

## Integrated Mathematics I

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

Curriculum (457 topics + 831 additional topics)

- Arithmetic Readiness (37 topics)
  - Factors, Multiples, and Equivalent Fractions (3 topics)
    - Equivalent fractions
    - Simplifying a fraction
    - Division involving zero
  - Addition and Subtraction with Fractions (2 topics)
    - Introduction to addition or subtraction of fractions with different denominators
    - Addition or subtraction of fractions with different denominators
  - Multiplication and Division with Fractions (5 topics)
    - Product of a unit fraction and a whole number
    - Product of a fraction and a whole number: Problem type 1
    - Introduction to fraction multiplication
    - Fraction multiplication
    - Product of a fraction and a whole number: Problem type 2
  - Rounding, Ordering, and the Number Line (4 topics)
    - Rounding to tens or hundreds
    - Rounding to hundreds or thousands
    - Decimal place value: Tenths and hundredths
    - Rounding decimals
  - Addition and Subtraction with Decimals (1 topics)
    - Decimal subtraction: Basic
  - Multiplication and Division with Decimals (5 topics)
    - Multiplication of a decimal by a power of ten
    - Multiplying a decimal by a whole number
    - Word problem with multiple decimal operations: Problem type 1
    - Division of a decimal by a power of ten
    - Division of a decimal by a whole number
  - Converting Between Fractions and Decimals (1 topics)
    - Converting a fraction to a terminating decimal: Basic
  - Ratios and Unit Rates (3 topics)
    - Finding missing values in a table of equivalent ratios
    - Using a table of equivalent ratios to find a missing quantity in a ratio
    - Solving a word problem on proportions using a unit rate
  - Percents (8 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
    - Converting a fraction to a percentage: Denominator of 20, 25, or 50
    - Converting a fraction to a percentage in a real-world situation
    - Finding a percentage of a whole number
    - Finding a percentage of a whole number without a calculator: Basic
  - Units of Measurement (5 topics)
    - U.S. Customary length conversion with whole number values
    - U.S. Customary volume conversion with whole number values
    - U.S. Customary weight conversions with whole number values
    - Time unit conversion with whole number values
    - Converting between metric and U.S. Customary unit systems
- Real Numbers (47 topics)
  - Plotting and Ordering (7 topics)

- Plotting integers on a number line
- Ordering integers
- Writing a signed number for a real-world situation
- Finding opposites of integers
- Square root of a perfect square
- Absolute value of a number
- Finding all numbers with a given absolute value
- Operations with Signed Numbers (13 topics)
  - Integer addition: Problem type 1
  - Integer addition: Problem type 2
  - Integer subtraction: Problem type 1
  - Integer subtraction: Problem type 2
  - Integer subtraction: Problem type 3
  - Addition and subtraction with 3 integers
  - Operations with absolute value: Problem type 1
  - Computing the distance between two integers on a number line
  - Integer multiplication and division
  - Multiplication of 3 or 4 integers
  - Signed fraction addition or subtraction: Basic
  - Signed fraction multiplication: Basic
  - Signed decimal addition and subtraction
- Exponents and Order of Operations (7 topics)
  - Introduction to exponents
  - Order of operations with whole numbers
  - Order of operations with whole numbers and exponents: Basic
  - Exponents and fractions
  - Exponents and integers: Problem type 1
  - Exponents and signed fractions
  - Order of operations with integers
- Evaluating Expressions (5 topics)
  - Evaluating an algebraic expression: Whole numbers with two operations
  - Evaluating a formula
  - Evaluating an algebraic expression: Whole numbers with one operation and an exponent
  - Evaluating a linear expression: Integer multiplication with addition or subtraction
  - Evaluating a quadratic expression: Integers
- Properties of Real Numbers (12 topics)
  - Combining like terms: Whole number coefficients
  - Combining like terms: Integer coefficients
  - Combining like terms: Fractional coefficients
  - Combining like terms: Decimal coefficients
  - Multiplying a constant and a linear monomial
  - Distributive property: Whole number coefficients
  - Distributive property: Integer coefficients
  - Distributive property: Fractional coefficients
  - Identifying parts in an algebraic expression
  - Identifying equivalent algebraic expressions
  - Using distribution and combining like terms to simplify: Univariate
  - Combining like terms in a quadratic expression
- Introduction to Perimeter and Area (3 topics)
  - Perimeter of a polygon
  - Perimeter of a square or a rectangle
  - Area of a square or a rectangle
- Linear Equations and Inequalities (91 topics)
  - One-Step Linear Equations (11 topics)
    - Identifying solutions to a one-step linear equation: Problem type 1
    - Identifying solutions to a one-step linear equation: Problem type 2
    - Additive property of equality with whole numbers
    - Additive property of equality with decimals
    - Additive property of equality with integers
    - Additive property of equality with signed fractions
    - Multiplicative property of equality with whole numbers
    - Multiplicative property of equality with fractions
    - Multiplicative property of equality with decimals
    - Multiplicative property of equality with integers
    - Multiplicative property of equality with signed fractions
  - Multi-Step Linear Equations (14 topics)

- Identifying solutions to a linear equation in one variable: Two-step equations
  - Using two steps to solve an equation with whole numbers
  - Additive property of equality with a negative coefficient
  - Solving a two-step equation with integers
  - Introduction to using substitution to solve a linear equation
  - Introduction to solving an equation with parentheses
  - Identifying properties used to solve a linear equation
  - Introduction to solving an equation with variables on the same side
  - Solving a linear equation with several occurrences of the variable: Variables on the same side
  - Introduction to solving a linear equation with a variable on each side
  - Solving a linear equation with several occurrences of the variable: Variables on both sides
  - Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
  - Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
  - Solving a two-step equation with signed fractions
- Writing Expressions and Equations (6 topics)
    - Writing a one-step expression for a real-world situation
    - Translating a phrase into a one-step expression
    - Translating a phrase into a two-step expression
    - Translating a sentence into a one-step equation
    - Writing an equation to represent a proportional relationship
    - Translating a sentence into a multi-step equation
- Applications Involving Linear Equations (6 topics)
    - Writing and solving a one-step equation with decimals that models a real-world situation
    - Writing an equation of the form  $Ax + B = C$  to solve a word problem
    - Solving a decimal word problem using a linear equation of the form  $Ax + B = C$
    - Solving a word problem with two unknowns using a linear equation
    - Writing an equation to represent a real-world problem: Variable on both sides
    - Solving a one-step word problem using the formula  $d = rt$
- Solving for a Variable and Dimensional Analysis (5 topics)
    - Solving for a variable in terms of other variables using addition or subtraction: Basic
    - Solving for a variable in terms of other variables using multiplication or division: Basic
    - Solving for a variable in terms of other variables using addition or subtraction with division
    - U.S. Customary length conversions involving dimensional analysis
    - Converting between compound units: Basic
- Proportions and Applications Involving Percents (13 topics)
    - Solving a proportion of the form  $x/a=b/c$ : Basic
    - Solving a proportion of the form  $x/a = b/c$
    - Writing a proportion to solve a problem involving rates
    - Writing and solving a proportion to convert between metric and U.S. Customary units
    - Word problem on proportions: Problem type 1
    - Applying the percent equation: Problem type 1
    - Writing a proportion to solve a multi-step problem involving percentages
    - Finding the multiplier to give a final amount after a percentage increase or decrease
    - Finding the final amount given the original amount and a percentage increase or decrease
    - Finding the sale price given the original price and percent discount
    - Finding the percentage increase or decrease: Advanced
    - Finding the absolute error and percent error of a measurement
    - Introduction to compound interest
- Absolute Value Equations (4 topics)
    - Introduction to solving an absolute value equation
    - Solving an absolute value equation: Problem type 1
    - Solving an absolute value equation: Problem type 2
    - Solving an absolute value equation: Problem type 3
- Writing and Graphing Inequalities (6 topics)
    - Translating a sentence by using an inequality symbol
    - Translating a sentence into a one-step inequality
    - Introduction to identifying solutions to an inequality
    - Writing an inequality for a real-world situation
    - Graphing a linear inequality on the number line
    - Writing an inequality given a graph on the number line
- One-Step Linear Inequalities (6 topics)
    - Identifying solutions to a one-step linear inequality
    - Additive property of inequality with whole numbers
    - Additive property of inequality with integers
    - Multiplicative property of inequality with whole numbers
    - Multiplicative property of inequality with integers
    - Multiplicative property of inequality with signed fractions

- Multi-Step Linear Inequalities (7 topics)
  - Identifying solutions to a two-step linear inequality in one variable
  - Solving a two-step linear inequality with whole numbers
  - Solving a two-step linear inequality: Problem type 1
  - Solving a two-step linear inequality: Problem type 2
  - Solving a two-step linear inequality with a fractional coefficient
  - Solving a linear inequality with multiple occurrences of the variable: Problem type 1
  - Solving a linear inequality with multiple occurrences of the variable: Problem type 2
- Applications Involving Linear Inequalities (5 topics)
  - Writing, solving, and graphing the solution to a one-step inequality that models a real-world situation
  - Solving a word problem using a one-step linear inequality
  - Solving a word problem using a two-step linear inequality
  - Solving a decimal word problem using a two-step linear inequality
  - Solving a decimal word problem using a linear inequality with the variable on both sides
- Compound Inequalities (4 topics)
  - Translating a sentence into a compound inequality
  - Graphing a compound inequality on the number line
  - Solving a compound linear inequality: Graph solution, basic
  - Solving and graphing the solution to a compound inequality that models a real-world situation
- Absolute Value Inequalities (4 topics)
  - Solving an absolute value inequality: Problem type 1
  - Solving an absolute value inequality: Problem type 3
  - Solving an absolute value inequality: Problem type 4
  - Writing and solving an absolute value inequality that models a real-world situation and interpreting the solution
- The Coordinate Plane and Equations of Lines (68 topics)
  - Ordered Pairs (4 topics)
    - Reading a point in the coordinate plane
    - Plotting a point in the coordinate plane
    - Finding distances between points that share a common coordinate given the graph
    - Finding distances between points that share a common coordinate given their coordinates
  - Tables and Graphs of Lines (15 topics)
    - Function tables with two-step rules
    - Table for a linear equation
    - Writing a function rule given a table of ordered pairs: One-step rules
    - Identifying solutions to a linear equation in two variables
    - Finding the coordinates of a point on a graph given the equation
    - Finding a solution to a linear equation in two variables
    - Graphing a linear equation of the form  $y = mx$
    - Graphing a line given its equation in slope-intercept form: Integer slope
    - Graphing a line given its equation in slope-intercept form: Fractional slope
    - Graphing a line given its equation in standard form
    - Graphing a vertical or horizontal line
    - Finding x- and y-intercepts given the graph of a line on a grid
    - Finding x- and y-intercepts of a line given the equation: Basic
    - Graphing a line by first finding its x- and y-intercepts
    - Interpreting a line graph
  - Slope (7 topics)
    - Finding slope given the graph of a line in quadrant 1 that models a real-world situation
    - Classifying slopes given graphs of lines
    - Finding slope given the graph of a line on a grid
    - Finding slope given two points on a line
    - Finding the slopes of horizontal and vertical lines
    - Graphing a line given its slope and y-intercept
    - Graphing a line through a given point with a given slope
  - Equations of Lines (18 topics)
    - Identifying linear functions given ordered pairs
    - Finding the slope and y-intercept of a line given its equation in the form  $y = mx + b$
    - Finding the slope and y-intercept of a line given its equation in the form  $Ax + By = C$
    - Graphing a line by first finding its slope and y-intercept
    - Writing an equation of a line given its slope and y-intercept
    - Finding the slope and y-intercept given a table for a linear function
    - Finding the slope, y-intercept, and equation for a linear function given a table of values
    - Writing an equation in slope-intercept form given the slope and a point
    - Writing the equation of a line given the y-intercept and another point
    - Writing the equation of a line through two given points
    - Comparing linear functions to the parent function  $y = x$

- Identifying parallel and perpendicular lines
- 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
- Applications of Linear Equations with Two Variables (14 topics)
  - Finding outputs of a one-step function that models a real-world situation: Two variable equation
  - Finding outputs of a two-step function with decimals that models a real-world situation: Two variable equation
  - Writing and evaluating a function that models a real-world situation: Basic
  - Writing a linear equation that models a real-world situation given a graph or a table of values
  - Writing an equation and drawing its graph to model a real-world situation: Advanced
  - Finding the intercepts and rate of change given a graph of a linear function
  - Finding the initial amount and rate of change given a table for a linear function
  - Finding the initial amount and rate of change given two points for a linear function
  - Combining functions to write a new function that models a real-world situation
  - Comparing properties of linear functions given in different forms
  - Interpreting the parameters of a linear function that models a real-world situation
  - Application problem with a linear function: Finding a coordinate given the slope and a point
  - Application problem with a linear function: Finding a coordinate given two points
  - Solving a linear equation by graphing
- Scatter Plots and Lines of Best Fit (10 topics)
  - Constructing a scatter plot
  - Sketching the line of best fit
  - Scatter plots and correlation
  - Predictions from the line of best fit
  - Approximating the equation of a line of best fit and making predictions
  - [Using technology to fit a linear regression model to data and to make a prediction](#) NEW
  - Computing residuals
  - Interpreting residual plots
  - Linear relationship and the correlation coefficient
  - Identifying correlation and causation
- Functions and Systems (56 topics)
  - Introduction to Functions (7 topics)
    - Identifying functions from relations
    - Vertical line test
    - Domain and range from ordered pairs
    - Table for a linear function
    - Evaluating functions: Linear and quadratic or cubic
    - Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
    - Domain and range of a linear function that models a real-world situation
  - Arithmetic Sequences (9 topics)
    - Finding the first terms of an arithmetic sequence using an explicit rule
    - Finding the next terms of an arithmetic sequence with whole numbers
    - Finding the next terms of an arithmetic sequence with integers
    - Finding the first terms of a sequence using a recursive rule
    - Identifying arithmetic sequences and finding the common difference
    - Finding a specified term of an arithmetic sequence given the first terms
    - Finding a specified term of an arithmetic sequence given the common difference and first term
    - Writing an explicit rule for an arithmetic sequence
    - Writing a recursive rule for an arithmetic sequence
  - Graphs of Functions (11 topics)
    - Finding an output of a function from its graph
    - Finding and interpreting an output of a linear function given a graph that models a real-world situation
    - Finding domain and range from a linear graph in context
    - Interpreting the domain and range of a linear function in context
    - Finding where a function is increasing, decreasing, or constant given the graph
    - Choosing a graph to fit a narrative: Basic
    - Choosing a graph to fit a narrative: Advanced
    - Drawing a graph to fit a narrative
    - Determining if a function is linear given its graph
    - Graphing a parabola of the form  $y = ax^2$
    - Finding the average rate of change of a function given its graph
  - Systems of Linear 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
- Solving a system of linear equations of the form  $y = mx + b$
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with addition
- Solving a system of linear equations using elimination with multiplication and addition
- Solving a system of linear equations with fractional coefficients
- Solving a system of linear equations with decimal coefficients
- Solving systems of linear equations with 0, 1, or infinitely many solutions
- Identifying the operations used to create equivalent systems of equations
- Applications Involving Systems of Linear Equations (7 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  $Ax + By = C$
  - Writing and solving a system of two linear equations given a table of values
  - Solving a word problem using a system of linear equations of the form  $y = mx + b$
  - Solving a value mixture problem using a system of linear equations
  - Solving a distance, rate, time problem using a system of linear equations
- Linear Inequalities with Two Variables (4 topics)
  - Identifying solutions to a linear inequality in two variables
  - Graphing a linear inequality in the plane: Vertical or horizontal line
  - Graphing a linear inequality in the plane: Slope-intercept form
  - Graphing a linear inequality in the plane: Standard form
- Systems of Linear Inequalities (5 topics)
  - Graphing a system of two linear inequalities: Basic
  - Graphing a system of two linear inequalities: Advanced
  - Writing a linear inequality in two variables given a table of values
  - Writing a multi-step inequality for a real-world situation
  - Writing a system of linear inequalities that models a real-world situation and determining possible solutions
- Exponents and Exponential Functions (35 topics)
  - Product, Power, and Quotient Rules (4 topics)
    - Introduction to the product rule of exponents
    - Introduction to the power of a power rule of exponents
    - Simplifying a ratio of multivariate monomials: Basic
    - Introduction to the quotient rule of exponents
  - Negative Exponents (5 topics)
    - Evaluating expressions with exponents of zero
    - Evaluating an expression with a negative exponent: Whole number base
    - Evaluating an expression with a negative exponent: Positive fraction base
    - Evaluating an expression with a negative exponent: Negative integer base
    - Power of a power rule with negative exponents
  - Introduction to Radicals (1 topics)
    - Introduction to square root addition or subtraction
  - Graphs of Exponential Functions (6 topics)
    - Table for an exponential function
    - Graphing an exponential function:  $f(x) = b^x$
    - Graphing an exponential function:  $f(x) = a(b)^x$
    - Translating the graph of an exponential function
    - Finding domain and range from the graph of an exponential function
    - Choosing the graph for an exponential function and identifying key features
  - Applications of Exponential Functions (10 topics)
    - Using a calculator to evaluate exponential expressions
    - Evaluating an exponential function that models a real-world situation
    - Finding a final amount in a word problem on exponential growth or decay
    - Finding the initial amount and rate of change given an exponential function
    - Writing an equation that models exponential growth or decay
    - Writing an exponential function rule given a table of ordered pairs
    - Choosing an exponential model and using it to make a prediction
    - [Using technology to determine the better regression model for a given data set and using that model to make a prediction: Linear and exponential](#)
    - NEW
    - Solving an exponential equation by finding common bases: Linear exponents
    - Comparing linear, polynomial, and exponential functions

- Geometric Sequences (9 topics)
  - Finding the first terms of a geometric sequence using an explicit rule
  - Finding the next terms of a geometric sequence with whole numbers
  - Finding the next terms of a geometric sequence with signed numbers
  - Identifying geometric sequences and finding the common ratio
  - Finding a specified term of a geometric sequence given the first terms
  - Finding a specified term of a geometric sequence given the common ratio and first term
  - Arithmetic and geometric sequences: Identifying and writing an explicit rule
  - Writing recursive rules for arithmetic and geometric sequences
  - Identifying linear, quadratic, and exponential functions given ordered pairs
- Data Analysis (24 topics)
  - 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
    - Constructing a frequency distribution and a histogram
    - Interpreting a histogram
    - Measuring an angle with the protractor
    - Interpreting a Venn diagram of 2 sets
  - Measures of Center and Spread (7 topics)
    - Range of a data set
    - How changing a value affects the range and IQR
    - Mean of a data set
    - Weighted mean
    - Mean and median of a data set
    - How changing a value affects the mean and median
    - Choosing the best measure to describe data
  - Comparing Data (6 topics)
    - Using back-to-back stem-and-leaf plots to compare data sets
    - Five-number summary and interquartile range
    - Interpreting a box-and-whisker plot
    - Interpreting a box-and-whisker plot: Problem type 2
    - Constructing a box-and-whisker plot
    - Using box-and-whisker plots to compare data sets
- Segments, Lines, and Angles (31 topics)
  - Points, Lines, and Planes (3 topics)
    - Naming segments, rays, and lines
    - Identifying congruent shapes on a grid
    - Matching basic geometric terms with their definitions
  - Distances and Midpoints on a Number Line (3 topics)
    - Introduction to segment addition
    - Midpoint of a number line segment: Integers
    - Segment addition and midpoints
  - Distances and Midpoints in the Coordinate Plane (4 topics)
    - Distance between two points in the plane: Exact answers
    - Identifying congruent segments in the plane
    - Midpoint of a line segment in the plane
    - Finding an endpoint of a line segment given the other endpoint and the midpoint
  - Angles (12 topics)
    - Drawing an angle with the protractor
    - Acute, obtuse, and right angles
    - Naming angles, sides of angles, and vertices
    - Introduction to angle addition
    - Finding the complement or supplement of an angle given a figure
    - Solving an equation involving complementary or supplementary angles
    - Writing and solving an equation involving complementary or supplementary angles
    - Angle addition with relationships between angles
    - Angle addition and angle bisectors
    - Identifying linear pairs and vertical angles

- Finding angle measures given two intersecting lines
  - Solving equations involving vertical angles and linear pairs
- Segment and Angle Constructions (4 topics)
  - Constructing congruent line segments
  - Constructing an angle bisector
  - Constructing congruent angles
  - Constructing the perpendicular bisector of a line segment
- Parallel Lines and Transversals (5 topics)
  - Identifying corresponding and alternate angles
  - Finding angle measures given two parallel lines cut by a transversal
  - Solving equations involving angles and a pair of parallel lines
  - Constructing a pair of perpendicular lines
  - Constructing a pair of parallel lines
- Triangles and Quadrilaterals (21 topics)
  - Classifying Triangles (4 topics)
    - Acute, obtuse, and right triangles
    - Classifying scalene, isosceles, and equilateral triangles by side lengths
    - Identifying coordinates that give right triangles
    - Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
  - Angles of Triangles (4 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 angle measures of a triangle given angles with variables
  - Congruent Triangles (4 topics)
    - Identifying transformations
    - Determining if figures are related by rigid motions
    - Examining triangle congruence in terms of rigid motion
    - Exploring the triangle congruence theorems
  - Isosceles and Equilateral Triangles (2 topics)
    - Finding side lengths and angle measures of isosceles and equilateral triangles
    - Finding angle measures of an isosceles triangle given angles with variables
  - Triangle Constructions and Triangle Inequalities (3 topics)
    - Creating triangles from given side lengths: Problem type 1
    - Drawing triangles with given conditions: Side lengths and angle measures
    - Drawing a circle with a given radius or diameter
  - Quadrilaterals (4 topics)
    - Identifying parallelograms, rectangles, and squares
    - Properties of quadrilaterals
    - Proving that a quadrilateral with given vertices is a parallelogram
    - Classifying parallelograms in the coordinate plane
- Similarity and Transformations (40 topics)
  - Similar Figures (2 topics)
    - Identifying similar or congruent shapes on a grid
    - Finding a missing side length given two similar triangles
  - Proofs Involving Triangle Similarity (1 topics)
    - Proving the slope criterion for parallel or perpendicular lines
  - 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
    - Understanding the definition of a translation
  - Reflections (8 topics)
    - Reflecting a point across an axis
    - Reflecting a point across an axis and giving its coordinates
    - Finding the coordinates of a point reflected across an axis
    - Reflecting a polygon across the x-axis or y-axis
    - Properties of reflected figures



- Determining if figures are related by a reflection
- Reflecting a polygon over a vertical or horizontal line
- Understanding the definition of a reflection
- Rotations (5 topics)
  - Rotating a point and giving its coordinates
  - Properties of rotated figures
  - Determining if figures are related by a rotation
  - Rotating a figure about the origin
  - Understanding the definition of a rotation
- Symmetry (3 topics)
  - Drawing lines of symmetry
  - Finding an angle of rotation
  - Identifying rotational symmetry and angles of rotation
- Congruence Transformations (7 topics)
  - Writing a rule to describe a translation
  - Writing a rule to describe a reflection
  - Writing a rule to describe a rotation
  - Identifying transformations that map a quadrilateral onto itself
  - Identifying transformations that map a regular polygon onto itself
  - Determining if figures are congruent and related by a transformation
  - Determining if figures are congruent and related by a sequence of transformations
- Dilations (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
  - Dilating a figure
  - Performing a composition of dilations NEW
  - Performing a composition consisting of a rigid transformation and a dilation NEW
  - Writing a rule to describe a dilation
- Area, Volume, and Circles (7 topics)
  - Areas of Various Polygons (5 topics)
    - Area of a parallelogram
    - Area of a triangle
    - Finding the perimeter or area of a rectangle in the coordinate plane
    - Finding the perimeter of a triangle, trapezoid, or parallelogram in the coordinate plane
    - Finding the area of a triangle or parallelogram in the coordinate plane
  - Inscribed Angles and Polygons (2 topics)
    - Inscribing an equilateral triangle or a regular hexagon in a circle
    - Inscribing a square in a circle
- Other Topics Available(\*) (831 additional topics)
  - Arithmetic Readiness (73 topics)
    - Factors
    - Prime numbers
    - Prime factorization
    - Prime factorization: Exponent notation NEW
    - Greatest common factor of 2 numbers
    - Greatest common factor of 3 numbers
    - Least common multiple of 2 numbers
    - Least common multiple of 3 numbers
    - Finding the LCD of two fractions
    - Addition or subtraction of fractions with the same denominator
    - Word problem involving addition or subtraction of fractions with different denominators
    - Multiplication of 3 fractions
    - Word problem involving fractions and multiplication
    - The reciprocal of a number
    - Division involving a whole number and a fraction
    - Fraction division
    - Complex fraction without variables: Problem type 1
    - Word problem involving fractions and division
    - Writing an improper fraction as a mixed number
    - Writing a mixed number as an improper fraction
    - Mixed number addition with the same denominator and renaming
    - Mixed number subtraction with the same denominator and renaming

- Addition or subtraction of mixed numbers with different denominators without renaming
- Addition of mixed numbers with different denominators and renaming
- Subtraction of mixed numbers with different denominators and renaming
- Word problem involving addition or subtraction of mixed numbers with different denominators
- Mixed number multiplication
- Multiplication of a mixed number and a whole number
- Division with a mixed number and a whole number
- Mixed number division
- Word problem involving multiplication or division with mixed numbers
- Fractional position on a number line
- Plotting fractions on a number line
- Using a common denominator to order fractions
- Reading decimal position on a number line: Tenths
- Reading decimal position on a number line: Hundredths
- Introduction to ordering decimals
- Ordering decimals
- Using a calculator to convert a fraction to a rounded decimal
- Ordering fractions and decimals
- Addition of aligned decimals
- Decimal addition with 3 numbers
- Word problem with addition of 3 or 4 decimals and whole numbers
- Introduction to decimal multiplication
- Decimal multiplication: Problem type 1
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Basic
- Converting a fraction to a repeating decimal: Advanced
- Converting a decimal to a proper fraction in simplest form: Basic
- Converting a decimal to a proper fraction in simplest form: Advanced
- Writing ratios using different notations
- Writing ratios for real-world situations
- Simplifying a ratio of whole numbers: Problem type 1
- Using tables to compare ratios
- Finding a unit price
- Computing unit prices to find the better buy
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers
- Representing benchmark percentages on a grid
- Converting between percentages and decimals in a real-world situation
- Converting a percentage to a fraction in simplest form
- Using a calculator to convert a fraction to a rounded percentage
- Finding a percentage of a total amount: Real-world situations
- Finding a percentage of a total amount without a calculator: Sales tax, commission, discount
- Writing a ratio as a percentage
- Finding the rate of a tax or commission
- Measuring length to the nearest inch
- Measuring length to the nearest quarter or half inch
- Conversions involving measurements in feet and inches
- Word problem involving a U.S. Customary length conversion
- Measuring length to the nearest centimeter
- Measuring length to the nearest millimeter
- Metric distance conversion with whole number values
- Conversions with currency
- Real Numbers (63 topics)
  - Plotting opposite integers on a number line
  - Plotting rational numbers on a number line
  - Comparing integers using a number line
  - Using a number line to compare signed numbers in context
  - Using a calculator to approximate a square root
  - Approximating the location of irrational numbers on a number line
  - Ordering real numbers
  - Interpreting absolute values in context as distances from zero
  - Identifying a sum as a point located a given distance from another point
  - Identifying relative change when combining two quantities
  - Addition and subtraction with 4 or 5 integers
  - Word problem with addition or subtraction of integers
  - Operations with absolute value: Problem type 2
  - Finding the distance between two rational numbers on a number line in context
  - Signed fraction subtraction involving double negation
  - Signed fraction division
  - Signed decimal multiplication
  - Signed decimal division
  - Writing expressions using exponents
  - Power of 10: Positive exponent
  - Order of operations with whole numbers and grouping symbols

- Order of operations with whole numbers and exponents: Advanced
- Order of operations with fractions: Problem type 1
- Order of operations with fractions: Problem type 2
- 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
- Exponents and integers: Problem type 2
- Order of operations with integers and exponents
- Evaluating an algebraic expression: Whole number addition or subtraction
- Evaluating an algebraic expression: Whole number multiplication or division
- Evaluating an algebraic expression: Whole number operations and exponents
- Converting between temperatures in Fahrenheit and Celsius
- Evaluating a linear expression: Signed fraction multiplication with addition or subtraction
- Identifying numbers as integers or non-integers
- Identifying rational decimal numbers
- Identifying true statements about rational and irrational numbers
- Identifying numbers as rational or irrational
- Identifying like terms
- Introduction to properties of addition
- Properties of addition
- Introduction to adding fractions with variables and common denominators
- Introduction to the distributive property
- Understanding the distributive property
- Introduction to properties of multiplication
- Properties of real numbers
- Introduction to factoring with numbers
- Factoring a linear binomial
- Identifying properties used to simplify an algebraic expression
- Using distribution with double negation and combining like terms to simplify: Multivariate
- Finding the missing length in a figure
- Perimeter of a piecewise rectangular figure
- Writing algebraic expressions for the perimeter of a figure
- Distinguishing between the area and perimeter of a rectangle
- Areas of rectangles with the same perimeter
- Area of a piecewise rectangular figure
- Area between two rectangles
- Writing algebraic expressions for the area of a figure
- Word problem involving the area of a rectangle: Problem type 2
- Word problem involving the area between two rectangles
- U.S. Customary area unit conversion with whole number values
- Word problem on area involving conversions of U.S. Customary units: Problem type 1
- Linear Equations and Inequalities (91 topics)
  - Additive property of equality with fractions and mixed numbers
  - Multiplicative property of equality with whole numbers: Fractional answers
  - Solving an equation to find the value of an expression
  - Solving a multi-step equation given in fractional form
  - Solving a two-step equation with signed decimals
  - Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
  - Clearing fractions in an equation
  - Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
  - Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
  - Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
  - Solving equations with zero, one, or infinitely many solutions
  - Solving a fraction word problem using a linear equation of the form  $Ax = B$
  - Choosing stories that can be represented by given one-step equations
  - Comparing arithmetic and algebraic solutions to a word problem
  - Choosing stories that can be represented by given two-step equations
  - Writing an equation of the form  $A(x + B) = C$  to solve a word problem
  - Writing and solving a real-world problem given an equation with the variable on both sides
  - Writing a multi-step equation for a real-world situation
  - Solving a decimal word problem using a linear equation with the variable on both sides
  - Solving a fraction word problem using a linear equation with the variable on both sides
  - Solving a word problem with three unknowns using a linear equation
  - Solving a word problem involving consecutive integers
  - Solving a value mixture problem using a linear equation
  - Solving a word problem involving rates and time conversion
  - Solving a distance, rate, time problem using a linear equation
  - Finding side lengths of squares given an area and a perimeter
  - Finding side lengths of rectangles given one dimension and an area or a perimeter
  - Word problem on optimizing an area or perimeter
  - Finding the dimensions of a rectangle given its perimeter and a relationship between sides
  - Finding the perimeter or area of a rectangle given one of these values

- Finding a side length given the perimeter and side lengths with variables
- Solving for a variable in terms of other variables using addition or subtraction: Advanced
- Solving for a variable in terms of other variables using multiplication or division: Advanced
- 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
- Converting between metric and U.S. Customary unit systems using dimensional analysis: U.S. Customary to metric
- **Converting between metric and U.S. Customary unit systems using dimensional analysis: Metric to U.S. Customary** NEW
- Word problem involving U.S. Customary length conversions using dimensional analysis
- Converting between compound units: Advanced
- Word problem involving conversion between compound units using dimensional analysis
- Solving a proportion of the form  $(x+a)/b = c/d$
- Solving a proportion of the form  $a/(x+b) = c/x$
- Introduction to solving a rational equation
- Solving a rational equation that simplifies to linear: Denominator  $x$
- Word problem on proportions: Problem type 2
- Finding the total amount given the percentage of a partial amount
- 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 amount given the result of a percentage increase or decrease
- Finding the original price given the sale price and percent discount
- Finding the percentage increase or decrease: Basic
- Solving a percent mixture problem using a linear equation
- Finding simple interest without a calculator
- Finding the interest and future value of a simple interest loan or investment
- Solving an absolute value equation: Problem type 4
- Writing an absolute value equation to solve a word problem and describing the solution
- Calculating income tax
- Comparing discounts
- Examining a savings plan for college
- Calculations involving paying for college
- Comparing total costs for attending different colleges
- Distinguishing between fixed and variable expenses
- Computing percentages for categories of a budget
- Computations involving cost of living and hourly wage
- Comparing annual salaries of different occupations
- Calculations involving purchases with debit and credit cards
- Comparing costs of checking accounts
- Balancing a check register
- Reading a credit report
- Understanding the impact of a credit score
- **Determining the value of credit reports to borrowers and lenders** NEW  
**Deciding when it is applicable to pay with cash or credit and examining the advantages and disadvantages of different payment methods**
- NEW Computing a person's net worth
- Calculating and comparing monthly payments using the ALEKS loan calculator
- Calculating monthly payment, total payment, and interest using the ALEKS loan calculator
- Calculating and comparing total loan payments using the ALEKS loan calculator
- Calculating and comparing simple interest and compounding interest
- Writing sets of integers using set-builder and roster forms
- Union and intersection of finite sets
- Additive property of inequality with signed fractions
- Additive property of inequality with signed decimals
- Solving a linear inequality with multiple occurrences of the variable: Problem type 3
- Solving inequalities with no solution or all real numbers as solutions
- Solving a word problem involving area using a one-step linear inequality: Area and lengths
- Translating a sentence into a multi-step inequality
- Solving a word problem using a two-step linear inequality and describing the solution
- Writing a compound inequality given a graph on the number line
- Solving a compound linear inequality: Graph solution, advanced
- Writing an absolute value inequality given a graph on the number line
- Solving an absolute value inequality: Problem type 2
- Solving an absolute value inequality: Problem type 5
- The Coordinate Plane and Equations of Lines (42 topics)
  - 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
  - Plotting points that share a coordinate and using absolute value to find the distance between them
  - Writing a function rule given a table of ordered pairs: Two-step rules
  - Making a table and plotting points given a unit rate
  - Finding x- and y-intercepts of a line given the equation: Advanced
  - Graphing a line given its x- and y-intercepts
  - Identifying proportional relationships in tables by calculating unit rates: Whole numbers

- Determining whether a relationship is proportional given a real-world situation
  - Identifying proportional relationships in graphs: Basic
  - 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
  - Comparing proportional relationships given in different forms
  - Finding the coordinate that yields a given slope
  - Deriving the slope formula (NEW)
  - Identifying linear equations: Basic
  - Identifying linear equations: Advanced
  - Rewriting a linear equation in the form  $Ax + By = C$
  - Writing an equation and graphing a line given its slope and y-intercept
  - Finding the slope and a point on a line given its equation in point-slope form
  - Graphing a line given its equation in point-slope form
  - Writing the equation of a line in point-slope form given the slope and a point
  - Writing the equation of a line in standard form given the slope and a point
  - Writing the equations of vertical and horizontal lines through a given point
  - Deriving the equation of a line through the origin (NEW)
  - Deriving the equation of a line not going through the origin (NEW)
  - Finding inputs and outputs of a two-step function that models a real-world situation: Two variable equation
  - Writing and evaluating a function that models a real-world situation: Advanced
  - Graphing ordered pairs and writing an equation from a table of values in context
  - Writing an equation and drawing its graph to model a real-world situation: Basic
  - Graphing a linear function that models a simple interest situation and identifying key features (NEW)
  - Identifying independent and dependent quantities from tables and graphs
  - Identifying independent and dependent variables from equations or real-world situations
  - 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
  - Classifying linear and nonlinear relationships from scatter plots
  - Using technology to calculate the correlation coefficients for two sets of bivariate data to compare the linear relationships (NEW)
  - Identifying outliers and clustering in scatter plots
- Functions and Systems (67 topics)
- Identifying functions given a verbal description (NEW)
  - Variable expressions as inputs of functions: Problem type 1
  - Evaluating a piecewise-defined function
  - Finding outputs of a one-step function that models a real-world situation: Function notation
  - Finding inputs and outputs of a two-step function that models a real-world situation: Function notation
  - Finding patterns in shapes
  - Finding inputs and outputs of a function from its graph
  - Domain and range from the graph of a discrete relation
  - Finding intercepts of a nonlinear function given its graph
  - Finding local maxima and minima of a function given the graph
  - Graphing an integer function and finding its range for a given domain
  - Graphing a function of the form  $f(x) = ax + b$ : Integer slope
  - Graphing a function of the form  $f(x) = ax + b$ : Fractional slope
  - Graphing an absolute value equation 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  $y = ax^2 + c$
  - Graphing a function of the form  $f(x) = ax^2$
  - Graphing a function of the form  $f(x) = ax^2 + c$
  - Graphing a parabola of the form  $y = (x-h)^2 + k$
  - Classifying function types given graphs of functions: Linear, exponential, and quadratic (NEW)
  - Classifying function types given graphs of functions: Absolute value, cubic, square root, and cubic root (NEW)
  - Classifying function types given equations of functions: Problem type 1 (NEW)
  - Classifying function types given equations of functions: Problem type 2 (NEW)
  - Graphing a piecewise-defined function: Problem type 1
  - Introduction to graphing a piecewise-defined function involving lines with non-zero slope
  - Graphing a piecewise-defined function: Problem type 2
  - Finding the average rate of change of a function given its equation
  - Word problem involving average rate of change
  - Translating the graph of a parabola: One step
  - Translating the graph of a parabola: Two steps
  - How the leading coefficient affects the shape of a parabola
  - Graphing quadratic functions of the form  $y=ax^2$  and  $y=(bx)^2$  by transforming the parent graph  $y=x^2$
  - Translating the graph of an absolute value function: One step
  - Translating the graph of an absolute value function: Two steps
  - How the leading coefficient affects the graph of an absolute value function

- Classifying systems of linear equations from graphs
  - Using a graphing calculator to solve a system of linear equations: Basic
  - Using a graphing calculator to solve a system of linear equations: Advanced
  - Writing a system of linear equations given its graph
  - Introduction to solving a 3x3 system of linear equations
  - Solving a 3x3 system of linear equations: Problem type 1
  - Solving a 3x3 system of linear equations: Problem type 2
  - Scalar multiplication of a matrix
  - Addition or subtraction of matrices
  - Linear combination of matrices
  - Multiplication of matrices: Basic
  - Squaring and multiplying 2x2 matrices
  - Multiplication of matrices: Advanced
  - Word problem involving multiplication of matrices
  - Completing Gauss-Jordan elimination with a 2x2 matrix
  - Gauss-Jordan elimination with a 2x2 matrix
  - Completing Gauss-Jordan elimination with a 3x3 matrix
  - Writing solutions to 3x3 systems of linear equations from augmented matrices
  - Solving a system of linear equations given its augmented matrix
  - Finding the inverse of a 2x2 matrix
  - Finding the inverse of a 3x3 matrix
  - Solving a word problem involving a system of linear equations by graphing and estimating a solution
  - [Writing and solving a system of two linear equations given a verbal description](#) (NEW)
  - Solving a percent mixture problem using a system of linear equations
  - Solving a tax rate or interest rate problem using a system of linear equations
  - Solving a word problem using a 3x3 system of linear equations: Problem type 1
  - 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 three linear inequalities
  - Solving a word problem using a system of linear inequalities: Problem type 1
  - Solving a word problem using a system of linear inequalities: Problem type 2
- Exponents and Exponential Functions (75 topics)
    - Introduction to the product rule with positive exponents: Whole number base
    - Understanding the product rule of exponents
    - Product rule with positive exponents: Univariate
    - Product rule with positive exponents: Multivariate
    - Introduction to the power of a power rule with positive exponents: Whole number base
    - Ordering numbers with positive exponents
    - Understanding the power rules 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
    - Introduction to the quotient rule with positive exponents: Whole number base
    - 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
    - Power of 10: Negative exponent
    - Ordering numbers with negative exponents
    - Rewriting an algebraic expression without a negative exponent
    - Introduction to the product rule with negative exponents: Whole number base
    - Introduction to the product rule with negative exponents
    - Product rule with negative exponents
    - Introduction to the quotient rule with negative exponents: Whole number base
    - Quotient rule with negative exponents: Problem type 1
    - Quotient rule with negative exponents: Problem type 2
    - Introduction to the power of a power rule with negative exponents: Whole number base
    - Power rules with negative exponents
    - Power and quotient rules with negative exponents: Problem type 1
    - Power and quotient rules with negative exponents: Problem type 2
    - Power, product, and quotient rules with negative exponents
    - Finding all square roots of a number
    - Estimating a square root
    - Square root of a rational perfect square
    - Square roots of perfect squares with signs
    - Cube root of an integer
    - Order of operations with exponents and radicals
    - Finding  $n^{\text{th}}$  roots of perfect  $n^{\text{th}}$  powers with signs
    - Simplifying the square root of a whole number less than 100
    - Simplifying the square root of a whole number greater than 100
    - Introduction to square root multiplication
    - Square root multiplication: Basic

- Square root multiplication: Advanced
  - Simplifying a quotient of square roots
  - Rationalizing a denominator: Quotient involving square roots
  - Classifying sums and products as rational or irrational
  - Converting between radical form and exponent form
  - Using the properties of integer exponents to define rational exponents
  - Rational exponents: Unit fraction exponents and whole number bases
  - Rational exponents: 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
  - 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
  - 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
  - Graphing an exponential function and its asymptote:  $f(x)=b^x$
  - Graphing an exponential function and its asymptote:  $f(x) = a(b)^x$
  - Graphing an exponential function and its asymptote:  $f(x) = b^{-x}$  or  $f(x) = -b^x$  or  $f(x) = -b^{-x}$
  - Finding the initial amount and asymptote given a graph of an exponential function
  - Finding the final amount in a word problem on compound interest
  - Finding the future value and interest for an investment earning compound interest
  - Finding the present value of an investment earning compound interest
  - Identifying arithmetic and geometric sequences
- Data Analysis (33 topics)
    - Identifying statistical questions
    - Choosing an appropriate method for gathering data: Problem type 1
    - Choosing an appropriate method for gathering data: Problem type 2
    - Finding if a question can be answered by the data
    - Constructing a bar graph for non-numerical data
    - Interpreting a bar graph
    - Interpreting a double bar graph
    - Interpreting a stem-and-leaf plot
    - Constructing a stem-and-leaf plot NEW
    - Interpreting a circle graph or pie chart
    - Finding a percentage of a total amount in a circle graph
    - Angle measure in a circle graph
    - Mode of a data set
    - Finding the mode and range from a line plot
    - Interpreting a percent bar graph to summarize categorical data using the mode NEW
    - Using a model to find the mean
    - Understanding the mean graphically: Two bars
    - Understanding the mean graphically: Four or more bars
    - Finding the mean of a symmetric distribution
    - 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
    - Finding outliers in a data set
    - Identifying peaks, symmetry, gaps, and clusters in a line plot
    - Identifying the center, spread, and shape of a data set
    - Computing mean absolute deviation from a list of numerical values
    - Percentiles
    - Population standard deviation
    - Comparing measures of center and variation
    - Finding sample size and comparing samples for estimating the mean
    - Comparing sample means
    - Using the graph of a distribution to find probabilities: Basic
    - Using the empirical rule to identify values and percentages of a normal distribution
    - Word problem involving calculations from a normal distribution
- Segments, Lines, and Angles (55 topics)
    - Analyzing relationships between points, lines, and planes given a figure
    - Computing distances between decimals on a number line
    - Finding a point on a number line given the length of a segment and another point

- Midpoint of a number line segment: Decimals
  - Using a segment's midpoint and endpoint to locate the other endpoint
  - Finding a point that partitions a number line segment in a given fractional relationship
  - Finding a point that partitions a number line segment in a given ratio
  - Distance between two points in the plane: Decimal answers
  - Deriving the distance formula using the Pythagorean Theorem (NEW)
  - Deriving the midpoint formula on the coordinate plane using previous knowledge about midpoint on a number line (NEW)
  - Finding a point that partitions a segment in the plane in a given fractional relationship
  - Finding a point that partitions a segment in the plane in a given ratio
  - Finding the weighted average of two points on a line segment in the plane (NEW)
  - Finding supplementary and complementary angles
  - Writing and solving an equation involving adjacent angles (NEW)
  - Writing and solving an equation involving vertical angles
  - Making conjectures given a geometric construction
  - Identifying statements
  - Identifying simple and compound statements
  - Negation of a statement
  - Conditional statements and negations
  - Symbolic translation of negations, conjunctions, and disjunctions: Basic
  - Symbolic translation of conditional and biconditional statements: Basic
  - The converse, inverse, and contrapositive of a conditional statement
  - Writing the converse, inverse, and contrapositive of a conditional statement and determining their truth values
  - Writing a biconditional statement as a conditional statement and its converse and determining truth values
  - Finding counterexamples to conjectures
  - Symbolic translation of negations, conjunctions, and disjunctions: Advanced
  - Using De Morgan's Laws to identify negations and equivalent statements
  - Symbolic translation involving three statements
  - Symbolic translation of conditional and biconditional statements: Advanced
  - Understanding quantifiers
  - Negation of a quantified statement
  - Introduction to truth tables with negations, conjunctions, or disjunctions
  - Truth tables with conjunctions or disjunctions
  - Completing rows of truth tables: Conjunctions and disjunctions
  - Using logic to test a claim: Conjunction or disjunction
  - Introduction to truth tables with conditional statements
  - Truth tables with conjunctions, disjunctions, and conditional statements
  - Identifying equivalent statements and negations of a conditional statement
  - Using logic to test a claim: Conditional statement, basic
  - Determining if statements are logically equivalent
  - Introduction to truth tables with biconditional statements
  - Using truth tables to determine the validity of an argument
  - Conditional statements and deductive reasoning
  - Validity of an argument
  - Translating an argument and determining its validity
  - Distinguishing between undefined terms, definitions, postulates, conjectures, and theorems
  - Introduction to proofs: Justifying statements
  - Proofs involving segment congruence
  - Proofs involving angle congruence
  - Solving equations involving angles and two pairs of parallel lines
  - Establishing facts about the angles created when parallel lines are cut by a transversal
  - Introduction to proofs involving parallel lines
  - Proofs involving parallel lines
- Triangles and Quadrilaterals (65 topics)
    - Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
    - 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
    - Identifying and naming congruent parts of congruent triangles
    - Completing proofs involving congruent triangles using SSS or SAS
    - Introduction to proving triangles congruent using SSS or SAS
    - Identifying and naming congruent triangles
    - Completing proofs involving congruent triangles using ASA or AAS
    - Introduction to proving triangles congruent using ASA or AAS
    - Proofs involving congruent triangles and segment or angle bisectors
    - Separating overlapping triangles and identifying common features
    - Proofs involving congruent triangles that overlap: Basic
    - Proofs involving congruent triangles with parallel or perpendicular segments
    - Determining when to apply the HL congruence property
    - Introduction to proving triangles congruent using the HL property
    - Introduction to proofs involving congruent triangles and CPCTC
    - Proofs involving congruent triangles, parallel or perpendicular segments, and CPCTC
    - Proofs involving congruent triangles that overlap: Advanced



- Finding an angle measure for a triangle sharing a side with another triangle
  - Proofs of theorems involving isosceles triangles
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem in three dimensions
  - 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
  - Identifying side lengths that give right triangles
  - Demonstrating the converse of the Pythagorean Theorem
  - Informal proof of the converse of the Pythagorean Theorem (NEW)
  - Classifying segments inside triangles
  - Using the circumcenter of a triangle to find segment lengths
  - Using the incenter of a triangle to find segment lengths and angle measures
  - Using the centroid of a triangle to find segment lengths
  - Verifying the Centroid Theorem (NEW)
  - Introduction to the triangle midsegment theorem
  - Proving the triangle midsegment theorem in the coordinate plane
  - Proof involving points on the perpendicular bisector of a line segment
  - Creating triangles from given side lengths: Problem type 2
  - Using triangle inequality to determine if side lengths form a triangle
  - Using triangle inequality to determine possible lengths of a third side
  - Determining if a triangle is possible based on given angle measures
  - Determining if given measurements define a unique triangle, more than one triangle, or no triangle
  - Drawing triangles with given conditions: Angle measures
  - Drawing triangles with given side lengths using a compass
  - Relationship between angle measures and side lengths in a triangle
  - Relationship between angle measures and side lengths in two triangles
  - Using the hinge theorem
  - Indirect proof (proof by contradiction)
  - Naming polygons
  - Sum of the angle measures of a quadrilateral
  - Classifying parallelograms
  - Finding measures involving diagonals of parallelograms
  - Investigating properties of diagonals of parallelograms (NEW)
  - Conditions for parallelograms
  - Finding measures involving diagonals of rectangles
  - Finding angle measures involving diagonals of a rhombus
  - Conditions for quadrilaterals
  - Completing proofs of theorems involving sides of a parallelogram
  - Completing proofs of theorems involving angles of a parallelogram
  - Drawing and identifying a polygon in the coordinate plane
  - Finding the coordinates of a point to make a parallelogram
  - Finding coordinates of vertices of polygons
- Similarity and Transformations (27 topics)
    - Finding angle measures of a triangle given two angles of a similar triangle
    - Relationships about ratios within and between similar triangles
    - Finding angle measures and side ratios to determine if two triangles are similar
    - Similar polygons
    - Similar right triangles
    - Indirect measurement
    - Triangles and parallel lines
    - Triangles and angle bisectors
    - Determining if figures are related by similarity transformations
    - Examining triangle similarity in terms of similarity transformations
    - Identifying and naming similar triangles
    - Proofs involving similar triangles
    - Completing proofs involving the triangle proportionality theorem
    - Identifying similar right triangles that overlap
    - Proving the Pythagorean Theorem using similar triangles
    - Using a translated point to find coordinates of other translated points
    - Reflecting a point across both coordinate axes
    - Finding the coordinates of a point reflected across both axes
    - Finding the coordinates of three points reflected over an axis
    - Finding the coordinates of a point reflected across an axis and translated
    - Identifying figures that have rotational symmetry or reflectional symmetry (NEW)
    - Rotational and point symmetries
    - The effect of dilation on area
    - Determining if figures are similar and related by a sequence of transformations
    - Exploring similarity of circles
    - Exploring the effect of dilation on lines
    - Identifying transformations and determining if they preserve congruent figures

- Area, Volume, and Circles (85 topics)
  - Word problem on population density
  - Finding the area of a right triangle using the Pythagorean Theorem
  - Computing an area using the Pythagorean Theorem
  - Area involving rectangles and triangles
  - [Decomposing a trapezoid or parallelogram to find its area given a situation in context](#) NEW
  - Area of a trapezoid
  - Area of a rhombus
  - Finding the area of a rhombus using the Pythagorean Theorem
  - Finding the area of a trapezoid, rhombus, or kite in the coordinate plane
  - Side lengths, perimeters, and areas of similar polygons
  - 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
  - Perimeter involving rectangles and circles
  - Area of a circle
  - Circumference and area of a circle
  - Circumference and area of a circle: Exact answers in terms of pi
  - Distinguishing between the area and circumference of a circle
  - Informal argument for the formula of the area of a circle
  - Area involving rectangles and circles
  - Classifying solids
  - Vertices, edges, and faces of a solid
  - Identifying geometric shapes that model real-world objects
  - 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
  - Identifying solids generated by rotations of two-dimensional regions
  - 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
  - [Deriving the formula for the surface area of a rectangular prism](#) NEW
  - Word problem involving the surface area of a rectangular prism
  - Word problem involving U.S. Customary conversions, surface area, and cost
  - 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
  - [Deriving the formula for the surface area of a right triangular prism](#) NEW
  - Surface area of a cylinder
  - Surface area of a cylinder: Exact answers in terms of pi
  - [Deriving the formula for the surface area of a cylinder](#) NEW
  - Volume of a rectangular prism
  - Writing equivalent expressions for the volume of a rectangular prism
  - Distinguishing between surface area and volume
  - Solving problems involving the volume of a rectangular prism in context
  - Word problem involving the volume of a rectangular prism
  - Word problem involving the rate of filling or emptying a rectangular prism
  - Computations involving density, mass, and volume
  - Word problem on density involving the volume of a rectangular solid
  - Volume of a piecewise rectangular prism
  - 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
  - Describing the formula for the volume of a cylinder
  - Informal argument for the formula of the volume of a cylinder
  - Word problem involving the volume of a cylinder
  - Word problem involving the rate of filling or emptying a cylinder
  - Word problem on density involving the volume of a cylindrical solid
  - Volume of a pyramid
  - Relating the volumes of a rectangular prism and a rectangular pyramid
  - Relating the volumes of a triangular prism and a triangular pyramid
  - Volume of a cone
  - Volume of a cone: Exact answers in terms of pi
  - Informal argument for the formula of the 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
  - Identifying chords, secants, and tangents of a circle
  - Tangents of a circle: Problem type 1
  - Tangents of a circle: Problem type 2

- Constructing a tangent of a circle
- Naming and finding measures of central angles, inscribed angles, and arcs of a circle
- Applying properties of radii, diameters, and chords
- Central angles and inscribed angles of a circle
- Central angles and angles involving chords and tangents of a circle
- Inscribed angles in relation to a diameter or a polygon inscribed in a circle
- Inscribed angles and angles involving chords and tangents of a circle
- Establishing facts about a quadrilateral inscribed in a circle
- Inscribing a circle in a triangle
- Circumscribing a circle about a triangle
- Angles of intersecting secants and tangents
- Lengths of chords, secants, and tangents
- Polynomials and Quadratic Functions (105 topics)
  - Degree and leading coefficient of a univariate polynomial
  - Degree of a multivariate polynomial
  - Simplifying a sum or difference of two univariate polynomials
  - Simplifying a sum or difference of three univariate polynomials
  - Simplifying a sum or difference of multivariate polynomials
  - Multiplying a univariate polynomial by a monomial with a positive coefficient
  - Multiplying a univariate polynomial by a monomial with a negative coefficient
  - Multiplying a multivariate polynomial by a monomial
  - Multiplying binomials with leading coefficients of 1
  - Multiplying binomials with leading coefficients greater than 1
  - Multiplying binomials in two variables
  - Multiplying conjugate binomials: Univariate
  - Multiplying conjugate binomials: Multivariate
  - Squaring a binomial: Univariate
  - Squaring a binomial: Multivariate
  - Multiplying binomials with negative coefficients
  - Multiplication involving binomials and trinomials in one variable
  - Multiplication involving binomials and trinomials in two variables
  - Introduction to the GCF of two monomials
  - Greatest common factor of three univariate monomials
  - Greatest common factor of two multivariate monomials
  - Factoring out a monomial from a polynomial: Univariate
  - Factoring out a monomial from a polynomial: Multivariate
  - Factoring out a binomial from a polynomial: GCF factoring, basic
  - Factoring a univariate polynomial by grouping: Problem type 1
  - Factoring a univariate polynomial by grouping: Problem type 2
  - Factoring a multivariate polynomial by grouping: Problem type 1
  - Factoring a multivariate polynomial by grouping: Problem type 2
  - Factoring a quadratic with leading coefficient 1
  - Factoring a quadratic in two variables with leading coefficient 1
  - Factoring out a constant before factoring a quadratic
  - Factoring a quadratic with leading coefficient greater than 1: Problem type 1
  - Factoring a quadratic with leading coefficient greater than 1: Problem type 2
  - Factoring a quadratic with leading coefficient greater than 1: Problem type 3
  - Factoring a quadratic by the ac-method
  - Factoring a quadratic in two variables with leading coefficient greater than 1
  - Factoring a quadratic with a negative leading coefficient
  - Factoring a perfect square trinomial with leading coefficient 1
  - Factoring a perfect square trinomial with leading coefficient greater than 1
  - Factoring a perfect square trinomial in two variables
  - Factoring a difference of squares in one variable: Basic
  - Factoring a difference of squares in one variable: Advanced
  - Factoring a difference of squares in two variables
  - Factoring a polynomial involving a GCF and a difference of squares: Univariate
  - Factoring a polynomial involving a GCF and a difference of squares: Multivariate
  - Factoring a product of a quadratic trinomial and a monomial
  - Factoring with repeated use of the difference of squares formula
  - Factoring a sum or difference of two cubes
  - Solving an equation written in factored form
  - Finding the roots of a quadratic equation of the form  $ax^2 + bx = 0$
  - Finding the roots of a quadratic equation with leading coefficient 1
  - Finding the roots of a quadratic equation with leading coefficient greater than 1
  - Solving a quadratic equation needing simplification
  - Writing a quadratic equation given the roots and the leading coefficient
  - Solving a word problem using a quadratic equation with rational roots
  - Writing and solving a quadratic equation for a real-world problem involving area or volume
  - Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
  - Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
  - Graphing a parabola of the form  $y = a(x-h)^2 + k$
  - Completing the square

- Graphing a parabola of the form  $y = x^2 + bx + c$
- Graphing a parabola of the form  $y = ax^2 + bx + c$ : Integer coefficients
- Graphing a parabola of the form  $y = ax^2 + bx + c$ : Rational coefficients
- Finding the zeros of a quadratic function given its equation
- Writing a quadratic function given its zeros
- Finding the linear factors of a quadratic function given its zeros and describing the general relationship between linear factors and zeros

NEW

- Finding the zeros of a quadratic function given its linear factors and describing the general relationship between linear factors and zeros

NEW

- Finding the x-intercept(s) and the vertex of a parabola
- Using a graphing calculator to find the zeros of a quadratic function
- Using a graphing calculator to find the x-intercept(s) and vertex of a quadratic function
- Writing the equation of a quadratic function given a real-world description
- Rewriting a quadratic function in standard form
- Rewriting a quadratic function to find its vertex and sketch its graph
- Rewriting a quadratic function to find its maximum or minimum and axis of symmetry
- Finding the maximum or minimum of a quadratic function
- Word problem involving the maximum or minimum of a quadratic function
- Finding the domain and range from the graph of a parabola
- Range of a quadratic function
- Graphing a quadratic function that models a real-world situation and identifying key features
- Writing the equation of a quadratic function given a table of values
- Writing the equation of a quadratic function given its x-intercepts and another point
- Writing the equation of a quadratic function given its graph
- Solving a quadratic equation by graphing
- Comparing properties of quadratic functions given in different forms
- Classifying the graph of a function
- Comparing linear, quadratic, and exponential functions given in different forms
- Determining whether a given situation is best modeled by a linear, exponential, or quadratic function
- Choosing a quadratic model and using it to make a prediction
- Using technology to determine the better regression model for a given data set and using that model to make a prediction: Exponential and quadratic

NEW

- Solving an equation of the form  $x^2 = a$  using the square root property
- Solving a quadratic equation using the square root property: Decimal answers, basic
- Solving a quadratic equation using the square root property: Decimal answers, advanced
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Deriving the quadratic formula NEW
- Solving a word problem using a quadratic equation with irrational roots
- Identifying the center and radius to graph a circle given its equation in standard form
- Writing the equation of a circle centered at the origin given its radius or a point on the circle
- Writing an equation of a circle and identifying points that lie on the circle
- Deriving the equation of a circle using the Pythagorean Theorem
- Sum, difference, and product of two functions
- Introduction to the composition of two functions
- Composition of two functions: Basic
- Inverse functions: Linear, discrete
- Finding, evaluating, and interpreting an inverse function for a given linear relationship

#### ■ Radicals and Trigonometry (50 topics)

- Square roots of integers raised to even exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- 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 quotient involving a sum or difference with a square root
- 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
- 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 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
- 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
- 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
- Using the Pythagorean Theorem to find several trigonometric ratios in a right triangle
- Understanding trigonometric ratios through similar right triangles
- Relationship between the sines and cosines of complementary angles
- Using similar right triangles to find trigonometric ratios
- Using a trigonometric ratio to find a side length in a right triangle
- 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
- Writing a vector in component form given its initial and terminal points
- Magnitude of a vector given in component form
- Vector addition and scalar multiplication: Component form
- Linear combination of vectors: Component form
- Multiplication of a vector by a scalar: Geometric approach
- Vector addition: Geometric approach
- Vector subtraction: Geometric approach
- Finding the magnitude and direction of a vector given its graph
- Finding the components of a vector given its graph
- Finding magnitudes of forces related to a sum of three vectors
- Finding magnitudes of forces related to an object suspended by cables
- Dot product of vectors given in component form
- Finding the angle between two vectors given in component form
- Using the dot product to find perpendicular vectors

**\*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.