

High School Geometry

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

Curriculum (524 topics + 406 additional topics)

- Arithmetic and Algebra Review (151 topics)
 - Fractions and Decimals (28 topics)
 - Factors
 - Greatest common factor of 2 numbers
 - Equivalent fractions
 - Simplifying a fraction
 - Division involving zero
 - Introduction to addition or subtraction of fractions with different denominators
 - Addition or subtraction of fractions with different denominators
 - Product of a unit fraction and a whole number
 - Product of a fraction and a whole number: Problem type 1
 - Fraction multiplication
 - Product of a fraction and a whole number: Problem type 2
 - The reciprocal of a number
 - Division involving a whole number and a fraction
 - Fraction division
 - Complex fraction without variables: Problem type 1
 - Decimal place value: Tenths and hundredths
 - Rounding decimals
 - Introduction to ordering decimals
 - Using a calculator to convert a fraction to a rounded decimal
 - Addition of aligned decimals
 - Decimal subtraction: Basic
 - Decimal subtraction: Advanced
 - Word problem with addition or subtraction of 2 decimals
 - Multiplication of a decimal by a power of ten
 - Introduction to decimal multiplication
 - Multiplying a decimal by a whole number
 - Word problem with multiple decimal operations: Problem type 1
 - Converting a fraction to a terminating decimal: Basic
 - Signed Numbers (14 topics)
 - Plotting integers on a number line
 - Ordering integers
 - Absolute value of a number
 - 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
 - Integer multiplication and division
 - Multiplication of 3 or 4 integers
 - Signed fraction addition or subtraction: Basic
 - Signed fraction multiplication: Basic
 - Order of Operations and Algebraic Expressions (23 topics)
 - Introduction to exponents
 - Exponents and integers: Problem type 1
 - Exponents and fractions
 - Order of operations with whole numbers
 - Order of operations with whole numbers and exponents: Basic
 - Order of operations with integers
 - Exponents and signed fractions
 - Evaluating an algebraic expression: Whole number addition or subtraction
 - Evaluating an algebraic expression: Whole number multiplication or division
 - 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

- 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
 - Factoring a linear binomial
 - Using distribution and combining like terms to simplify: Univariate
 - Combining like terms in a quadratic expression
 - Introduction to adding fractions with variables and common denominators
- Linear Equations (29 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 whole numbers: Fractional answers
 - Multiplicative property of equality with fractions
 - Multiplicative property of equality with integers
 - Multiplicative property of equality with signed fractions
 - Identifying solutions to a linear equation in one variable: Two-step equations
 - Using two steps to solve an equation with whole numbers
 - Additive property of equality with a negative coefficient
 - Solving a two-step equation with integers
 - Introduction to using substitution to solve a linear equation
 - Introduction to solving an equation with parentheses
 - Identifying properties used to solve a linear equation
 - Introduction to solving an equation with variables on the same side
 - Solving a linear equation with several occurrences of the variable: Variables on the same side
 - Introduction to solving a linear equation with a variable on each side
 - Solving a linear equation with several occurrences of the variable: Variables on both sides
 - Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
 - Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
 - Introduction to solving a rational equation
 - Solving a rational equation that simplifies to linear: Denominator x
 - Translating a phrase into a one-step expression
 - Translating a sentence into a one-step equation
 - Writing an equation to represent a proportional relationship
 - Solving a word problem on proportions using a unit rate
- Solving Formulas for a Variable (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
- Percents (6 topics)
 - Introduction to converting a percentage to a decimal
 - Introduction to converting a decimal to a percentage
 - Converting between percentages and decimals
 - Converting a fraction to a percentage: Denominator of 4, 5, or 10
 - Converting a fraction to a percentage: Denominator of 20, 25, or 50
 - Writing a ratio as a percentage
- Inequalities (8 topics)
 - Translating a sentence by using an inequality symbol
 - Introduction to identifying solutions to an inequality
 - Translating a sentence into a compound inequality
 - Additive property of inequality with whole numbers
 - Additive property of inequality with integers
 - Multiplicative property of inequality with whole numbers
 - Solving a two-step linear inequality with whole numbers
 - Solving a two-step linear inequality: Problem type 1
- Exponents and Polynomials (11 topics)
 - Introduction to the product rule of exponents
 - Introduction to the power of a product rule of exponents
 - Simplifying a ratio of multivariate monomials: Basic
 - Simplifying a sum or difference of two univariate polynomials
 - Multiplying binomials with leading coefficients of 1
 - Multiplying binomials with leading coefficients greater than 1
 - Multiplying binomials in two variables
 - Squaring a binomial: Univariate
 - Squaring a binomial: Multivariate

- Factoring a quadratic with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient 1
- Radicals (10 topics)
 - Square root of a perfect square
 - Using a calculator to approximate a square root
 - Square root of a rational perfect square
 - Simplifying the square root of a whole number less than 100
 - Simplifying the square root of a whole number greater than 100
 - Introduction to square root addition or subtraction
 - Introduction to square root multiplication
 - Square root multiplication: Basic
 - Simplifying a quotient of square roots
 - Rationalizing a denominator: Quotient involving square roots
- Venn Diagrams and Sets (4 topics)
 - Interpreting a Venn diagram of 2 sets
 - Interpreting a Venn diagram of 3 sets
 - Interpreting Venn diagram cardinalities with 2 sets for a real-world situation
 - Interpreting Venn diagram cardinalities with 3 sets for a real-world situation
- Introduction to Perimeter and Area (15 topics)
 - Perimeter of a polygon
 - Perimeter of a square or a rectangle
 - Finding the missing length in a figure
 - Writing algebraic expressions for the perimeter of a figure
 - Finding a side length given the perimeter and side lengths with variables
 - Area of a rectangle on a grid
 - Area of a square or a rectangle
 - Distinguishing between the area and perimeter of a rectangle
 - Areas of rectangles with the same perimeter
 - Word problem involving the area of a rectangle: Problem type 2
 - Finding side lengths of rectangles given one dimension and an area or a perimeter
 - Word problem on optimizing an area or perimeter
 - Finding the area of a composite figure on a grid
 - Introduction to area of a piecewise rectangular figure
 - Area between two rectangles
- Segments and Angles (37 topics)
 - Points, Lines, and Planes (5 topics)
 - Naming segments, rays, and lines
 - Analyzing relationships between points, lines, and planes given a figure
 - Identifying congruent shapes on a grid
 - Identifying parallel and perpendicular lines
 - Matching basic geometric terms with their definitions
 - Distances and Midpoints on a Number Line (5 topics)
 - Introduction to segment addition
 - Computing the distance between two integers on a number line
 - Finding a point on a number line given the length of a segment and another point
 - Midpoint of a number line segment: Integers
 - Segment addition and midpoints
 - Ordered Pairs (3 topics)
 - Reading a point in the coordinate plane
 - Plotting a point in the coordinate plane
 - Table for a linear equation
 - Distances and Midpoints in the Coordinate Plane (7 topics)
 - Finding distances between points that share a common coordinate given the graph
 - Finding distances between points that share a common coordinate given their coordinates
 - Introduction to the Pythagorean Theorem
 - Pythagorean Theorem
 - Distance between two points in the plane: Exact answers
 - Identifying congruent segments in the plane
 - Midpoint of a line segment in the plane
 - Angles (13 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
 - Introduction to angle addition

- Finding the complement or supplement of an angle given a figure
- Solving an equation involving complementary or supplementary angles
- Finding supplementary and complementary angles
- Angle addition with relationships between angles
- Angle addition and angle bisectors
- Identifying linear pairs and vertical angles
- Finding angle measures given two intersecting lines
- Solving equations involving vertical angles and linear pairs
- Segment and Angle Constructions (4 topics)
 - Constructing congruent line segments
 - Constructing an angle bisector
 - Constructing congruent angles
 - Constructing the perpendicular bisector of a line segment
- Reasoning (13 topics)
 - Patterns and Inductive Reasoning (3 topics)
 - Finding the next terms of an arithmetic sequence with whole numbers
 - Finding the next terms of a geometric sequence with whole numbers
 - Finding patterns in shapes
 - Negations and Conditional Statements (6 topics)
 - Negation of a statement
 - Conditional statements and negations
 - 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
 - Deductive Reasoning (1 topics)
 - Conditional statements and deductive reasoning
 - Proofs Involving Segments and Angles (3 topics)
 - Introduction to proofs: Justifying statements
 - Proofs involving segment congruence
 - Proofs involving angle congruence
- Lines (31 topics)
 - Parallel Lines and Transversals (5 topics)
 - Identifying corresponding and alternate angles
 - Finding angle measures given two parallel lines cut by a transversal
 - Solving equations involving angles and a pair of parallel lines
 - Solving equations involving angles and two pairs of parallel lines
 - Establishing facts about the angles created when parallel lines are cut by a transversal
 - Line Constructions (2 topics)
 - Constructing a pair of perpendicular lines
 - Constructing a pair of parallel lines
 - Proofs Involving Parallel Lines (2 topics)
 - Introduction to proofs involving parallel lines
 - Proofs involving parallel lines
 - Graphing Lines (8 topics)
 - 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
 - Slope of Lines (3 topics)
 - Finding slope given the graph of a line on a grid
 - Finding slope given two points on a line
 - Finding the slopes of horizontal and vertical lines
 - Equations of Lines (5 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

- 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
- Parallel and Perpendicular Lines (5 topics)
 - Finding slopes of lines parallel and perpendicular to a line given in slope-intercept form
 - Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$
 - Identifying parallel and perpendicular lines from equations
 - Writing equations of lines parallel and perpendicular to a given line through a point
 - Identifying parallel and perpendicular lines from coordinates
- Systems of Equations (1 topics)
 - Solving a system of linear equations of the form $y = mx + b$
- Triangles (47 topics)
 - Classifying Triangles (4 topics)
 - Acute, obtuse, and right triangles
 - Classifying scalene, isosceles, and equilateral triangles by side lengths
 - Identifying coordinates that give right triangles
 - Identifying scalene, isosceles, and equilateral triangles given coordinates of their vertices
 - Angles of Triangles (6 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
 - Finding angle measures of a triangle given with variables
 - Establishing facts about the interior angles of a triangle
 - Congruent Triangles (5 topics)
 - Identifying transformations
 - Identifying and naming congruent parts of congruent triangles
 - Determining if figures are related by rigid motions
 - Examining triangle congruence in terms of rigid motion
 - Exploring the triangle congruence theorems
 - 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 (4 topics)
 - Finding side lengths and angle measures of isosceles and equilateral triangles
 - Finding an angle measure for a triangle sharing a side with another triangle
 - Finding angle measures of an isosceles triangle given angles with variables
 - Proofs of theorems involving isosceles triangles
 - Segments within Triangles (7 topics)
 - 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
 - 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 (8 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
 - Using the hinge theorem

- Indirect proof (proof by contradiction)
- Polygons and Quadrilaterals (20 topics)
 - Angles of Polygons (5 topics)
 - Naming polygons
 - Sum of the angle measures of a quadrilateral
 - Finding the sum of the interior angle measures of a convex polygon given the number of sides
 - Finding a missing interior angle measure in a convex polygon
 - Finding the measures of an interior angle and an exterior angle of a regular polygon
 - Parallelograms and Trapezoids (15 topics)
 - Identifying parallelograms, rectangles, and squares
 - Properties of quadrilaterals
 - Classifying parallelograms
 - Finding measures involving diagonals of parallelograms
 - Conditions for parallelograms
 - Finding measures involving diagonals of rectangles
 - Finding angle measures involving diagonals of a rhombus
 - Conditions for quadrilaterals
 - Completing proofs of theorems involving sides of a parallelogram
 - Completing proofs of theorems involving angles of a parallelogram
 - Drawing and identifying a polygon in the coordinate plane
 - Finding the coordinates of a point to make a parallelogram
 - Finding coordinates of vertices of polygons
 - Proving that a quadrilateral with given vertices is a parallelogram
 - Classifying parallelograms in the coordinate plane
- Similarity (25 topics)
 - Ratios and Proportions (8 topics)
 - Writing ratios for real-world situations
 - Simplifying a ratio of whole numbers: Problem type 1
 - Solving a proportion of the form $x/a=b/c$: Basic
 - Solving a proportion of the form $x/a = b/c$
 - Solving a proportion of the form $(x+a)/b = c/d$
 - Word problem on proportions: Problem type 1
 - Finding a point that partitions a number line segment in a given ratio
 - Finding a point that partitions a segment in the plane in a given ratio
 - 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
 - Similar polygons
 - Similar right triangles
 - Indirect measurement
 - Triangles and parallel lines
 - Triangles and angle bisectors
 - Proving Triangle Similarity (6 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
 - Proving the slope criterion for parallel or perpendicular lines
 - 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
- Right Triangles and Trigonometry (24 topics)
 - The Pythagorean Theorem (2 topics)
 - Word problem involving the Pythagorean Theorem
 - Identifying side lengths that give right triangles
 - 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

- Right Triangle Trigonometry (11 topics)
 - Sine, cosine, and tangent ratios: Numbers for side lengths
 - Using a calculator to approximate sine, cosine, and tangent values
 - Understanding trigonometric ratios through similar right triangles
 - Relationship between the sines and cosines of complementary angles
 - Using similar right triangles to find trigonometric ratios
 - Using a trigonometric ratio to find a side length in a right triangle
 - Solving a right triangle
 - Using trigonometry to find a length in a word problem with one right triangle
 - Using trigonometry to find a length in a word problem with two right triangles
 - 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

- Laws of Sines and Cosines (7 topics)
 - 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
 - Solving a word problem using the law of cosines
 - Proving the law of cosines

- Transformations (37 topics)
 - Translations (6 topics)
 - Translating a point and giving its coordinates: One step
 - Translating a point and giving its coordinates: Two steps
 - Properties of translated figures
 - Determining if figures are related by a translation
 - Translating a polygon
 - Understanding the definition of a translation

 - Reflections (9 topics)
 - Reflecting a point across an axis
 - Reflecting a point across an axis and giving its coordinates
 - Finding the coordinates of a point reflected across an axis
 - Reflecting a polygon across the x-axis or y-axis
 - Properties of reflected figures
 - Determining if figures are related by a reflection
 - Reflecting a polygon over a vertical or horizontal line
 - Finding the coordinates of a point reflected across an axis and translated
 - Understanding the definition of a reflection

 - Rotations (5 topics)
 - Rotating a point and giving its coordinates
 - Properties of rotated figures
 - Determining if figures are related by a rotation
 - Rotating a figure about the origin
 - Understanding the definition of a rotation

 - Symmetry (3 topics)
 - Drawing lines of symmetry
 - Finding an angle of rotation
 - Identifying rotational symmetry and angles of rotation

 - Congruence Transformations (7 topics)
 - Writing a rule to describe a translation
 - Writing a rule to describe a reflection
 - Writing a rule to describe a rotation
 - Identifying transformations that map a quadrilateral onto itself
 - Identifying transformations that map a regular polygon onto itself
 - Determining if figures are congruent and related by a transformation
 - Determining if figures are congruent and related by a sequence of transformations

 - Dilations (7 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
 - Writing a rule to describe a dilation
 - Exploring similarity of circles
 - Exploring the effect of dilation on lines

- Area and Volume (65 topics)

- Areas of Parallelograms and Triangles (12 topics)
 - Area of a parallelogram
 - Finding the area of a right triangle on a grid
 - Finding the area of a right triangle or its corresponding rectangle
 - Area of a triangle
 - Finding the perimeter or area of a rectangle in the coordinate plane
 - Word problem on population density
 - 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
 - Area involving rectangles and triangles
 - Using trigonometry to find the area of a right triangle
 - Expressing the area of a triangle in terms of the sine of one of its angles
- Areas of Trapezoids, Rhombi, and Kites (3 topics)
 - Area of a trapezoid
 - Area of a rhombus
 - Finding the area of a trapezoid, rhombus, or kite in the coordinate plane
- Areas of Regular Polygons and Similar Polygons (4 topics)
 - Area of a regular polygon
 - Finding the area of a regular polygon using special right triangles
 - Side lengths, perimeters, and areas of similar polygons
 - Investigating the effects on the area for non-proportional and proportional figures
- Circumferences and Areas of Circles (13 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
 - Area involving rectangles and circles
 - Area between two concentric circles
 - Area involving inscribed figures
 - Area involving multiple inscribed figures
 - Area of a sector of a circle: Exact answer in terms of pi
 - Informal argument for the formula of the area of a sector
- Solids and Cross Sections (6 topics)
 - Classifying solids
 - Vertices, edges, and faces of a solid
 - Identifying geometric shapes that model real-world objects
 - Nets of solids
 - Identifying horizontal and vertical cross sections of solids
 - Identifying solids generated by rotations of two-dimensional regions
- Surface Areas of Prisms and Cylinders (3 topics)
 - Surface area of a cube or a rectangular prism
 - Surface area of a triangular prism
 - Surface area of a cylinder
- Volumes of Prisms and Cylinders (16 topics)
 - Volume of a rectangular prism made of unit cubes
 - Volume of a rectangular prism
 - Writing equivalent expressions for the volume of a rectangular prism
 - Volume of an oblique rectangular prism
 - Distinguishing between surface area and volume
 - Word problem involving the volume of 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
 - 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 (3 topics)
 - Volume of a pyramid
 - Volume of a cone

- Informal argument for the formula of the volume of a cone
- Surface Areas and Volumes of Spheres (2 topics)
 - Surface area of a sphere
 - Volume of a sphere
- Similar Solids (3 topics)
 - Identifying similar solids
 - Computing ratios of side lengths, surface areas, and volumes for similar solids
 - Computing side length, surface area, and volume for similar solids
- Circles (31 topics)
 - Segments in a Circle and Tangent Lines (3 topics)
 - Identifying chords, secants, and tangents of a circle
 - Tangents of a circle: Problem type 1
 - Constructing a tangent of a circle
 - Chords and Arcs (5 topics)
 - Naming and finding measures of central angles, inscribed angles, and arcs of a circle
 - Applying properties of radii, diameters, and chords
 - Arc length
 - Arc length and area of a sector of a circle
 - 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
 - Graphs and Equations of Circles (7 topics)
 - Identifying the center and radius to graph a circle given its equation in standard form
 - Completing the square
 - 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
 - Graphs and Equations of Parabolas (5 topics)
 - Graphing a parabola of the form $y = ax^2$
 - Graphing a parabola of the form $y = ax^2 + c$
 - Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
 - Graphing a parabola of the form $y^2 = ax$ or $x^2 = ay$
 - Deriving the equation of a parabola given its focus and directrix
- Probability and Data Analysis (43 topics)
 - Permutations and Combinations (9 topics)
 - Introduction to the counting principle
 - Counting principle
 - Counting principle with repetition allowed
 - Factorial expressions
 - Computing permutations and combinations
 - Word problem involving permutations
 - Introduction to permutations and combinations
 - Permutations and combinations: Problem type 1
 - Permutations and combinations: Problem type 2
 - Probability of Simple Events (8 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 selecting one card from a standard deck
 - Probabilities of an event and its complement
 - Experimental and theoretical probability
 - Area as probability
- Two-Way Tables (3 topics)
 - Constructing a two-way frequency table: Basic
 - Constructing a two-way frequency table: Advanced
 - Computing a percentage from a table of values
- Probabilities of Independent and Dependent Events (15 topics)
 - Determining a sample space and outcomes for an event: Experiment involving multiple selections
 - Outcomes and event probability
 - Experimental and theoretical probability for compound events
 - Probabilities of a permutation and a combination
 - Identifying independent events given descriptions of experiments
 - Probability of independent events
 - Probability of dependent events
 - Determining outcomes for unions, intersections, and complements of events
 - 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
- Probabilities of the Union of Two Events (3 topics)
 - Using a Venn diagram to understand the addition rule for probability
 - Outcomes and event probability: Addition rule
 - Computing probability involving the addition rule using a two-way frequency table
- Modeling Randomness and Simulations (5 topics)
 - Identifying outcomes in a random number table used to simulate a simple event
 - Using a random number table to simulate a simple event
 - Constructing a percent bar graph
 - Generating a random number table with technology to simulate a simple event
 - Using a random number table to make a fair decision
- Other Topics Available(*) (406 additional topics)
 - Arithmetic and Algebra Review (162 topics)
 - Fractional position on a number line
 - Plotting fractions on a number line
 - Least common multiple of 2 numbers
 - Least common multiple of 3 numbers
 - Finding the LCD of two fractions
 - Addition and subtraction of 3 fractions with different denominators
 - Multiplication of 3 fractions
 - 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
 - Addition and subtraction of 3 mixed numbers with different denominators
 - Mixed number multiplication
 - Multiplication of a mixed number and a whole number
 - Mixed number division
 - Division of a decimal by a power of ten
 - Division of a decimal by a whole number
 - Converting a decimal to a proper fraction in simplest form: Basic
 - Converting a fraction to a repeating decimal: Basic
 - Plotting rational numbers on a number line
 - Finding all numbers with a given absolute value
 - Signed fraction subtraction involving double negation
 - Signed decimal addition and subtraction
 - Order of operations with whole numbers and grouping symbols
 - Distributive property: Fractional coefficients
 - Additive property of equality with signed fractions
 - Multiplicative property of equality with decimals
 - Solving an equation to find the value of an expression
 - Solving a multi-step equation given in fractional form
 - Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
 - Clearing fractions in an equation

- Solving a two-step equation with signed fractions
- Introduction to solving an absolute value equation
- 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
- Using a calculator to convert a fraction to a rounded percentage
- Finding a percentage of a whole number
- Finding a percentage of a whole number without a calculator: Basic
- Writing a ratio as a percentage without a calculator
- 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 percentage increase or decrease: Basic
- Graphing a linear inequality on the number line
- Graphing a compound inequality on the number line
- Identifying solutions to a one-step linear inequality
- Multiplicative property of inequality with integers
- Multiplicative property of inequality with signed fractions
- Identifying solutions to a two-step linear inequality in one variable
- Solving a two-step linear inequality: Problem type 2
- Solving a two-step linear inequality with a fractional coefficient
- Product rule with positive exponents: Univariate
- Introduction to the power of a power rule of exponents
- Introduction to the quotient rule of exponents
- Simplifying a ratio of univariate monomials
- Quotient of expressions involving exponents
- Multiplying a univariate polynomial by a monomial with a positive coefficient
- Multiplying conjugate binomials: Univariate
- Introduction to the GCF of two monomials
- Factoring out a monomial from a polynomial: Univariate
- 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
- Square roots of perfect squares with signs
- Cube root of an integer
- Square roots of integers raised to even exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- Using absolute value to simplify square roots of perfect square monomials
- 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
- Rationalizing a denominator: Square root of a fraction
- Introduction to solving a radical equation
- Solving a radical equation that simplifies to a linear equation: One radical, basic
- Solving an equation of the form $x^3 = a$ using integers
- 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 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: Exact answers, basic
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Identifying numbers as integers or non-integers
- Identifying rational decimal numbers
- Identifying true statements about rational and irrational numbers
- Identifying numbers as rational or irrational
- Constructing a Venn diagram to classify rational numbers
- Constructing a Venn diagram to describe relationships between sets of rational numbers
- Constructing a Venn diagram to classify real numbers
- Constructing a Venn diagram to describe relationships between sets of real numbers
- Identifying elements of sets for a real world situation
- Writing sets of numbers using descriptive and roster forms
- Writing sets for a real-world situation using descriptive and roster forms
- Identifying infinite sets and determining cardinalities of finite sets
- Identifying equivalent and equal sets
- Identifying equivalent and equal sets for a real-world situation
- Writing sets of natural numbers using set-builder and roster forms
- Set-builder notation
- Membership and cardinality of sets

- Identifying true statements involving subsets and proper subsets
 - Identifying true statements about set membership and subsets
 - Writing subsets
 - Determining the total number of subsets of a set
 - Writing subsets for a real-world situation
 - Determining the number of subsets for a real-world situation
 - Finding sets and complements of sets
 - Finding sets and complements of sets for a real-world situation
 - Union and intersection of finite sets
 - Constructing a Venn diagram with 2 sets
 - Constructing a Venn diagram with 2 sets to solve a word problem
 - Constructing a Venn diagram with 3 sets
 - Constructing a Venn diagram with 3 sets to solve a word problem
 - Perimeter of a rectangle on a grid
 - Perimeter of a polygon involving mixed numbers and fractions
 - Perimeter of a piecewise rectangular figure
 - Sides of polygons having the same perimeter
 - Area of a rectangle with fractional side lengths
 - Area of a rectangle involving mixed number and fractional side lengths
 - Writing algebraic expressions for the area of a figure
 - Finding side lengths of squares given an area and a perimeter
 - Finding the dimensions of a rectangle given its perimeter and a relationship between sides
 - Finding the perimeter or area of a rectangle given one of these values
 - Estimates and exact answers
 - Area of a piecewise rectangular figure
 - Word problem involving the area between two rectangles
 - Measuring length to the nearest inch
 - Measuring length to the nearest quarter or half inch
 - U.S. Customary length conversion with whole number values
 - Conversions involving measurements in feet and inches
 - Adding measurements in feet and inches
 - U.S. Customary length conversions involving rounding decimals
 - Word problem involving a U.S. Customary length conversion
 - U.S. Customary volume conversion with whole number values
 - U.S. Customary weight conversions with whole number values
 - U.S. Customary unit conversion with whole number values: Two-step conversion
 - U.S. Customary area unit conversion with whole number values
 - Word problem on area involving conversions of U.S. Customary units: Problem type 1
 - Word problem on area involving conversions of U.S. Customary units: Problem type 2
 - Unit conversions involving acres and hectares
 - Measuring length to the nearest centimeter
 - Measuring length to the nearest millimeter
 - Metric distance conversion with whole number values
 - Metric distance conversion with decimal values
 - Metric distance conversions between the base unit m and dm, dam, hm
 - Metric mass or volume conversion with whole numbers
 - Metric conversion with decimal values: Two-step problem
 - Metric area unit conversion with decimal values
 - Converting between metric and U.S. Customary unit systems
 - Word problem on area involving conversions between systems
 - Time unit conversion with whole number values
 - U.S. Customary length conversions involving dimensional analysis
 - Solving a one-step word problem using the formula $d = rt$
 - Converting between compound units: Basic
 - Word problem involving U.S. Customary length conversions using dimensional analysis
 - Word problem involving a conversion between U.S. Customary units of weight and metric units of mass
 - Converting between compound units: Advanced
- Segments and Angles (14 topics)
 - 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
 - Plotting a point in the coordinate plane: Mixed number coordinates
 - Naming the quadrant or axis of a point given its graph
 - Naming the quadrant or axis of a point given its coordinates
 - Naming the quadrant or axis of a point given the signs of its coordinates
 - Using the Pythagorean Theorem to find distance on a grid
 - Distance between two points in the plane: Decimal answers
 - Finding an endpoint of a line segment given the other endpoint and the midpoint
 - Finding a point that partitions a segment in the plane in a given fractional relationship
 - Writing and solving an equation involving complementary or supplementary angles
 - Making conjectures given a geometric construction

- Reasoning (26 topics)
 - Finding the next terms of an arithmetic sequence with integers
 - Finding the next terms of a geometric sequence with signed numbers
 - Identifying statements
 - Identifying simple and compound statements
 - Symbolic translation of negations, conjunctions, and disjunctions: Basic
 - Symbolic translation of conditional and biconditional statements: Basic
 - 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
 - Validity of an argument
 - Translating an argument and determining its validity
 - Distinguishing between undefined terms, definitions, postulates, conjectures, and theorems
- Lines (25 topics)
 - Table for a linear function
 - Finding x- and y-intercepts of a line given the equation: Basic
 - 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
 - Classifying slopes given graphs of lines
 - Using right triangles to find the slope of a line
 - Graphing a line given its slope and y-intercept
 - Graphing a line through a given point with a given slope
 - 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 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 equation of a line through two given points
 - Writing the equations of vertical and horizontal lines through a given point
 - Identifying solutions to a system of linear equations
 - Identifying the solution of systems of linear equations from graphs
 - Graphically solving a system of linear equations both of the form $y=mx+b$
 - Graphically solving a system of linear equations
 - Solving a system of linear equations using substitution
 - Solving a system of linear equations using elimination with addition
 - Solving a system of linear equations using elimination with multiplication and addition
- Triangles (10 topics)
 - Classifying scalene, isosceles, and equilateral triangles by side lengths or angles
 - 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
 - Proofs involving congruent triangles that overlap: Advanced
 - 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
- Polygons and Quadrilaterals (3 topics)
 - Finding the number of sides of a convex polygon given the sum of the measures of the interior angles
 - Finding the number of sides of a regular polygon given the measure of an interior angle
 - Congruence in the coordinate plane
- Similarity (8 topics)
 - Writing ratios using different notations

- Simplifying a ratio of decimals
 - Solving a proportion of the form $a/(x+b) = c/x$
 - Word problem on proportions: Problem type 2
 - Finding the coordinate that yields a given slope
 - Relationships about ratios within and between similar triangles
 - Finding angle measures and side ratios to determine if two triangles are similar
 - Reproducing a scale drawing at a different scale
- Right Triangles and Trigonometry (16 topics)
 - Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
 - Using the Pythagorean Theorem repeatedly
 - Demonstrating the converse of the Pythagorean Theorem
 - Special right triangles: Decimal answers
 - Sine, cosine, and tangent ratios: Variables for side lengths
 - Using the Pythagorean Theorem to find a sine, cosine, or tangent ratio in a right triangle
 - Using the Pythagorean Theorem to find several trigonometric ratios in a right triangle
 - Writing a vector in component form given its initial and terminal points
 - Multiplication of a vector by a scalar: Geometric approach
 - Magnitude of a vector given in component form
 - Vector addition and scalar multiplication: Component form
 - Linear combination of vectors: Component form
 - 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
- Transformations (12 topics)
 - Using a translated point to find coordinates of other translated points
 - Reflecting a point across both coordinate axes
 - Finding the coordinates of a point reflected across both axes
 - Finding the coordinates of three points reflected over an axis
 - Rotational and point symmetries
 - The effect of dilation on area
 - Determining if figures are similar and related by a sequence of transformations
 - Addition or subtraction of matrices
 - Scalar multiplication of a matrix
 - Linear combination of matrices
 - Squaring and multiplying 2x2 matrices
 - Multiplication of matrices: Basic
- Area and Volume (51 topics)
 - Computing an area using the Pythagorean Theorem
 - Informal proof of the Pythagorean Theorem
 - Finding an area in terms of variables
 - Using trigonometry to find the area of a triangle
 - Heron's formula
 - Finding the area of a trapezoid on a grid by using triangles and rectangles
 - Finding the area of a rhombus using the Pythagorean Theorem
 - 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
 - Word problem involving the area between two concentric circles
 - Circles inscribed in and circumscribed about regular polygons
 - Nets of solids: Advanced
 - Counting the cubes in a solid made of cubes
 - Side views of a solid made of cubes
 - Identifying properties of Euclidean and spherical geometries
 - Surface area of a rectangular prism made of unit cubes
 - Using a net to find the surface area of a rectangular prism
 - Using a net to find the lateral surface area and total surface area of a rectangular prism
 - Word problem involving the surface area of a rectangular prism
 - Word problem involving U.S. Customary conversions, surface area, and cost
 - Surface area of a piecewise rectangular prism made of unit cubes
 - Using a net to find the surface area of a triangular prism
 - Using a net to find the lateral surface area and total surface area of a triangular prism
 - Surface area of a cylinder: Exact answers in terms of pi
 - 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 solid made of cubes with unit fraction edge lengths

- Volume of a rectangular prism with fractional edge lengths
 - Measuring the net of a solid to find surface area or volume
 - Finding the side length of a cube given its volume
 - Word problem involving the rate of filling or emptying a rectangular prism
 - Word problem on volume involving conversions of U.S. Customary units
 - Word problem involving the volume of a triangular prism
 - Word problem involving the rate of filling or emptying a cylinder
 - Word problem on density involving the volume of a cylindrical solid
 - Ratio of volumes
 - Converting between U.S. Customary units of volume: Problem type 1
 - Converting between metric units of volume and capacity
 - 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
 - Word problem involving the volume of a cone
 - Word problem involving the volume of a sphere
 - Word problem involving volumes of similar solids
- Circles (7 topics)
 - Tangents of a circle: Problem type 2
 - Angle measure in a circle graph
 - Converting between degree and radian measure: Problem type 1
 - 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
 - Writing an equation of a circle given the endpoints of a diameter
 - Graphing a parabola of the form $y = (x-h)^2 + k$
- Probability and Data Analysis (72 topics)
 - Interpreting a tree diagram
 - Counting arrangements of objects that are not all distinct
 - Permutations and combinations: Problem type 3
 - Finding the odds in favor and against
 - Converting between probability and odds
 - Finding odds in favor and against drawing a card from a standard deck
 - Introduction to expectation
 - Computing expected value in a game of chance
 - Computing expected value in a business application
 - Finding if a question can be answered by the data
 - Making an inference using a two-way frequency table
 - Calculating relative frequencies in a contingency table
 - Calculating relative frequencies in a contingency table: Advanced
 - Probabilities involving two rolls of a die
 - Probability of independent events involving a standard deck of cards
 - Probability of dependent events involving a survey
 - Probability of dependent events involving a standard deck of cards
 - Probabilities of draws with replacement
 - Probabilities of draws without replacement
 - Probability of the union of two events
 - Word problem involving the probability of a union
 - Probability of intersection or union: Word problems
 - Constructing a bar graph for non-numerical data
 - Identifying outcomes in a random number table used to simulate a compound event
 - Using a random number table to simulate a compound event
 - Generating a random number table with technology to simulate a compound event
 - Generating random samples from a population with known characteristics
 - Identifying statistical questions
 - Classifying samples
 - Choosing an appropriate method for gathering data: Problem type 1
 - Choosing an appropriate method for gathering data: Problem type 2
 - Making predictions using experimental data for compound events
 - Making a reasonable inference based on proportion statistics
 - Constructing a line plot
 - Constructing a line plot with fractional values: Fourths
 - Making part-to-whole, part-to-part, and equivalence comparisons given a line plot
 - Interpreting a bar graph
 - Making part-to-whole, part-to-part, and equivalence comparisons given a bar graph
 - Interpreting a double bar graph
 - Constructing a frequency distribution for grouped data
 - Constructing a relative frequency distribution for grouped data
 - Constructing a frequency distribution and a histogram
 - Interpreting a stem-and-leaf plot
 - Interpreting a circle graph or pie chart
 - Finding a percentage of a total amount in a circle graph

- Making part-to-part and equivalence comparisons given a circle graph
- Computations from a circle graph
- Mode of a data set
- Range of a data set
- Finding the mode and range from a line plot
- Mean of a data set
- Finding the mean of a symmetric distribution
- Computations involving the mean, sample size, and sum of a data set
- Finding the value for a new score that will yield a given mean
- Rejecting unreasonable claims based on average statistics
- 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 peaks, symmetry, gaps, and clusters in a line plot
- Identifying the center, spread, and shape of a data set
- Computing mean absolute deviation from a list of numerical values
- Percentage of data below a specified value
- Interpreting percentile ranks
- Percentiles
- Comparing measures of center and variation
- Finding sample size and comparing samples for estimating the mean
- Using back-to-back stem-and-leaf plots to compare data sets
- Five-number summary and interquartile range
- Constructing a box-and-whisker plot
- Using box-and-whisker plots to compare data sets

***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.