approximating the location of irrational numbers on a number line to compare them
    - Ordering real numbers



- Converting a repeating decimal to a fraction
- Identifying true statements about rational and irrational numbers
- Identifying numbers as rational or irrational
- Constructing a Venn diagram to classify real numbers
- Constructing a Venn diagram to describe relationships between sets of real numbers
- Higher Roots and Nonlinear Equations (5 topics)
  - Solving an equation of the form  $x^2 = a$  using the square root property
  - Finding side lengths of squares given an area and a perimeter
  - Cube root of an integer
  - Order of operations with exponents and radicals
  - Solving an equation of the form  $x^3 = a$  using integers
- Applying the Pythagorean Theorem (6 topics)
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem
  - Using the Pythagorean Theorem repeatedly
  - Using the Pythagorean Theorem to find distance on a grid
  - Using the Pythagorean Theorem to find the distance between two points in the plane in context
- Lines, Angles, and Polygons (39 topics)
  - Classifying and Measuring Angles (3 topics)
    - Acute, obtuse, and right angles
    - Measuring an angle with the protractor
    - Drawing an angle with the protractor
  - Angle Relationships (7 topics)
    - Introduction to angle addition
    - Finding an angle measure in a figure with a right or straight angle
    - Solving an equation involving complementary or supplementary angles
    - Writing and solving an equation involving complementary or supplementary angles
    - Identifying supplementary and vertical angles
    - Finding angle measures given two intersecting lines
    - Solving equations involving vertical angles
  - Parallel Lines (4 topics)
    - Identifying corresponding and alternate angles
    - Finding angle measures given two parallel lines cut by a transversal
    - Solving equations involving angles and a pair of parallel lines
    - Establishing facts about the angles created when parallel lines are cut by a transversal
  - Classifying Triangles (3 topics)
    - Acute, obtuse, and right triangles
    - Classifying scalene, isosceles, and equilateral triangles by side lengths
    - Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
  - Angles of Triangles (7 topics)
    - Finding an angle measure of a triangle given two angles
    - Finding an angle measure for a triangle with an extended side
    - Finding an angle measure given extended triangles
    - Finding an angle measure given a triangle and parallel lines
    - Writing an equation to find angle measures of a triangle given angles with variables
    - Establishing facts about the interior angles of a triangle
    - Establishing facts about the interior and exterior angles of a triangle
  - Triangle Constructions and Triangle Inequalities (7 topics)
    - Creating triangles from given side lengths: Problem type 1
    - Creating triangles from given side lengths: Problem type 2
    - Using triangle inequality to determine if side lengths form a triangle
    - Determining if a triangle is possible based on given angle measures
    - Determining if given measurements define a unique triangle, more than one triangle, or no triangle
    - Drawing triangles with given conditions: Angle measures
    - Relationship between angle measures and side lengths in a triangle
  - Polygons and Quadrilaterals (8 topics)
    - Shared attributes among categories of quadrilaterals
    - Identifying parallelograms, rectangles, and squares
    - Properties of quadrilaterals
    - Classifying parallelograms
    - Sum of the angle measures of a quadrilateral
    - Finding the sum of the interior angle measures of a convex polygon given the number of sides
    - Finding the number of sides of a convex polygon given the sum of the measures of the interior angles

- Finding a missing interior angle measure in a convex polygon
- Transformations (35 topics)
  - Congruence and Similarity (4 topics)
    - Identifying transformations
    - Identifying and naming congruent parts of congruent triangles
    - Finding angle measures of a triangle given two angles of a similar triangle
    - Finding angle measures and side ratios to determine if two triangles are similar
  - Translations (6 topics)
    - Translating a point and giving its coordinates: One step
    - Translating a point and giving its coordinates: Two steps
    - Properties of translated figures
    - Determining if figures are related by a translation
    - Translating a polygon
    - Writing a rule to describe a translation
  - Reflections (10 topics)
    - Reflecting a point across an axis
    - Reflecting a point across both coordinate axes
    - Reflecting a point across an axis and giving its coordinates
    - Finding the coordinates of a point reflected across an axis
    - Finding the coordinates of a point reflected across both axes
    - Reflecting a polygon across the x-axis or y-axis
    - Properties of reflected figures
    - Determining if figures are related by a reflection
    - Finding the coordinates of a point reflected across an axis and translated
    - Writing a rule to describe a reflection
  - Rotations (7 topics)
    - Rotating a point and giving its coordinates
    - Properties of rotated figures
    - Determining if figures are related by a rotation
    - Rotating a figure about the origin
    - Writing a rule to describe a rotation
    - Determining if figures are congruent and related by a transformation
    - Determining if figures are congruent and related by a sequence of transformations
  - Dilations (8 topics)
    - Dilating a segment and giving the coordinates of its endpoints
    - The effect of dilation on side length
    - Determining if figures are related by a dilation
    - Finding a scale factor given a dilation in the coordinate plane
    - The effect of dilation on area
    - Dilating a figure
    - Writing a rule to describe a dilation
    - Determining if figures are similar and related by a sequence of transformations
- Perimeter, Area, and Volume (64 topics)
  - Perimeter (1 topics)
    - Finding the missing length in a figure
  - Area of Rectangles (2 topics)
    - Word problem involving the area of a rectangle: Problem type 2
    - Finding side lengths of rectangles given one dimension and an area or a perimeter
  - Area of Parallelograms, Triangles, and Trapezoids (6 topics)
    - Area of a parallelogram
    - Finding the area of a right triangle on a grid
    - Area of a triangle
    - Finding the area of a right triangle using the Pythagorean Theorem
    - Finding the area of a trapezoid on a grid by using triangles and rectangles
    - Area of a trapezoid
  - Area of Composite Figures (5 topics)
    - Finding the area of a composite figure on a grid
    - Area of a piecewise rectangular figure
    - Word problem on finding the area of a piecewise rectangular figure
    - Area between two rectangles
    - Area involving rectangles and triangles
  - The Converse and a Proof of the Pythagorean Theorem (3 topics)

- Identifying side lengths that give right triangles
- Demonstrating the converse of the Pythagorean Theorem
- Informal proof of the Pythagorean Theorem
- Circumference and Area of Circles (11 topics)
  - Introduction to a circle: Diameter, radius, and chord
  - Circumference of a circle
  - Finding the radius or the diameter of a circle given its circumference
  - Informal argument for the formula of the circumference of a circle
  - Area of a circle
  - Circumference and area of a circle
  - Informal argument for the formula of the area of a circle
  - Area involving rectangles and circles
  - Area between two concentric circles
  - Area involving inscribed figures
  - Area of a sector of a circle: Exact answer in terms of  $\pi$
- Three-Dimensional Figures (5 topics)
  - Classifying solids
  - Nets of solids
  - Counting the cubes in a solid made of cubes
  - Side views of a solid made of cubes
  - Identifying horizontal and vertical cross sections of solids
- Volume of Prisms and Cylinders (9 topics)
  - Volume of a rectangular prism
  - Writing equivalent expressions for the volume of a rectangular prism
  - Word problem involving the volume of a rectangular prism
  - Volume of a piecewise rectangular prism
  - Word problem involving the volume of a piecewise rectangular prism
  - Volume of a triangular prism
  - Word problem involving the volume of a triangular prism
  - Volume of a cylinder
  - Word problem involving the volume of a cylinder
- Volume of Pyramids, Cones, and Spheres (8 topics)
  - Volume of a pyramid
  - Relating the volumes of a rectangular prism and a rectangular pyramid
  - Relating the volumes of a triangular prism and a triangular pyramid
  - Volume of a cone
  - Relating the volumes of a cylinder and a cone
  - Word problem involving the volume of a cone
  - Volume of a sphere
  - Word problem involving the volume of a sphere
- Surface Area (14 topics)
  - Surface area of a cube or a rectangular prism
  - Using a net to find the surface area of a rectangular prism
  - Using a net to find the lateral surface area and total surface area of a rectangular prism
  - Word problem involving the surface area of a rectangular prism
  - Surface area of a triangular prism
  - Using a net to find the surface area of a triangular prism
  - Using a net to find the lateral surface area and total surface area of a triangular prism
  - Surface area of a cylinder
  - Word problem involving the surface area of a cylinder
  - Word problem involving the surface area of rectangular prisms and cylinders
  - Using a net to find the lateral surface area and total surface area of a pyramid
  - Word problem involving the surface area of rectangular prisms and pyramids
  - Lateral surface area and surface area of a cone
  - Surface area of a sphere
- Data Analysis and Probability (55 topics)
  - Collecting Data (4 topics)
    - Choosing an appropriate method for gathering data: Problem type 1
    - Choosing an appropriate method for gathering data: Problem type 2
    - Introduction to expectation
    - Making predictions using experimental data for compound events
  - Frequency Tables (6 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
- Calculating relative frequencies in a contingency table: Advanced
- Graphs of Data (5 topics)
  - Constructing a line plot
  - Making part-to-whole, part-to-part, and equivalence comparisons given a line plot
  - Making part-to-whole, part-to-part, and equivalence comparisons given a bar graph
  - Angle measure in a circle graph
  - Constructing a percent bar graph
- Scatter Plots and Lines of Best Fit (7 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
  - Classifying linear and nonlinear relationships from scatter plots
  - Identifying outliers and clustering in scatter plots
- Mean, Median, and Mode (3 topics)
  - Finding the mean of a symmetric distribution
  - Finding sample size and comparing samples for estimating the mean
  - Mean and median of a data set
- Measures of Variation (7 topics)
  - Range of a data set
  - Interpreting a box-and-whisker plot
  - Interpreting a box-and-whisker plot: Problem type 2
  - Using box-and-whisker plots to compare data sets
  - Comparing sample means
  - Computing mean absolute deviation from a list of numerical values
  - Assessing the degree of overlap of two distributions
- Counting (1 topics)
  - Interpreting a tree diagram
- Probability of Simple Events (8 topics)
  - Classifying likelihood
  - 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
  - Understanding likelihood
  - Probabilities of an event and its complement
  - Experimental and theoretical probability
- Probability of Compound Events (7 topics)
  - 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
  - Identifying independent events given descriptions of experiments
  - Probability of independent events
  - Probability of dependent events
- Simulations (7 topics)
  - 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
- Other Topics Available(\*) (619 additional topics)
  - Whole Numbers and Integers (73 topics)
    - Whole number place value: Problem type 1
    - Whole number place value: Problem type 2
    - Comparing place values of digits in a whole number: Problem type 1
    - Numeral translation: Problem type 1
    - Numeral translation: Problem type 2
    - Expanded form: 2 and 3-digit numbers

- Expanded form: 4 and 5-digit numbers
  - Expanded form with zeros
  - Adding 3 numbers with two, three, and four-digits
  - Subtraction involving 3-digit numbers without regrouping
  - Subtraction with multiple regrouping steps involving 4-digit numbers
  - Word problem with addition or subtraction of whole numbers
  - Perimeter of a polygon
  - Perimeter of a rectangle on a grid
  - Multiplication as repeated addition
  - Understanding multiplication of a one-digit number with a larger number
  - Area of a rectangle on a grid
  - Area of a rectangle with one-digit side lengths
  - Introduction to multiplication using an area model
  - Multiplying a multi-digit and a 1-digit number using an area model
  - Writing a division sentence for equal groups
  - Writing a division sentence for equal groups and a remainder
  - Quotient with remainder: 1-digit divisor, 3-digit or 4-digit dividend
  - Division involving quotients with intermediate zeros: Problem type 1
  - Division involving quotients with intermediate zeros: Problem type 2
  - Division with remainder involving quotients with intermediate zeros: Problem type 1
  - Division with remainder involving quotients with intermediate zeros: Problem type 2
  - Division with remainder and a two-digit divisor: Problem type 1
  - Division with remainder and a two-digit divisor: Problem type 2
  - Word problem with division of whole numbers and rounding: Problem type 1
  - Word problem with division of whole numbers and rounding: Problem type 2
  - Comparing a numerical expression with a number
  - Ordering large numbers
  - Rounding to tens or hundreds
  - Rounding to hundreds or thousands
  - Rounding to thousands, ten thousands, or hundred thousands
  - Estimating a sum of whole numbers: Problem type 1
  - Estimating a sum of whole numbers: Problem type 2
  - Estimating a difference of whole numbers: Problem type 1
  - Estimating a difference of whole numbers: Problem type 2
  - Estimating a quotient
  - Writing expressions using exponents
  - Power of 10: Positive exponent
  - Comparing numerical expressions with parentheses
  - Order of operations with whole numbers and grouping symbols
  - Order of operations with whole numbers and exponents: Advanced
  - Even and odd numbers
  - Divisibility rules for 2, 5, and 10
  - Divisibility rules for 3 and 9
  - Prime numbers
  - Prime factorization
  - 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
  - Word problem with common multiples
  - Comparing integers using a number line
  - Interpreting a table of signed numbers that relate to a real-world situation: Problem type 1
  - Interpreting a table of signed numbers that relate to a real-world situation: Problem type 2
  - Comparing signed numbers relating to a real-world situation
  - Finding opposites of integers
  - 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
  - Operations with absolute value: Problem type 2
  - Finding a point on a number line given the length of a segment and another point
  - 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
  - Plotting the solution for a one-step equation on a number line
  - Distinguishing between expressions and equations
- Fractions (50 topics)
    - Understanding equivalent fractions: Problem type 1
    - Understanding equivalent fractions: Problem type 2
    - Modeling and writing equivalent fractions
    - Introduction to finding equivalent fractions: Multiplying
    - Introduction to finding equivalent fractions: Dividing

- o Position of fractions on a number line
  - o Comparing fractions with the same numerator
  - o Writing a mixed number and an improper fraction for a shaded region
  - o Position of mixed numbers on a number line
  - o Addition or subtraction of fractions with the same denominator
  - o Decomposing a fraction into a sum of fractions with the same denominator
  - o Introduction to adding fractions with variables and common denominators
  - o Writing unit fractions with a common denominator to add or subtract
  - o Addition and subtraction of 3 fractions with different denominators
  - o Signed fraction addition or subtraction: Advanced
  - o Addition and subtraction of 3 fractions involving signs
  - o Fractional part of a circle
  - o Addition or subtraction of mixed numbers with the same denominator
  - o Addition of mixed numbers with the same denominator and renaming: Problem type 1
  - o Addition of mixed numbers with the same denominator and renaming: Problem type 2
  - o Subtraction of mixed numbers with the same denominator and renaming: Problem type 1
  - o Subtraction of mixed numbers with the same denominator and renaming: Problem type 2
  - o Addition or subtraction of mixed numbers with different denominators without renaming
  - o Addition of mixed numbers with different denominators and renaming
  - o Subtraction of mixed numbers with different denominators and renaming
  - o Addition and subtraction of 3 mixed numbers with different denominators
  - o Word problem involving addition or subtraction of mixed numbers with different denominators
  - o Multiplication of 3 fractions
  - o Modeling multiplication of proper fractions
  - o Signed fraction multiplication: Advanced
  - o Multi-step word problem involving fractions and multiplication
  - o Determining if a quantity is increased or decreased when multiplied by a fraction
  - o Fact families for multiplication and division of fractions
  - o Modeling division of a whole number by a fraction
  - o Multiplying mixed numbers: Problem type 1
  - o Multiplying mixed numbers: Problem type 2
  - o Multiplying a mixed number and a whole number: Problem type 2
  - o Mixed number division
  - o Word problem involving multiplication or division with mixed numbers
  - o Evaluating expressions with exponents of zero
  - o Exponents and signed fractions
  - o Order of operations with fractions: Problem type 1
  - o Order of operations with fractions: Problem type 2
  - o Order of operations with fractions: Problem type 3
  - o Complex fraction without variables: Problem type 1
  - o Evaluating a linear expression: Signed fraction multiplication with addition or subtraction
  - o Additive property of equality with fractions and mixed numbers
  - o Additive property of equality with signed fractions
  - o Multiplicative property of equality with whole numbers: Fractional answers
  - o Multiplicative property of equality with fractions
- Decimals (43 topics)
    - o Writing a decimal and a fraction for a shaded region
    - o Decimal place value: Hundreds to ten thousandths
    - o Writing a decimal number less than 1 given its name
    - o Writing a decimal number greater than 1 given its name
    - o Writing a decimal number given its name: Advanced
    - o Reading decimal position on a number line: Tenths
    - o Reading decimal position on a number line: Hundredths
    - o Understanding decimal position on a number line using zoom: Hundredths
    - o Understanding decimal position on a number line using zoom: Thousandths
    - o Ordering decimals
    - o Converting a decimal to a proper fraction without simplifying: Advanced
    - o Converting a decimal to a proper fraction in simplest form: Advanced
    - o Converting a decimal to a mixed number and an improper fraction in simplest form: Advanced
    - o Addition of decimals: Vertically aligned
    - o Decimal addition with 3 numbers
    - o Subtraction of aligned decimals
    - o Decimal addition and subtraction with 3 or more numbers
    - o Estimating a decimal sum or difference
    - o Signed decimal addition and subtraction with 3 numbers
    - o Computing distances between decimals on a number line
    - o Word problem with addition of 3 or 4 decimals and whole numbers
    - o Decimal multiplication: Problem type 2
    - o Multiplying decimals less than 1: Problem type 2
    - o Estimating a product of decimals
    - o Word problem with multiplication of two decimals
    - o Division of a decimal by a power of 0.1
    - o Whole number division with decimal answers

- Division of a decimal by a 1-digit decimal: Problem type 1
- Division of a decimal by a 2-digit decimal
- Decimal division with rounding
- Average of two numbers
- Signed decimal division
- Word problem with division of two decimals
- Converting a fraction with a denominator of 100 or 1000 to a decimal
- Converting a fraction to a repeating decimal: Advanced
- Using a calculator to convert a fraction to a rounded decimal
- Converting a mixed number to a terminating decimal: Advanced
- Converting a fraction or mixed number to a rounded decimal
- Ordering fractions and decimals
- Interpreting a Venn diagram of 3 sets
- Order of operations with decimals: Problem type 3
- Addition or subtraction with a decimal and a mixed number
- Multiplication with a decimal and a fraction
  
- Ratios, Proportions, and Measurement (48 topics)
  - Writing ratios using different notations
  - Writing ratios for real-world situations
  - Writing a ratio and finding a quantity in an equivalent ratio in context
  - Identifying statements that describe a ratio
  - Simplifying a ratio of whole numbers: Problem type 1
  - Simplifying a ratio of decimals
  - Word problem on proportions: Problem type 2
  - Word problem with powers of ten
  - Investigating the effects on the area for non-proportional and proportional figures
  - Choosing a measuring tool
  - Choosing U.S. Customary measurement units
  - Measuring length to the nearest inch
  - Measuring length to the nearest quarter or half inch
  - Conversions involving measurements in feet and inches
  - Adding measurements in feet and inches
  - U.S. Customary length conversions involving rounding decimals
  - Word problem involving a U.S. Customary length conversion
  - U.S. Customary unit conversion with whole number values: Two-step conversion
  - U.S. Customary unit conversion with mixed number values: One-step conversion
  - U.S. Customary unit conversion with mixed number values: Two-step conversion
  - U.S. Customary area unit conversion with whole number values
  - Word problem on area involving conversions of U.S. Customary units: Problem type 1
  - Unit conversions involving acres and hectares
  - Choosing metric measurement units
  - Measuring length to the nearest centimeter
  - Measuring length to the nearest millimeter
  - Metric distance conversion with whole number values
  - Metric distance conversion with decimal values
  - Metric mass or volume conversion with whole numbers
  - Metric conversion with decimal values: Two-step problem
  - Metric area unit conversion with decimal values
  - Word problem involving adding or subtracting time within the hour
  - Introduction to adding time
  - Adding time
  - Word problem on elapsed time within the hour
  - Word problem on elapsed time less than one hour
  - Word problem on elapsed time more than one hour
  - Word problem on elapsed times crossing a.m. and p.m.
  - Reading a positive temperature from a thermometer
  - Reading the temperature from a thermometer
  - Converting between temperatures in Fahrenheit and Celsius
  - Simplifying a ratio of whole numbers: Problem type 2
  - Solving a word problem involving rates and time conversion
  - 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
  - Conversions with currency
  - Word problem involving conversion between compound units using dimensional analysis
  
- Percents (40 topics)
  - Finding the percentage of a grid that is shaded
  - Representing benchmark percentages on a grid
  - Converting a mixed number percentage to a decimal
  - Converting between percentages and decimals in a real-world situation
  - Converting a percentage to a fraction in simplest form
  - Converting a decimal percentage to a fraction

- Comparing fractions, decimals, and percentages using a number line
  - Using a calculator to convert a fraction to a rounded percentage
  - Writing a ratio as a percentage
  - Applying the percent equation: Problem type 2
  - Interpreting a circle graph or pie chart
  - Computations from a circle graph
  - Finding the multiplier to give a final amount after a percentage increase or decrease
  - Combined effect of more than one markup or discount
  - Finding the original amount given the result of a percentage increase or decrease
  - Finding the original price given the sale price and percent discount
  - Finding the absolute error and percent error of a measurement
  - 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
  - Comparing discounts
  - Calculations involving paying for college
  - Comparing total costs for attending different colleges
  - Distinguishing between fixed and variable expenses
  - Computing percentages for categories of a budget
  - Computations involving cost of living and hourly wage
  - Using a family budget estimator to determine the minimum monthly budget and average hourly wage needed for a family
  - Comparing annual salaries of different occupations
  - Hourly gross pay with overtime
  - Gross pay with commission and salary
  - Calculations involving purchases with debit and credit cards
  - Comparing costs of checking accounts
  - Balancing a check register
  - Reading a credit report
  - Understanding the impact of a credit score
  - Computing a person's net worth
  - Word problem on financial responsibility
  - Calculating and comparing monthly payments using the ALEKS loan calculator
  - Calculating monthly payment, total payment, and interest using the ALEKS loan calculator
  - Calculating and comparing total loan payments using the ALEKS loan calculator
- Equations and Inequalities (58 topics)
    - Introduction to the distributive property
    - Understanding the distributive property
    - Introduction to factoring with numbers
    - Factoring a sum or difference of whole numbers
    - Identifying like terms
    - Properties of addition
    - Properties of real numbers
    - Combining like terms: Decimal coefficients
    - Combining like terms: Fractional coefficients
    - Using algebra tiles to determine if two expressions are equivalent
    - Identifying parts in an algebraic expression
    - Identifying equivalent algebraic expressions
    - Using distribution with double negation and combining like terms to simplify: Multivariate
    - Combining like terms in a quadratic expression
    - Adding rational expressions with different denominators and a single occurrence of a variable
    - Solving an equation to find the value of an expression
    - Solving a multi-step equation given in fractional form
    - Clearing fractions in an equation
    - Solving a two-step equation with signed fractions
    - Solving a proportion of the form  $(x+a)/b = c/d$
    - Introduction to solving a rational equation
    - Solving a rational equation that simplifies to linear: Denominator  $x$
    - Introduction to solving an absolute value equation
    - Solving an absolute value equation: Problem type 1
    - 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 linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
    - Solving a proportion of the form  $a/(x+b) = c/x$
    - 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
    - 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
    - Solving a fraction word problem using a linear equation of the form  $Ax = B$
    - 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 percent mixture problem using a linear equation
  - Solving a distance, rate, time problem using a linear equation
  - Writing an inequality given a graph on the number line
  - 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
  - Additive property of inequality with signed fractions
  - Additive property of inequality with signed decimals
  - Multiplicative property of inequality with signed fractions
  - Solving a two-step linear inequality with a fractional coefficient
  - Solving a linear inequality with multiple occurrences of the variable: Problem type 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 linear inequality with the variable on both sides
  - 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
- Graphs, Functions, and Sequences (96 topics)
    - Reading a point in quadrant 1
    - Plotting a point in quadrant 1
    - Plotting a point in quadrant 1: Mixed number coordinates
    - Plotting a point in the coordinate plane: Mixed number coordinates
    - Naming the quadrant or axis of a point given its graph
    - Naming the quadrant or axis of a point given its coordinates
    - Naming the quadrant or axis of a point given the signs of its coordinates
    - Finding distances between points that share a common coordinate given their coordinates
    - Plotting points that share a coordinate and using absolute value to find the distance between them
    - Midpoint of a line segment in the plane
    - Writing a function rule given a table of ordered pairs: One-step rules
    - Finding the coordinates of a point on a graph given the equation
    - Finding a solution to a linear equation in two variables
    - Comparing two rules with forms of  $y=ax$  and  $y=x+a$
    - Finding x- and y-intercepts of a line given the equation: Advanced
    - Graphing a line given its x- and y-intercepts
    - Graphing a line by first finding its x- and y-intercepts
    - Interpreting a line graph
    - Classifying slopes given graphs of lines
    - Finding the coordinate that yields a given slope
    - Graphing a line through a given point with a given slope
    - Identifying direct variation equations
    - 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
    - Rewriting a linear equation in the form  $Ax + By = C$
    - Graphing a line by first finding its slope and y-intercept
    - Writing an equation and graphing a line given its slope and y-intercept
    - Finding the slope, y-intercept, and equation for a linear function given a table of values
    - Graphing a line given its equation in point-slope form
    - Writing the equation of a line in standard form given the slope and a point
    - Writing the equations of vertical and horizontal lines through a given point
    - Writing the equation and finding the slope of a line parallel or perpendicular to a vertical or horizontal line
    - Finding slopes of lines parallel and perpendicular to a line given in slope-intercept form
    - Finding slopes of lines parallel and perpendicular to a line given in the form  $Ax + By = C$
    - Identifying parallel and perpendicular lines from equations
    - Writing equations of lines parallel and perpendicular to a given line through a point
    - Identifying parallel and perpendicular lines from coordinates
    - Finding inputs and outputs of a two-step function that models a real-world situation: Two variable equation
    - Graphing ordered pairs and writing an equation from a table of values in context
    - Application problem with a linear function: Finding a coordinate given the slope and a point
    - Application problem with a linear function: Finding a coordinate given two points
    - Identifying independent and dependent quantities from tables and graphs
    - Identifying independent and dependent variables from equations or real-world situations
    - 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
    - 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
  - Finding and interpreting an output of a linear function given a graph that models a real-world situation
  - Graphing an integer function and finding its range for a given domain
  - Graphing a function of the form  $f(x) = ax + b$ : Integer slope
  - Graphing a function of the form  $f(x) = ax + b$ : Fractional slope
  - Graphing an absolute value equation of the form  $y = |x|$
  - Graphing an absolute value equation in the plane: Basic
  - Graphing an absolute value equation in the plane: Advanced
  - Graphing a parabola of the form  $y = ax^2$
  - Graphing a parabola of the form  $y = ax^2 + c$
  - Graphing a function of the form  $f(x) = ax^2$
  - Graphing a function of the form  $f(x) = ax^2 + c$
  - Graphing a cubic function of the form  $y = ax^3$
  - 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
  - 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
  - Finding the first terms of a geometric sequence using an explicit rule
  - Finding the next terms of a geometric sequence with whole numbers
  - Finding the next terms of a geometric sequence with signed numbers
  - Identifying arithmetic and geometric sequences
  - Identifying geometric sequences and finding the common ratio
  - Finding a specified term of a geometric sequence given the first terms
  - 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
  - Finding patterns in shapes
  - Writing a system of linear equations given its graph
  - Solving a system of linear equations using elimination with multiplication and addition
  - 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 table of values
  - Solving a value mixture problem using a system of linear equations
  - Addition or subtraction of matrices
  - Identifying solutions to a linear inequality in two variables
  - Graphing a linear inequality in the plane: Vertical or horizontal line
  - Graphing a linear inequality in the plane: Slope-intercept form
  - Graphing a linear inequality in the plane: Standard form
  - Writing an inequality given its graph in the plane: Horizontal or vertical boundary line
  - Writing an inequality given its graph in the plane: Slanted boundary line
  - Graphing a 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
- Exponents, Polynomials, and Radicals (62 topics)
    - Product rule with positive exponents: Multivariate
    - Ordering numbers with positive exponents
    - Power rules with positive exponents: Multivariate products
    - Power rules with positive exponents: Multivariate quotients
    - Simplifying a ratio of multivariate monomials: Basic
    - Simplifying a ratio of univariate monomials
    - Quotient of expressions involving exponents
    - Simplifying a ratio of multivariate monomials: Advanced
    - Ordering numbers with negative exponents
    - Rewriting an algebraic expression without a negative exponent
    - Power of a power rule with negative exponents
    - Adding or subtracting numbers written in scientific notation: Same exponents, advanced
    - Estimating the sum or difference of two numbers written in scientific notation
    - Degree and leading coefficient of a univariate polynomial
    - Degree of a multivariate polynomial
    - Simplifying a sum or difference of two univariate polynomials
    - Simplifying a sum or difference of three univariate polynomials
    - Multiplying a univariate polynomial by a monomial with a positive coefficient
    - Multiplying a univariate polynomial by a monomial with a negative coefficient
    - Multiplying a multivariate polynomial by a monomial
    - Multiplying binomials with leading coefficients of 1
    - Multiplying binomials with leading coefficients greater than 1
    - Multiplying binomials in two variables
    - Multiplying conjugate binomials: Univariate
    - Squaring a binomial: Univariate
    - Multiplication involving binomials and trinomials in one variable

- Multiplication involving binomials and trinomials in two variables
  - Introduction to the LCM of two monomials
  - Least common multiple of two monomials
  - 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 a quadratic with leading coefficient 1
  - Factoring a perfect square trinomial with leading coefficient 1
  - Factoring a difference of squares in one variable: Basic
  - Factoring a difference of squares in one variable: Advanced
  - Dividing a polynomial by a monomial: Univariate
  - Dividing a polynomial by a monomial: Multivariate
  - Finding the roots of a quadratic equation with leading coefficient 1
  - Introduction to simplifying a radical expression with an even exponent
  - Square root of a perfect square 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
  - Introduction to square root addition or subtraction
  - Square root addition or subtraction
  - Introduction to square root multiplication
  - Square root multiplication: Basic
  - Square root multiplication: Advanced
  - Simplifying a quotient of square roots
  - Rationalizing a denominator: Quotient involving square roots
  - 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
  - Solving an equation using the odd-root property: Problem type 1
  - Rational exponents: Unit fraction exponents and whole number bases
  - Rational exponents: Non-unit fraction exponent with a whole number base
  - Distance between two points in the plane: Exact answers
  - Distance between two points in the plane: Decimal answers
- Lines, Angles, and Polygons (34 topics)
    - Naming segments, rays, and lines
    - Naming angles, sides of angles, and vertices
    - Finding supplementary and complementary angles
    - Constructing congruent line segments
    - Constructing an angle bisector
    - Constructing congruent angles
    - Constructing the perpendicular bisector of a line segment
    - Constructing a pair of perpendicular lines
    - Constructing a pair of parallel lines
    - Identifying congruent segments in the plane
    - Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
    - Finding angle measures of a triangle given angles with variables
    - Finding side lengths and angle measures of isosceles and equilateral triangles
    - Finding angle measures of an isosceles triangle given angles with variables
    - Finding an angle measure for a triangle sharing a side with another triangle
    - Drawing triangles with given conditions: Side lengths and angle measures
    - Drawing a circle with a given radius or diameter
    - Drawing triangles with given side lengths using a compass
    - Relationship between angle measures and side lengths in two triangles
    - Sine, cosine, and tangent ratios: Numbers for side lengths
    - Sine, cosine, and tangent ratios: Variables for side lengths
    - Using a calculator to approximate sine, cosine, and tangent values
    - Using the Pythagorean Theorem to find a sine, cosine, or tangent ratio in a right triangle
    - Understanding trigonometric ratios through similar right triangles
    - Relationship between the sines and cosines of complementary angles
    - Using a trigonometric ratio to find a side length in a right triangle
    - Solving a right triangle
    - Using trigonometry to find a length in a word problem with one right triangle
    - Using a trigonometric ratio to find an angle measure in a right triangle
    - Using trigonometry to find angles of elevation or depression in a word problem
    - Special right triangles: Decimal answers
    - Naming polygons
    - Drawing and identifying a polygon in the coordinate plane
    - Finding the coordinates of a point to make a parallelogram
- Transformations (8 topics)

- Identifying and naming congruent triangles
  - Exploring the triangle congruence theorems
  - Using a translated point to find coordinates of other translated points
  - Reflecting a polygon over a vertical or horizontal line
  - Finding the coordinates of three points reflected over an axis
  - Drawing lines of symmetry
  - Finding an angle of rotation
  - Identifying rotational symmetry and angles of rotation
- Perimeter, Area, and Volume (56 topics)
    - Perimeter of a piecewise rectangular figure
    - Writing algebraic expressions for the perimeter of a figure
    - Finding a side length given the perimeter and side lengths with variables
    - Sides of polygons having the same perimeter
    - Perimeter of a polygon involving mixed numbers and fractions
    - Area of a rectangle with fractional side lengths
    - Area of a rectangle involving mixed number and fractional side lengths
    - Distinguishing between the area and perimeter of a rectangle
    - Areas of rectangles with the same perimeter
    - Word problem on area involving conversions of U.S. Customary units: Problem type 2
    - Word problem on area involving conversions between systems
    - Estimates and exact answers
    - Writing algebraic expressions for the area of a figure
    - Word problem on optimizing an area or perimeter
    - Finding the dimensions of a rectangle given its perimeter and a relationship between sides
    - Finding the perimeter or area of a rectangle given one of these values
    - Finding the perimeter or area of a rectangle in the coordinate plane
    - Finding the area of a right triangle or its corresponding rectangle
    - Solving a word problem involving area using a one-step linear inequality: Area and lengths
    - Finding the area of a triangle or parallelogram in the coordinate plane
    - Introduction to area of a piecewise rectangular figure
    - Word problem involving the area between two rectangles
    - Finding an area in terms of variables
    - Finding the area of a trapezoid, rhombus, or kite in the coordinate plane
    - Identifying chords, secants, and tangents of a circle
    - Naming and finding measures of central angles, inscribed angles, and arcs of a circle
    - Circumference ratios
    - Perimeter involving rectangles and circles
    - Circumference and area of a circle: Exact answers in terms of pi
    - Distinguishing between the area and circumference of a circle
    - Word problem involving the area between two concentric circles
    - Area involving multiple inscribed figures
    - Vertices, edges, and faces of a solid
    - Identifying geometric shapes that model real-world objects
    - Volume of a rectangular prism made of unit cubes
    - Volume of a solid made of cubes with unit fraction edge lengths
    - Volume of a rectangular prism with fractional edge lengths
    - Finding the side length of a cube given its volume
    - Word problem involving the rate of filling or emptying a rectangular prism
    - Word problem on volume involving conversions of U.S. Customary units
    - Word problem involving the rate of filling or emptying a cylinder
    - Ratio of volumes
    - Converting between U.S. Customary units of volume: Problem type 1
    - Converting between metric units of volume and capacity
    - Volume of a cone: Exact answers in terms of pi
    - Surface area of a rectangular prism made of unit cubes
    - Distinguishing between surface area and volume
    - Word problem involving U.S. Customary conversions, surface area, and cost
    - Surface area of a piecewise rectangular prism made of unit cubes
    - Surface area of a cylinder: Exact answers in terms of pi
    - Lateral surface area and surface area of a cone: Exact answers in terms of pi
    - Side lengths, perimeters, and areas of similar polygons
    - Identifying similar solids
    - Computing ratios of side lengths, surface areas, and volumes for similar solids
    - Computing side length, surface area, and volume for similar solids
    - Word problem involving volumes of similar solids
- Data Analysis and Probability (51 topics)
    - Identifying statistical questions
    - Classifying samples
    - Interpreting a tally table
    - Constructing a frequency distribution for grouped data
    - Constructing a frequency distribution for non-grouped data
    - Constructing a relative frequency distribution for grouped data

- 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 double bar graph
- Constructing a frequency distribution and a histogram
- Interpreting a histogram
- Introduction to interpreting a pictograph
- Interpreting a pictograph table
- Interpreting a stem-and-leaf plot
- Linear relationship and the correlation coefficient
- Mean of a data set
- Using a model to find the mean
- Understanding the mean graphically: Two bars
- Understanding the mean graphically: Four or more bars
- Computations involving the mean, sample size, and sum of a data set
- Finding the value for a new score that will yield a given mean
- Rejecting unreasonable claims based on average statistics
- Weighted mean
- How changing a value affects the mean and median
- Mode of a data set
- Choosing the best measure to describe data
- Finding the mode and range from a line plot
- How changing a value affects the range and IQR
- Identifying peaks, symmetry, gaps, and clusters in a line plot
- Identifying the center, spread, and shape of a data set
- Comparing measures of center and variation
- Using back-to-back stem-and-leaf plots to compare data sets
- Five-number summary and interquartile range
- Constructing a box-and-whisker plot
- Computing mean absolute deviation from a bar graph
- Finding outliers in a data set
- Introduction to the counting principle
- Counting principle
- Counting principle with repetition allowed
- Factorial expressions
- Computing permutations and combinations
- Word problem involving permutations
- Word problem involving combinations
- Introduction to permutations and combinations
- Finding the odds in favor and against
- Converting between probability and odds
- Area as probability
- Probabilities of a permutation and a combination
- Using a random number table to make a fair decision

**\*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.