

## Integrated Mathematics II

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 (550 topics + 889 additional topics)

- Real Numbers (63 topics)
  - Factors, Multiples, and Equivalent Fractions (3 topics)
    - Greatest common factor of 2 numbers
    - Simplifying a fraction
    - Division involving zero
  - Arithmetic with Fractions and Decimals (9 topics)
    - Addition or subtraction of fractions with different denominators
    - Fraction multiplication
    - Fraction division
    - Complex fraction without variables: Problem type 1
    - Decimal subtraction: Basic
    - Multiplication of a decimal by a power of ten
    - Multiplying a decimal by a whole number
    - Division of a decimal by a power of ten
    - Division of a decimal by a whole number
  - Ordering, the Number Line, and Absolute Value (7 topics)
    - Rounding decimals
    - Plotting integers on a number line
    - Using a common denominator to order fractions
    - Ordering integers
    - Square root of a perfect square
    - Using a calculator to approximate a square root
    - Absolute value of a number
  - Operations with Signed Numbers (12 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
  - 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 (7 topics)
    - Combining like terms: Whole number coefficients
    - Combining like terms: Integer coefficients
    - Multiplying a constant and a linear monomial
    - Distributive property: Whole number coefficients

- Distributive property: Integer coefficients
- Using distribution and combining like terms to simplify: Univariate
- Combining like terms in a quadratic expression
- Introduction to Perimeter, Area, and Volume (7 topics)
  - Perimeter of a square or a rectangle
  - Writing algebraic expressions for the perimeter of a figure
  - Area of a square or a rectangle
  - Writing algebraic expressions for the area of a figure
  - Word problem involving the area of a rectangle: Problem type 2
  - Volume of a rectangular prism
  - Word problem involving the volume of a rectangular prism
- Ratios and Percents (6 topics)
  - Writing ratios for real-world situations
  - Simplifying a ratio of whole numbers: Problem type 1
  - Finding missing values in a table of equivalent ratios
  - Solving a word problem on proportions using a unit rate
  - Converting between percentages and decimals
  - Finding a percentage of a whole number
- Linear Equations and Inequalities (64 topics)
  - One-Step Linear Equations (10 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
    - 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 (12 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
    - 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
  - Writing Expressions and Equations (5 topics)
    - Writing a one-step expression for a real-world situation
    - Translating a phrase into a one-step expression
    - Translating a phrase into a two-step expression
    - Translating a sentence into a one-step equation
    - Writing an equation to represent a proportional relationship
  - Applications Involving Linear Equations (7 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
    - Finding side lengths of rectangles given one dimension and an area or a perimeter
    - Finding the dimensions of a rectangle given its perimeter and a relationship between sides
    - Finding a side length given the perimeter and side lengths with variables
  - Solving for a Variable and Dimensional Analysis (3 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
  - Proportions and Applications Involving Percents (10 topics)
    - Solving a proportion of the form  $x/a=b/c$ : Basic
    - Solving a proportion of the form  $x/a = b/c$
    - Introduction to solving a rational equation

- Solving a rational equation that simplifies to linear: Denominator  $x$
- Word problem on proportions: Problem type 1
- Applying the percent equation: Problem type 1
- Finding the multiplier to give a final amount after a percentage increase or decrease
- Finding the final amount given the original amount and a percentage increase or decrease
- Finding the sale price given the original price and percent discount
- Introduction to compound interest
- Writing and Graphing Inequalities (4 topics)
  - Translating a sentence by using an inequality symbol
  - 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 Linear 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 Linear Inequalities (4 topics)
  - 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 linear inequality with multiple occurrences of the variable: Problem type 1
- Sets (2 topics)
  - Interpreting a Venn diagram of 2 sets
  - Interpreting a Venn diagram of 3 sets
- Compound Inequalities (2 topics)
  - Translating a sentence into a compound inequality
  - Graphing a compound inequality on the number line
- The Coordinate Plane and Equations of Lines (48 topics)
  - Ordered Pairs (7 topics)
    - Reading a point in the coordinate plane
    - Plotting a point in the coordinate plane
    - 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 the graph
    - Finding distances between points that share a common coordinate given their coordinates
  - Tables and Graphs of Lines (12 topics)
    - Table for a linear equation
    - Writing a function rule given a table of ordered pairs: One-step rules
    - Identifying solutions to a linear equation in two variables
    - Finding a solution to a linear equation in two variables
    - Graphing a linear equation of the form  $y = mx$
    - Graphing a line given its equation in slope-intercept form: Integer slope
    - Graphing a line given its equation in slope-intercept form: Fractional slope
    - Graphing a line given its equation in standard form
    - Graphing a vertical or horizontal line
    - Finding  $x$ - and  $y$ -intercepts given the graph of a line on a grid
    - Finding  $x$ - and  $y$ -intercepts of a line given the equation: Basic
    - Interpreting a line graph
  - Slope (2 topics)
    - Finding slope given the graph of a line on a grid
    - Finding slope given two points on a line
  - Equations of Lines (10 topics)
    - 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
    - Finding the slope and  $y$ -intercept given a table for a linear function
    - 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

- Identifying parallel and perpendicular lines from coordinates
- Applications Involving Linear Equations with Two Variables (8 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
  - Comparing properties of linear functions given in different forms
  - Interpreting the parameters of a linear function that models a real-world situation
- Scatter Plots and Lines of Best Fit (1 topics)
  - Sketching the line of best fit
- Direct and Inverse Variation (8 topics)
  - Identifying direct variation equations
  - Identifying direct variation from ordered pairs and writing equations
  - Writing a direct variation equation
  - Word problem on direct variation
  - 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
- Functions and Systems (38 topics)
  - Introduction to Functions (6 topics)
    - Domain and range from ordered pairs
    - Table for a linear function
    - Evaluating functions: Linear and quadratic or cubic
    - Evaluating a piecewise-defined function
    - Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
    - Finding inputs and outputs of a two-step function that models a real-world situation: Function notation
  - Graphs of Functions (18 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
    - Interpreting the domain and range of a linear function in context
    - Finding where a function is increasing, decreasing, or constant given the graph
    - Choosing a graph to fit a narrative: Basic
    - Choosing a graph to fit a narrative: Advanced
    - Drawing a graph to fit a narrative
    - Graphing an absolute value equation of the form  $y = A|x|$
    - Graphing an absolute value equation in the plane: Basic
    - Graphing a parabola of the form  $y = ax^2$
    - Graphing a parabola of the form  $y = (x-h)^2 + k$
    - Graphing a piecewise-defined function: Problem type 1
    - Introduction to graphing a piecewise-defined function involving lines with non-zero slope
    - Graphing a piecewise-defined function: Problem type 2
    - Graphing a piecewise-defined function: Problem type 3
    - Finding the average rate of change of a function given its equation
    - Finding the average rate of change of a function given its graph
    - Word problem involving average rate of change
  - Transforming the Graphs of Functions (8 topics)
    - Translating the graph of a parabola: One step
    - Translating the graph of a parabola: Two steps
    - How the leading coefficient affects the shape of a parabola
    - Graphing quadratic functions of the form  $y=ax^2$  and  $y=(bx)^2$  by transforming the parent graph  $y=x^2$
    - Translating the graph of an absolute value function: One step
    - Translating the graph of an absolute value function: Two steps
    - How the leading coefficient affects the graph of an absolute value function
    - Writing an equation for a function after a vertical translation
  - Systems of Linear Equations (6 topics)
    - Identifying the solution of systems of linear equations from graphs
    - Graphically solving a system of linear equations both of the form  $y=mx+b$
    - 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
- Exponents and Polynomials (38 topics)

- Product, Power, and Quotient Rules (6 topics)
  - Introduction to the product rule of exponents
  - Product rule with positive exponents: Univariate
  - 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 of exponents
  - Simplifying a ratio of univariate monomials
- Negative Exponents (7 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
  - Introduction to the product rule with negative exponents
  - Quotient rule with negative exponents: Problem type 1
  - Power of a power rule with negative exponents
- Polynomial Addition, Subtraction, and Multiplication (6 topics)
  - Simplifying a sum or difference of two univariate polynomials
  - Multiplying a univariate polynomial by a monomial with a positive coefficient
  - Multiplying binomials with leading coefficients of 1
  - Multiplying binomials with leading coefficients greater than 1
  - Multiplying conjugate binomials: Univariate
  - Squaring a binomial: Univariate
- Factoring Using the GCF (3 topics)
  - Factoring a linear binomial
  - Introduction to the GCF of two monomials
  - Factoring out a monomial from a polynomial: Univariate
- Factoring Quadratic Trinomials (4 topics)
  - Factoring a quadratic with leading coefficient 1
  - Factoring out a constant before factoring a quadratic
  - Factoring a quadratic with leading coefficient greater than 1: Problem type 1
  - Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring Special Products (2 topics)
  - Factoring a perfect square trinomial with leading coefficient 1
  - Factoring a difference of squares in one variable: Basic
- Polynomial Division (1 topics)
  - Closure properties of integers and polynomials
- Solving Quadratic Equations by Factoring (7 topics)
  - Solving an equation written in factored form
  - Finding the roots of a quadratic equation of the form  $ax^2 + bx = 0$
  - Finding the roots of a quadratic equation with leading coefficient 1
  - Finding the roots of a quadratic equation with leading coefficient greater than 1
  - Solving a quadratic equation needing simplification
  - Solving a word problem using a quadratic equation with rational roots
  - Writing and solving a quadratic equation for a real-world problem involving area or volume
- Quadratic Inequalities (2 topics)
  - Solving a quadratic inequality written in factored form
  - Solving a quadratic inequality
- Radicals (28 topics)
  - Roots of Perfect Powers (5 topics)
    - Square root of a rational perfect square
    - Square roots of perfect squares with signs
    - Introduction to simplifying a radical expression with an even exponent
    - Square root of a perfect square monomial
    - Cube root of an integer
  - Rational Exponents (7 topics)
    - Converting between radical form and exponent form
    - Using the properties of integer exponents to define rational exponents
    - Rational exponents: Unit fraction exponents and whole number bases
    - Rational exponents: Non-unit fraction exponent with a whole number base
    - Rational exponents: Product rule
    - Rational exponents: Quotient rule
    - Rational exponents: Power of a power rule

- Simplifying Expressions (5 topics)
  - 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
- Addition and Subtraction (1 topics)
  - Introduction to square root addition or subtraction
- Multiplication (4 topics)
  - Introduction to square root multiplication
  - Square root multiplication: Basic
  - Square root multiplication: Advanced
  - Classifying sums and products as rational or irrational
- Division and Rationalization (2 topics)
  - Simplifying a quotient of square roots
  - Rationalizing a denominator: Quotient involving square roots
- Complex Numbers (4 topics)
  - Using  $i$  to rewrite square roots of negative numbers
  - Simplifying a product and quotient involving square roots of negative numbers
  - Adding or subtracting complex numbers
  - Multiplying complex numbers
- Quadratic and Exponential Functions (42 topics)
  - Quadratic Equations (10 topics)
    - Solving an equation of the form  $x^2 = a$  using the square root property
    - Solving a quadratic equation using the square root property: Decimal answers, basic
    - Solving a quadratic equation using the square root property: Decimal answers, advanced
    - Completing the square
    - Solving a quadratic equation by completing the square: Decimal answers
    - Applying the quadratic formula: Exact answers
    - Applying the quadratic formula: Decimal answers
    - Solving a quadratic equation with complex roots
    - Discriminant of a quadratic equation
    - Solving a word problem using a quadratic equation with irrational roots
  - Quadratic Functions (22 topics)
    - Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
    - Graphing a parabola of the form  $y = a(x-h)^2 + k$
    - Graphing a parabola of the form  $y = x^2 + bx + c$
    - Graphing a parabola of the form  $y = ax^2 + bx + c$ : Integer coefficients
    - Finding the zeros of a quadratic function given its equation
    - Writing a quadratic function given its zeros
    - Finding the x-intercept(s) and the vertex of a parabola
    - Using a graphing calculator to find the x-intercept(s) and vertex of a quadratic function
    - 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
    - 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
    - Comparing properties of quadratic functions given in different forms
    - Classifying the graph of a function
    - Choosing a quadratic model and using it to make a prediction
    - Using technology to determine the better regression model for a given data set and using that model to make a prediction: Exponential and quadratic
- Function Operations (1 topics)
  - Sum, difference, and product of two functions
- Graphing Exponential Functions (2 topics)
  - Table for an exponential function
  - Graphing an exponential function:  $f(x) = b^x$

**NEW**



- Applications of Exponential Functions (7 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
  - Comparing linear, polynomial, and exponential functions
- Segments, Lines and Angles (36 topics)
  - Points, Lines, and Planes (2 topics)
    - Naming segments, rays, and lines
    - Identifying congruent shapes on a grid
  - Distances and Midpoints on a Number Line (5 topics)
    - Introduction to segment addition
    - Finding a point on a number line given the length of a segment and another point
    - Midpoint of a number line segment: Integers
    - Segment addition and midpoints
    - Finding a point that partitions a number line segment in a given ratio
  - 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 a point that partitions a segment in the plane in a given ratio
  - Angles (11 topics)
    - Measuring an angle with the protractor
    - Drawing an angle with the protractor
    - Acute, obtuse, and right angles
    - Naming angles, sides of angles, and vertices
    - Finding supplementary and complementary angles
    - Introduction to angle addition
    - Finding the complement or supplement of an angle given a figure
    - Angle addition with relationships between angles
    - 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 (3 topics)
    - Constructing congruent line segments
    - Constructing an angle bisector
    - Constructing the perpendicular bisector of a line segment
  - Proofs Involving Segments and Angles (3 topics)
    - Introduction to proofs: Justifying statements
    - Proofs involving segment congruence
    - Proofs involving angle congruence
  - Parallel Lines and Transversals (8 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
    - Solving equations involving angles and two pairs of parallel lines
    - Establishing facts about the angles created when parallel lines are cut by a transversal
    - Constructing a pair of perpendicular lines
    - Introduction to proofs involving parallel lines
    - Proofs involving parallel lines
- Triangles and Other Polygons (50 topics)
  - Classifying Triangles (1 topics)
    - Acute, obtuse, and right triangles
  - Angles of Triangles (5 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
    - Establishing facts about the interior angles of a triangle
  - Congruent Triangles (4 topics)

- Identifying and naming congruent parts of congruent triangles
- Identifying transformations
- Determining if figures are related by rigid motions
- Examining triangle congruence in terms of rigid motion
- Proving Triangle Congruence (13 topics)
  - Completing proofs involving congruent triangles using SSS or SAS
  - Introduction to proving triangles congruent using SSS or SAS
  - Identifying and naming congruent triangles
  - Completing proofs involving congruent triangles using ASA or AAS
  - Introduction to proving triangles congruent using ASA or AAS
  - Proofs involving congruent triangles and segment or angle bisectors
  - 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
- Isosceles and Equilateral Triangles (2 topics)
  - Finding side lengths and angle measures of isosceles and equilateral triangles
  - Proofs of theorems involving isosceles triangles
- The Pythagorean Theorem (4 topics)
  - Introduction to the Pythagorean Theorem
  - Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem
  - Word problem involving the Pythagorean Theorem in three dimensions
- Segments within Triangles (3 topics)
  - 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
- Triangle Constructions and Triangle Inequalities (6 topics)
  - Creating triangles from given side lengths: Problem type 1
  - Using triangle inequality to determine if side lengths form a triangle
  - Using triangle inequality to determine possible lengths of a third side
  - Drawing a circle with a given radius or diameter
  - Relationship between angle measures and side lengths in a triangle
  - Relationship between angle measures and side lengths in two triangles
- Angles of Polygons (2 topics)
  - Naming polygons
  - Sum of the angle measures of a quadrilateral
- Quadrilaterals (10 topics)
  - Identifying parallelograms, rectangles, and squares
  - Properties of quadrilaterals
  - Classifying parallelograms
  - Finding measures involving diagonals of parallelograms
  - Finding measures involving diagonals of rectangles
  - Finding angle measures involving diagonals of a rhombus
  - Completing proofs of theorems involving sides of a parallelogram
  - Completing proofs of theorems involving angles of a parallelogram
  - Proving that a quadrilateral with given vertices is a parallelogram
  - Classifying parallelograms in the coordinate plane
- Similarity and Transformations (31 topics)
  - Similar Figures (8 topics)
    - Identifying similar or congruent shapes on a grid
    - Finding a missing side length given two similar 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
    - Similar polygons
    - Similar right triangles
    - Indirect measurement
    - Triangles and parallel lines
  - Proofs Involving Triangle Similarity (5 topics)
    - 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
- Scale Factors and Scale Drawings (3 topics)
  - Finding lengths using scale models
  - Finding a scale factor: Same units
  - Using a scale drawing to find actual area
- Similar Right Triangles and Special Right Triangles (4 topics)
  - Identifying similar right triangles that overlap
  - Right triangles and geometric mean
  - Proving the Pythagorean Theorem using similar triangles
  - Special right triangles: Exact answers
- Translations (3 topics)
  - Translating a point and giving its coordinates: One step
  - Translating a point and giving its coordinates: Two steps
  - Determining if figures are related by a translation
- 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
  - Dilating a figure
  - Performing a composition of dilations NEW
  - Performing a composition consisting of a rigid transformation and a dilation NEW
  - Exploring similarity of circles
  - Exploring the effect of dilation on lines
- Area, Volume, and Circles (49 topics)
  - Areas of Parallelograms and Triangles (2 topics)
    - Area of a parallelogram
    - Area of a triangle
  - Areas of Trapezoids, Rhombi, and Kites (1 topics)
    - Area of a trapezoid
  - Areas of Regular Polygons and Similar Polygons (1 topics)
    - Side lengths, perimeters, and areas of similar polygons
  - Circumferences and Areas of Circles (8 topics)
    - Introduction to a circle: Diameter, radius, and chord
    - Circumference of a circle
    - Informal argument for the formula of the circumference of a circle
    - Area of a circle
    - Circumference and area of a circle
    - Circumference and area of a circle: Exact answers in terms of pi
    - Informal argument for the formula of the area of a circle
    - Informal argument for the formula of the area of a sector
  - Solids and Cross Sections (1 topics)
    - Classifying solids
  - Surface Areas of Prisms, Cylinders, and Cones (1 topics)
    - Surface area of a cube or a rectangular prism
  - Volumes of Prisms and Cylinders (8 topics)
    - Writing equivalent expressions for the volume of a rectangular prism
    - Volume of an oblique rectangular prism
    - Solving problems involving the volume of a rectangular prism in context
    - Volume of a cylinder
    - Informal argument for the formula of the volume of a cylinder
    - Volume of an oblique cylinder
    - Word problem involving the volume of a cylinder
    - Using cross sections to identify solids with the same volume
  - Volumes of Pyramids and Cones (4 topics)
    - Volume of a pyramid
    - Volume of a cone
    - Informal argument for the formula of the volume of a cone
    - Word problem involving the volume of a cone

- Surface Areas and Volumes of Spheres (2 topics)
  - Volume of a sphere
  - Word problem involving the volume of a sphere
- Similar Solids (2 topics)
  - Computing ratios of side lengths, surface areas, and volumes for similar solids
  - Computing side length, surface area, and volume for similar solids
- Segments in a Circle and Tangent Lines (4 topics)
  - 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
- Chords and Arcs (4 topics)
  - Naming and finding measures of central angles, inscribed angles, and arcs of a circle
  - Applying properties of radii, diameters, and chords
  - Arc length
  - Computing ratios of arc lengths to radii and describing the result
- Inscribed Angles and Polygons (9 topics)
  - 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 an equilateral triangle or a regular hexagon in a circle
  - Inscribing a square in a circle
  - Inscribing a circle in a triangle
  - Circumscribing a circle about a triangle
- Angle and Segment Relationships in Circles (2 topics)
  - Angles of intersecting secants and tangents
  - Lengths of chords, secants, and tangents
- Sequences, Probability, and Conic Sections (47 topics)
  - Collecting and Displaying Data (4 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
  - Counting (7 topics)
    - Introduction to the counting principle
    - Counting principle
    - Factorial expressions
    - Computing permutations and combinations
    - Introduction to permutations and combinations
    - Permutations and combinations: Problem type 1
    - Permutations and combinations: Problem type 2
  - Probability of Simple Events (4 topics)
    - 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
  - Probability of Compound Events (20 topics)
    - Determining a sample space and outcomes for an event: Experiment involving multiple selections
    - Outcomes and event probability
    - Probabilities of a permutation and a combination
    - Identifying independent events given descriptions of experiments
    - Probability of independent events
    - Probability of dependent events
    - Probability of independent events: Decimal answers
    - Determining outcomes for unions, intersections, and complements of events
    - Using a Venn diagram to understand the addition rule for probability
    - Outcomes and event probability: Addition rule
    - Probability of the union of two events
    - Word problem involving the probability of a union
    - Probability of intersection or union: Word problems
    - Computing conditional probability using a sample space
    - Using a Venn diagram to understand the multiplication rule for probability

- Outcomes and event probability: Conditional probability
- Identifying independent events given values of probabilities
- Computing conditional probability using a two-way frequency table
- Computing conditional probability to make an inference using a two-way frequency table
- Conditional probability: Basic
- Simulations (1 topics)
  - Using a random number table to make a fair decision
- Parabolas (2 topics)
  - Graphing a parabola of the form  $y^2 = ax$  or  $x^2 = ay$
  - Deriving the equation of a parabola given its focus and directrix
- Circles (7 topics)
  - Identifying the center and radius to graph a circle given its equation in standard form
  - Identifying the center and radius to graph a circle given its equation in general form: Basic
  - Writing the equation of a circle centered at the origin given its radius or a point on the circle
  - Writing an equation of a circle and identifying points that lie on the circle
  - Writing an equation of a circle given its center and radius or diameter
  - Deriving the equation of a circle using the Pythagorean Theorem
  - Writing an equation of a circle given the endpoints of a diameter
- Nonlinear Systems (2 topics)
  - Graphically solving a system of linear and quadratic equations
  - Solving a system of linear and quadratic equations
- Trigonometry (16 topics)
  - Right Triangle Trigonometry (13 topics)
    - Sine, cosine, and tangent ratios: Numbers for side lengths
    - Using the Pythagorean Theorem to find several trigonometric ratios in a right triangle
    - 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 similar right triangles to find trigonometric ratios
    - Using a trigonometric ratio to find a side length in a right triangle
    - Using trigonometry to find a length in a word problem with one right triangle
    - Using a trigonometric ratio to find an angle measure in a right triangle
    - Using trigonometry to find angles of elevation or depression in a word problem
    - Solving a right triangle
    - Using trigonometry to find a length in a word problem with two right triangles
  - Trigonometric Functions of Angles (1 topics)
    - Finding values of trigonometric functions given information about an angle: Problem type 2
  - Laws of Sines and Cosines (1 topics)
    - Using trigonometry to find the area of a right triangle
  - Complex Numbers in Trigonometric Form (1 topics)
    - Plotting complex numbers
- Other Topics Available(\*) (889 additional topics)
  - Real Numbers (55 topics)
    - Greatest common factor of 3 numbers
    - Least common multiple of 2 numbers
    - Least common multiple of 3 numbers
    - The reciprocal of a number
    - Writing an improper fraction as a mixed number
    - Writing a mixed number as an improper fraction
    - Addition of mixed numbers with different denominators and renaming
    - Subtraction of mixed numbers with different denominators and renaming
    - Mixed number multiplication
    - Mixed number division
    - Addition of aligned decimals
    - Interpreting absolute values in context as distances from zero
    - Finding all numbers with a given absolute value
    - Signed fraction subtraction involving double negation
    - Signed fraction division
    - Signed decimal addition and subtraction
    - Signed decimal multiplication

- 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
- Exponents and integers: Problem type 2
- 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 numbers as rational or irrational
- Properties of addition
- Combining like terms: Fractional coefficients
- Combining like terms: Decimal coefficients
- Distributive property: Fractional coefficients
- Properties of real numbers
- Identifying parts in an algebraic expression
- Identifying equivalent algebraic expressions
- 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
- 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
- Word problem involving the area between two rectangles
- U.S. Customary length conversion with whole number values
- Conversions involving measurements in feet and inches
- Word problem involving a U.S. Customary length conversion
- U.S. Customary volume conversion with whole number values
- U.S. Customary weight conversions with whole number values
- U.S. Customary area unit conversion with whole number values
- Word problem on area involving conversions of U.S. Customary units: Problem type 1
- Metric distance conversion with whole number values
- Time unit conversion with whole number values
- Converting between metric and U.S. Customary unit systems
- Conversions with currency
- Writing ratios using different notations
- Writing a ratio as a percentage
- Linear Equations and Inequalities (89 topics)
  - Additive property of equality with signed fractions
  - Multiplicative property of equality with whole numbers: Fractional answers
  - Solving a multi-step equation given in fractional form
  - Solving a two-step equation with signed decimals
  - Identifying properties used to solve a linear equation
  - 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 two-step equation with signed fractions
  - 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
  - Translating a sentence into a multi-step equation
  - Solving a fraction word problem using a linear equation of the form  $Ax = B$
  - Writing an equation of the form  $A(x + B) = C$  to solve a word problem
  - 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
  - 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 one-step word problem using the formula  $d = rt$
  - Solving a distance, rate, time problem using a linear equation
  - Finding side lengths of squares given an area and a perimeter
  - Word problem on optimizing an area or perimeter
  - Finding the perimeter or area of a rectangle given one of these values
  - 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
  - U.S. Customary length conversions involving dimensional analysis

- 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
- Converting between compound units: Basic
- 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  $a/(x+b) = c/x$
- Word problem on proportions: Problem type 2
- Finding the total cost including tax or markup
- Finding the percentage increase or decrease: Basic
- Finding the absolute error and percent error of a measurement
- 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
- Introduction to solving an absolute value equation
- Solving an absolute value equation: Problem type 1
- Solving an absolute value equation: Problem type 2
- Solving an absolute value equation: Problem type 3
- Solving an absolute value equation: Problem type 4
- Solving an absolute value equation of the form  $|ax+b| = |cx+d|$
- Writing an absolute value equation to solve a word problem and describing the solution
- Translating a sentence into a one-step inequality
- Writing an 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
- Identifying solutions to a two-step linear inequality in one variable
- Solving a two-step linear inequality with a fractional coefficient
- 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 inequalities with no solution or all real numbers as solutions
- 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
- Solving a decimal word problem using a linear inequality with the variable on both sides
- Writing sets of integers using set-builder and roster forms
- Union and intersection of finite sets
- Writing a compound inequality given a graph on the number line
- Solving a compound linear inequality: Graph solution, basic
- Solving a compound linear inequality: Graph solution, advanced
- Solving and graphing the solution to a compound inequality that models a real-world situation
- Set-builder and interval notation
- Union and intersection of intervals
- Solving a compound linear inequality: Interval notation
- Solving an absolute value inequality: Problem type 1
- Writing an absolute value inequality given a graph on the number line
- Solving an absolute value inequality: Problem type 2
- Solving an absolute value inequality: Problem type 3
- Solving an absolute value inequality: Problem type 4
- Solving an absolute value inequality: Problem type 5
- Writing and solving an absolute value inequality that models a real-world situation and interpreting the solution
- The Coordinate Plane and Equations of Lines (57 topics)
  - Plotting points that share a coordinate and using absolute value to find the distance between them
  - Finding the coordinates of a point on a graph given the equation
  - 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
  - Finding slope given the graph of a line in quadrant 1 that models a real-world situation
  - Classifying slopes given graphs of lines
  - Finding the slopes of horizontal and vertical lines
  - Finding the coordinate that yields a given slope
  - Graphing a line given its slope and y-intercept
  - Graphing a line through a given point with a given slope
  - [Deriving the slope formula](#) NEW
  - Identifying linear equations: Basic
  - Identifying linear equations: Advanced
  - Identifying linear functions given ordered pairs
  - 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
  - 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
  - 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
  - Finding inputs and outputs of a two-step function that models a real-world situation: Two variable equation
  - Writing and evaluating a function that models a real-world situation: Advanced
  - Writing an equation and drawing its graph to model a real-world situation: Basic
  - 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
  - Graphing a linear function that models a simple interest situation and identifying key features NEW
  - 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
  - Constructing a scatter plot
  - 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
  - Classifying linear and nonlinear relationships from scatter plots
  - Linear relationship and the correlation coefficient
  - Using technology to calculate the correlation coefficients for two sets of bivariate data to compare the linear relationships NEW
  - Identifying outliers and clustering in scatter plots
  - Identifying correlation and causation
  - Interpreting direct variation from a graph
  - Word problem on inverse variation involving the completion of a task
  - Writing an equation that models variation
  - Word problem on combined variation
- Functions and Systems (94 topics)
- Identifying functions from relations
  - Identifying functions given a verbal description NEW
  - Vertical line test
  - Variable expressions as inputs of functions: Problem type 1
  - Finding outputs of a one-step function that models a real-world situation: Function notation
  - Domain and range of a linear function that models a real-world situation
  - Finding inputs and outputs of a function from its graph
  - Domain and range from the graph of a discrete relation
  - Finding domain and range from a linear graph in context
  - Domain and range from the graph of a continuous function
  - Domain and range from the graph of a piecewise function
  - Finding intercepts of a nonlinear function given its graph
  - Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
  - Finding local maxima and minima of a function given the graph
  - Finding values and intervals where the graph of a function is zero, positive, or negative
  - Graphing an integer function and finding its range for a given domain
  - Graphing a function of the form  $f(x) = ax + b$ : Integer slope
  - Graphing a function of the form  $f(x) = ax + b$ : Fractional slope
  - Graphing an absolute value equation in the plane: Advanced
  - Determining if a function is linear given its graph
  - 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  $f(x) = ax^2 + c$
  - Classifying function types given graphs of functions: Linear, exponential, and quadratic
  - Classifying function types given graphs of functions: Absolute value, cubic, square root, and cubic root NEW
  - Classifying function types given equations of functions: Problem type 1 NEW
  - Classifying function types given equations of functions: Problem type 2 NEW
  - Translating the graph of a function: One step
  - Translating the graph of a function: Two steps
  - Transforming the graph of a function by reflecting over an axis



- Transforming the graph of a function by shrinking or stretching
- Transforming the graph of a function using more than one transformation
- Transforming the graph of a quadratic, cubic, square root, or absolute value function
- Writing an equation for a function after a vertical and horizontal translation
- Identifying solutions to a system of linear equations
- Classifying systems of linear equations from graphs
- Graphing a system of linear equations and estimating a solution
- 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
- 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
- Solving a 2x2 system of linear equations that is inconsistent or consistent dependent
- Identifying the operations used to create equivalent systems of equations
- 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
- Squaring and multiplying 2x2 matrices
- Multiplication of matrices: Basic
- 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
- Finding the inverse of a matrix to solve a 2x2 system of linear equations
- Using the inverse of a matrix to solve a 3x3 system of linear equations
- Interpreting the graphs of two functions
- Solving a word problem involving a system of linear equations by graphing and estimating a solution
- 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
- Writing and solving a system of two linear equations given a verbal description NEW
- 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 percent mixture problem using a system of linear equations
- Solving a distance, rate, time 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
- Solving a word problem using a 3x3 system of linear equations: Problem type 2
- 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
- Graphing a system of three linear inequalities
- Writing a linear inequality in two variables given a table of values
- Writing a multi-step inequality for a real-world situation
- 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
- Writing a system of linear inequalities that models a real-world situation and determining possible solutions
- Linear programming
- Solving a word problem using linear programming
- Exponents and Polynomials (77 topics)
  - Understanding the product rule of exponents
  - Product rule with positive exponents: Multivariate
  - Ordering numbers with positive exponents
  - Understanding the power rules of exponents
  - Power rules with positive exponents: Multivariate products
  - Power rules with positive exponents: Multivariate quotients
  - Power and product rules with positive exponents
  - Simplifying a ratio of multivariate monomials: Basic

- 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
- Product rule with negative exponents
- Quotient rule with negative exponents: Problem type 2
- 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
- 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
- Adding or subtracting numbers written in scientific notation: Same exponents, basic
- Adding or subtracting numbers written in scientific notation: Same exponents, advanced
- Adding or subtracting numbers written in scientific notation: Different exponents
- Estimating the sum or difference of two numbers written in scientific notation
- Degree and leading coefficient of a univariate polynomial
- Degree of a multivariate polynomial
- Simplifying a sum or difference of three univariate polynomials
- Simplifying a sum or difference of multivariate polynomials
- Multiplying a univariate polynomial by a monomial with a negative coefficient
- Multiplying a multivariate polynomial by a monomial
- Multiplying binomials in two variables
- Multiplying conjugate binomials: Multivariate
- 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
- Greatest common factor of three univariate monomials
- Greatest common factor of two multivariate monomials
- Factoring out a monomial from a polynomial: Multivariate
- Factoring out a binomial from a polynomial: GCF factoring, basic
- Factoring a 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 in two variables with leading coefficient 1
- 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 greater than 1
- Factoring a perfect square trinomial in two variables
- 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
- Dividing a polynomial by a monomial: Univariate
- Dividing a polynomial by a monomial: Multivariate
- Polynomial long division: Problem type 1
- Polynomial long division: Problem type 2
- Polynomial long division: Problem type 3
- Synthetic division
- Roots of a product of polynomials
- Writing a quadratic equation given the roots and the leading coefficient
- Radicals (69 topics)
  - Finding all square roots of a number
  - Estimating a square root
  - Square roots of integers raised to even exponents

- Order of operations with exponents and radicals
- Finding  $n^{\text{th}}$  roots of perfect  $n^{\text{th}}$  powers with signs
- Finding the  $n^{\text{th}}$  root of a perfect  $n^{\text{th}}$  power fraction
- Finding the  $n^{\text{th}}$  root of a perfect  $n^{\text{th}}$  power monomial
- Table for a square root function
- Evaluating a cube root function
- Domain of a square root function: Basic
- Domain of a square root function: Advanced
- Domains of higher root functions
- Graphing a square root function: Problem type 1
- Graphing a square root function: Problem type 2
- Graphing a square root function: Problem type 3
- Rational exponents: Unit fraction exponents and bases involving signs
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Products and quotients with negative exponents
- Rational exponents: Powers of powers with negative exponents
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Introduction to simplifying a higher radical expression
- Simplifying a higher radical expression: Univariate
- Simplifying a higher radical expression: Multivariate
- Square root addition or subtraction
- Square root addition or subtraction with three terms
- Introduction to simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Multivariate
- Simplifying a sum or difference of higher roots
- Simplifying a sum or difference of higher radical expressions
- Introduction to simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Multivariate
- Introduction to simplifying a product of higher roots
- Simplifying a product of higher radical expressions
- Introduction to simplifying a product involving square roots using the distributive property
- Simplifying a product involving square roots using the distributive property: Basic
- Simplifying a product involving square roots using the distributive property: Advanced
- Special products of radical expressions: Conjugates and squaring
- Simplifying a quotient involving a sum or difference with a square root
- Rationalizing a denominator: Square root of a fraction
- Rationalizing a denominator: Quotient involving a monomial
- Rationalizing a denominator using conjugates: Integer numerator
- Rationalizing a denominator using conjugates: Square root in numerator
- Rationalizing a denominator using conjugates: Variable in denominator
- Rationalizing a denominator: Quotient involving a higher radical
- Rationalizing a denominator: Quotient involving higher radicals and monomials
- Simplifying products or quotients of higher radicals with different indices: Univariate
- Simplifying products or quotients of higher radicals with different indices: Multivariate
- Introduction to solving a radical equation
- Solving a radical equation that simplifies to a linear equation: One radical, basic
- Solving a radical equation that simplifies to a linear equation: One radical, advanced
- Solving a radical equation that simplifies to a linear equation: Two radicals
- Solving a radical equation that simplifies to a quadratic equation: One radical, basic
- Solving a radical equation that simplifies to a quadratic equation: One radical, advanced
- Solving a radical equation with a quadratic expression under the radical
- Solving a radical equation with two radicals that simplifies to  $\sqrt{x} = a$
- Solving a radical equation that simplifies to a quadratic equation: Two radicals
- Solving for a variable in terms of other variables in an equation involving radicals
- Word problem involving radical equations: Basic
- Word problem involving radical equations: Advanced
- Solving an equation with a root index greater than 2: Problem type 1
- Solving an equation with a root index greater than 2: Problem type 2
- Solving an equation of the form  $x^3 = a$  using integers
- Finding the side length of a cube given its volume
- Solving an equation using the odd-root property: Problem type 1
- Dividing complex numbers
- Simplifying a power of  $i$
- Quadratic and Exponential Functions (40 topics)
  - Solving a quadratic equation using the square root property: Exact answers, basic
  - Solving a quadratic equation using the square root property: Exact answers, advanced
  - Solving a quadratic equation by completing the square: Exact answers
  - [Deriving the quadratic formula](#) NEW
  - Discriminant of a quadratic equation with a parameter

- Graphing a parabola of the form  $y = ax^2 + bx + c$ : Rational coefficients
- Finding the linear factors of a quadratic function given its zeros and describing the general relationship between linear factors and zeros
- NEW Finding the zeros of a quadratic function given its linear factors and describing the general relationship between linear factors and zeros
- NEW Using a graphing calculator to find the zeros of a quadratic function
- Writing the equation of a quadratic function given a real-world description
- Word problem involving optimizing area by using a quadratic function
- Range of a quadratic function
- Solving a quadratic equation by graphing
- Determining whether a given situation is best modeled by a linear, exponential, or quadratic function
- Introduction to the composition of two functions
- Composition of two functions: Basic
- Word problem involving composition of two functions
- Rewriting a multivariate function as a univariate function given a relationship between its variables
- Determining whether an equation defines a function: Basic
- Horizontal line test
- Determining whether two functions are inverses of each other
- Inverse functions: Linear, discrete
- Finding, evaluating, and interpreting an inverse function for a given linear relationship
- Even and odd functions: Problem type 1
- Graphing an exponential function and its asymptote:  $f(x) = b^x$
- Graphing an exponential function:  $f(x) = a(b)^x$
- 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  $f(x) = -b^{-x}$
- 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
- Comparing linear, quadratic, and exponential functions given in different forms
- Graphing an exponential function and finding its domain and range
- Finding the initial amount and asymptote given a graph of an exponential function
- Choosing an exponential model and using it to make a prediction
- Using technology to determine the better regression model for a given data set and using that model to make a prediction: Linear and exponential
- NEW Finding the final amount in a word problem on compound interest
- Finding the future value and interest for an investment earning compound interest
- Finding the present value of an investment earning compound interest
- Solving an exponential equation by finding common bases: Linear exponents
- Segments, Lines and Angles (51 topics)
  - Analyzing relationships between points, lines, and planes given a figure
  - Matching basic geometric terms with their definitions
  - Computing distances between decimals on a number line
  - 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
  - Distance between two points in the plane: Decimal answers
  - Deriving the distance formula using the Pythagorean Theorem NEW
  - Finding an endpoint of a line segment given the other endpoint and the midpoint
  - Deriving the midpoint formula on the coordinate plane using previous knowledge about midpoint on a number line NEW
  - Finding a point that partitions a segment in the plane in a given fractional relationship
  - Finding the weighted average of two points on a line segment in the plane NEW
  - Writing and solving an equation involving adjacent angles NEW
  - Solving an equation involving complementary or supplementary angles
  - Writing and solving an equation involving complementary or supplementary angles
  - Angle addition and angle bisectors
  - Writing and solving an equation involving vertical angles
  - Constructing congruent 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
- Constructing a pair of parallel lines
- Triangles and Other Polygons (44 topics)
  - Classifying scalene, isosceles, and equilateral triangles by side lengths
  - Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
  - Identifying coordinates that give right triangles
  - Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
  - Finding angle measures of a triangle given angles with variables
  - Writing an equation to find angle measures of a triangle given angles with variables
  - Establishing facts about the interior and exterior angles of a triangle
  - Exploring the triangle congruence theorems
  - Proofs involving congruent triangles that overlap: Advanced
  - Finding an angle measure for a triangle sharing a side with another triangle
  - Finding angle measures of an isosceles triangle given angles with variables
  - 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
  - Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
  - 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
  - Creating triangles from given side lengths: Problem type 2
  - Determining if a triangle is possible based on given angle measures
  - Determining if given measurements define a unique triangle, more than one triangle, or no triangle
  - Drawing triangles with given conditions: Angle measures
  - Drawing triangles with given conditions: Side lengths and angle measures
  - Drawing triangles with given side lengths using a compass
  - Using the hinge theorem
  - Indirect proof (proof by contradiction)
  - Informally deriving the formula for the sum of interior angles of polygons by decomposing them into triangles
  - Finding the sum of the interior angle measures of a convex polygon given the number of sides
  - Finding the number of sides of a convex polygon given the sum of the measures of the interior angles
  - Finding a missing interior angle measure in a convex polygon
  - Finding the measures of an interior angle and an exterior angle of a regular polygon
  - Finding the number of sides of a regular polygon given the measure of an interior angle
  - Investigating properties of diagonals of parallelograms NEW
  - Conditions for parallelograms
  - Conditions for quadrilaterals
  - 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
  - Congruence in the coordinate plane
- Similarity and Transformations (43 topics)
  - Relationships about ratios within and between similar triangles
  - Triangles and angle bisectors
  - Proving the slope criterion for parallel or perpendicular lines
  - Reproducing a scale drawing at a different scale
  - Special right triangles: Decimal answers



- Properties of translated figures
  - Translating a polygon
  - Using a translated point to find coordinates of other translated points
  - Understanding the definition of a translation
  - 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
  - Reflecting a polygon over a vertical or horizontal line
  - Finding the coordinates of three points reflected over an axis
  - Finding the coordinates of a point reflected across an axis and translated
  - Understanding the definition of a reflection
  - 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
  - Drawing lines of symmetry
  - Finding an angle of rotation
  - Identifying rotational symmetry and angles of rotation
  - Identifying figures that have rotational symmetry or reflectional symmetry NEW
  - Rotational and point symmetries
  - 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
  - Finding a scale factor given a dilation in the coordinate plane
  - The effect of dilation on area
  - Writing a rule to describe a dilation
  - Determining if figures are similar and related by a sequence of transformations
  - Identifying transformations and determining if they preserve congruent figures
- Area, Volume, and Circles (72 topics)
    - Word problem on population density
    - 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
    - Finding the area of a right triangle using the Pythagorean Theorem
    - Computing an area using the Pythagorean Theorem
    - Informal proof of the Pythagorean Theorem
    - Area involving rectangles and triangles
    - 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
    - Area of a regular polygon
    - Finding the area of a regular polygon using special right triangles
    - Investigating the effects on the area for non-proportional and proportional figures
    - Finding the radius or the diameter of a circle given its circumference
    - Circumference ratios
    - Perimeter involving rectangles and circles
    - Distinguishing between the area and circumference of a circle
    - Area involving rectangles and circles
    - Area between two concentric circles
    - Word problem involving the area between two concentric circles
    - Area involving inscribed figures
    - Area involving multiple inscribed figures
    - Circles inscribed in and circumscribed about regular polygons
    - Area of a sector of a circle: Exact answer in terms of pi
    - 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
    - Identifying properties of Euclidean and spherical geometries
    - 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
- 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
- Lateral surface area and surface area of a cone: Exact answers in terms of pi
- Volume of a rectangular prism made of unit cubes
- Volume of a rectangular prism with fractional edge lengths
- Distinguishing between surface area and volume
- 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
- Describing the formula for 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
- 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: Exact answers in terms of pi
- Relating the volumes of a cylinder and a cone
- Surface area of a sphere
- Identifying similar solids
- Word problem involving volumes of similar solids
- Arc length and area of a sector of a circle
- Sequences, Probability, and Conic Sections (118 topics)
  - Finding the first terms of an arithmetic sequence using an explicit rule
  - Finding the first terms of a geometric sequence using an explicit rule
  - Finding the first terms of a sequence using an explicit rule with multiple occurrences of  $n$
  - 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
  - Finding a specified term of an arithmetic sequence given two terms of the sequence
  - Writing an explicit rule for an arithmetic sequence
  - Writing a recursive rule for an arithmetic sequence
  - Finding patterns in shapes
  - Sum of the first  $n$  terms of an arithmetic sequence
  - 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
  - Finding a specified term of a geometric sequence given two terms of the sequence
  - Arithmetic and geometric sequences: Identifying and writing an explicit rule
  - Writing recursive rules for arithmetic and geometric sequences
  - Sum of the first  $n$  terms of a geometric sequence
  - Sum of an infinite geometric series
  - Identifying linear, quadratic, and exponential functions given ordered pairs
  - Identifying statistical questions
  - Choosing an appropriate method for gathering data: Problem type 1
  - Choosing an appropriate method for gathering data: Problem type 2
  - Introduction to expectation
  - Calculating relative frequencies in a contingency table
  - Calculating relative frequencies in a contingency table: Advanced
  - Constructing a line plot
  - Constructing a frequency distribution and a histogram

- Interpreting a histogram
- Interpreting a stem-and-leaf plot
- Constructing a stem-and-leaf plot NEW
- Finding a percentage of a total amount in a circle graph
- Angle measure in a circle graph
- Mode of a data set
- Range of a data set
- Interpreting a percent bar graph to summarize categorical data using the mode NEW
- How changing a value affects the range and IQR
- Mean of a data set
- Computations involving the mean, sample size, and sum of a data set
- Finding the value for a new score that will yield a given mean
- Weighted mean
- Mean and median of a data set
- How changing a value affects the mean and median
- Finding outliers in a data set
- Choosing the best measure to describe data
- Identifying the center, spread, and shape of a data set
- Percentage of data below a specified value
- Percentiles
- 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
- Computing mean absolute deviation from a list of numerical values
- Population standard deviation
- Interpreting a tree diagram
- Counting principle with repetition allowed
- Counting arrangements of objects that are not all distinct
- Permutations and combinations: Problem type 3
- Probabilities of an event and its complement
- Experimental and theoretical probability
- Finding the odds in favor and against
- Area as probability
- Experimental and theoretical probability for compound events
- Probabilities involving two rolls of a die
- Probability of dependent events: Decimal answers
- Probabilities of draws with replacement
- Probabilities of draws without replacement
- Computing probability involving the addition rule using a two-way frequency table
- Using the binomial formula to solve a word problem: Problem type 1
- Using the binomial formula to solve a word problem: Problem type 2
- Identifying outcomes in a random number table used to simulate a compound event
- Using a random number table to simulate a compound event
- Generating random samples from a population with known characteristics
- 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
- Graphing a parabola of the form  $x = a(y-k)^2 + h$  or  $y = a(x-h)^2 + k$
- Graphing a parabola of the form  $ay^2 + by + cx + d = 0$  or  $ax^2 + bx + cy + d = 0$
- Writing an equation of a parabola given the vertex and the focus
- Writing an equation of a parabola given the focus and the directrix
- Finding the vertex, focus, directrix, and axis of symmetry of a parabola
- Finding the focus of a parabola of the form  $ay^2 + by + cx + d = 0$  or  $ax^2 + bx + cy + d = 0$
- Writing an equation of a parabola given its graph
- Word problem involving a parabola
- Identifying the center and radius to graph a circle given its equation in general form: Advanced
- Writing an equation of a circle given its center and a point on the circle
- Graphing an ellipse given its equation in standard form
- Graphing an ellipse centered at the origin:  $Ax^2 + By^2 = C$
- Graphing an ellipse given its equation in general form
- Finding the center, vertices, and foci of an ellipse
- Finding the foci of an ellipse given its equation in general form
- Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis
- Writing an equation of an ellipse given the foci and the major axis length
- Word problem involving an ellipse
- Graphing a hyperbola given its equation in standard form
- Graphing a hyperbola centered at the origin:  $Ax^2 + By^2 = C$
- Graphing a hyperbola given its equation in general form
- Finding the center, vertices, foci, and asymptotes of a hyperbola
- Finding the foci of a hyperbola given its equation in general form

- Writing an equation of a hyperbola given the foci and the vertices
- Writing an equation of a hyperbola given the foci and the asymptotes: Basic
- Writing an equation of a hyperbola given the foci and the asymptotes: Advanced
- Classifying conics given their equations
- Graphing a quadratic inequality: Problem type 1
- Graphing a quadratic inequality: Problem type 2
- Using a graphing calculator to solve a nonlinear system of equations: Basic
- Using a graphing calculator to solve a nonlinear system of equations: Advanced
- Solving a system of nonlinear equations: Problem type 1
- Solving a word problem involving geometry using a system of nonlinear equations
- Graphing a system of nonlinear inequalities: Problem type 1
- Trigonometry (80 topics)
  - Sine, cosine, and tangent ratios: Variables for side lengths
  - Converting degrees-minutes-seconds to decimal degrees
  - Converting decimal degrees to degrees-minutes-seconds
  - Converting between degree and radian measure: Problem type 1
  - Converting between degree and radian measure: Problem type 2
  - Sketching an angle with absolute value less than  $2\pi$  radians in standard position
  - Coterminal angles
  - Arc length and central angle measure
  - Area of a sector of a circle
  - Finding coordinates on the unit circle for special angles
  - Trigonometric functions and special angles: Problem type 1
  - Finding values of trigonometric functions from a point on the unit circle
  - Trigonometric functions and special angles: Problem type 2
  - Trigonometric functions and special angles: Problem type 3
  - Evaluating a sinusoidal function that models a real-world situation
  - Reference angles: Problem type 1
  - Reference angles: Problem type 2
  - Determining the location of a terminal point given the signs of trigonometric values
  - Finding values of trigonometric functions given information about an angle: Problem type 1
  - Finding values of trigonometric functions given information about an angle: Problem type 3
  - Values of inverse trigonometric functions
  - Solving a triangle with the law of sines: Problem type 1
  - Solving a triangle with the law of sines: Problem type 2
  - Solving a word problem using the law of sines
  - Proving the law of sines
  - Solving a triangle with the law of cosines
  - Proving the law of cosines
  - Solving a word problem using the law of cosines
  - Using trigonometry to find the area of a triangle
  - Expressing the area of a triangle in terms of the sine of one of its angles
  - Simplifying trigonometric expressions
  - Using cofunction identities
  - Verifying a trigonometric identity
  - Proving trigonometric identities: Problem type 1
  - Sum and difference identities: Problem type 1
  - Sum and difference identities: Problem type 2
  - Double-angle identities: Problem type 1
  - Half-angle identities: Problem type 1
  - Finding solutions in an interval for a basic trigonometric equation involving sine or cosine
  - Finding solutions in an interval for a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
  - Using a calculator to approximate inverse trigonometric values
  - Finding solutions in an interval for a basic trigonometric equation using a calculator
  - Solving a basic trigonometric equation involving sine or cosine
  - Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
  - Finding solutions in an interval for a trigonometric equation in factored form
  - Finding solutions in an interval for a trigonometric equation involving a squared function: Problem type 1
  - Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2
  - Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 1
  - Solving a trigonometric equation modeling a real-world situation
  - Using a graphing calculator to solve a trigonometric equation
  - Solving a trigonometric equation involving a squared function: Problem type 1
  - Solving a trigonometric equation involving a squared function: Problem type 2
  - Solving a trigonometric equation involving more than one function
  - 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
- Plotting points in polar coordinates
- Multiple representations of polar coordinates
- Converting rectangular coordinates to polar coordinates: Special angles
- Converting rectangular coordinates to polar coordinates: Decimal answers
- Converting polar coordinates to rectangular coordinates
- Writing a complex number in standard form given its trigonometric form
- Writing a complex number in trigonometric form: Special angles
- Writing a complex number in trigonometric form: Decimal answers
- Multiplying and dividing complex numbers in trigonometric form
- De Moivre's Theorem: Answers in trigonometric form
- De Moivre's Theorem: Answers in standard form
- Finding the  $n$ th roots of a number: Problem type 1
- Finding the  $n$ th roots of a number: Problem type 2

**\*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.