

## Geometry

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
9.3	Geometry & Measurement		
9.3.1	Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations.		
9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.	Unit 9: Surface Area and Volume	<p>Section A, p. 10: Finding the Surface Area of Prisms and Cylinders p. 14: Finding the Volume of Prisms and Cylinders</p> <p>Section B, p. 9: Surface Area of Pyramids and Cones p. 12: Flashcards: Volumes of Pyramids and Cones</p> <p>Section C: Written Assignment: Surface Area and Volume of Spherical Objects</p>
9.3.1.2	Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.	<p>Unit 4: Triangles</p> <p>Unit 5: Quadrilaterals and Polygons</p> <p>Unit 9: Surface Area and Volume</p>	<p>Section E</p> <p>Section B, p. 17: Think &amp; Click: Perimeter and Area of a Parallelogram</p> <p>Section C, p. 16: Flashcards: Perimeter and Area</p> <p>Section D, p. 16: Think &amp; Click: Perimeter and Area of Trapezoids and Kites</p> <p>Section A, B, C</p>

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9.3.1.3	Understand that quantities associated with physical measurements must be assigned units; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert between measurement systems.	Unit 6: Similarity	Section C, p. 15: Think & Click: Similar Polygons in Real World Problems
9.3.1.4	Understand and apply the fact that the effect of a scale factor $k$ on length, area and volume is to multiply each by $k$ , $k^2$ and $k^3$ , respectively.		
9.3.1.5	Make reasonable estimates and judgments about the accuracy of values resulting from calculations involving measurements.		
9.3.2	Construct logical arguments, based on axioms, definitions and theorems, to prove theorems and other results in geometry.		
9.3.2.1	Understand the roles of axioms, definitions, undefined terms and theorems in logical arguments.	Unit 2: Introduction to Proofs	Section B, p. 7: Theorems, Postulates, and Definitions
9.3.2.2	Accurately interpret and use words and phrases such as "if...then," "if and only if," "all," and "not." Recognize the logical relationships between an "if...then" statement and its inverse, converse and contrapositive.	Unit 2: Introduction to Proofs	Section A, p. 28: Writing Assignment: Conditional Statements
9.3.2.3	Assess the validity of a logical argument and give counterexamples to disprove a statement.	Unit 2: Introduction to Proofs	Section A, p. 25: Tutorial: Truth Tables  p. 28: Writing Assignment: Conditional Statements
9.3.2.4	Construct logical arguments and write proofs of theorems and other results in geometry, including proofs by contradiction. Express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts or illustrations.	Unit 2: Introduction to Proofs	Section B, p. 14: Writing Assignment: Two Column Proofs

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9.3.2.5	Use technology tools to examine theorems, test conjectures, perform constructions and develop mathematical reasoning skills in multi-step problems. The tools may include compass and straight edge, dynamic geometry software, design software or Internet applets.	Unit 3: Lines and the Coordinate Plane	Section A, p. 11: Writing Assignment: Construct a Parallel Line  Section C, p. 21: Writing Assignment: Construct a Perpendicular Line
9.3.3	Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry.		
9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.	Unit 1: Introduction to Geometry	Section D, p. 8: Example: Perpendicular Lines p. 19: Tutorial: Parallel Lines and Transversals
9.3.3.2	Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.	Unit 2: Introduction to Proofs	Section B, p. 11: Two Column Proofs in Geometry p. 12: Fill in the Blanks p. 14: Writing Assignment: Two Column Proofs
9.3.3.3	Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.	Unit 4: Triangles	Section A, p. 4: Classifying Triangles: Sides p. 5: Classifying Triangles: Angles
9.3.3.4	Apply the Pythagorean Theorem and its converse to solve problems and logically justify results.	Unit 4: Triangles	Section C, p. 14: Flashcards: Real World Applications of the Pythagorean Theorem
9.3.3.5	Know and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems and logically justify results.	Unit 4: Triangles	Section C, p. 5: Tutorial: 45-45-90 Right Triangle p. 7: Tutorial: 30-60-90 Right Triangle p. 11: Writing Assignment: Special Right Triangles
9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.	Unit 4: Triangles	Section B, p. 9: Think & Click: Proving Triangles Congruent  p. 15: Writing

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		Unit 6: Similarity	Assignment: Proofs on Congruent Triangles  Section B, p. 15: Similarity Postulates Quiz
9.3.3.7	Use properties of polygons-including quadrilaterals and regular polygons-to define them, classify them, solve problems and logically justify results.	Unit 5: Quadrilaterals and Polygons	Section A, p. 6: Flashcards: Naming Polygons  Section B, p. 14: Parallelogram Proof Assignment  Section C, p. 18: Squares, Rectangles, and Rhombi Quiz
9.3.3.8	Know and apply properties of a circle to solve problems and logically justify results.	Unit 7: Circles	Section B, p. 15: Angles and Arcs Short Answer Quiz
9.3.4	Solve real-world and mathematical geometric problems using algebraic methods.		
9.3.4.1	Understand how the properties of similar right triangles allow the trigonometric ratios to be defined, and determine the sine, cosine and tangent of an acute angle in a right triangle.	Unit 8: Right Triangles and Trigonometry	Section B, p. 5: Tutorial: The Sine, Cosine and Tangent Functions  p. 7: Example: Sine, Cosine and Tangent of $60^\circ$ and $45^\circ$
9.3.4.2	Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios.	Unit 8: Right Triangles and Trigonometry	Section B, p. 19: Flashcards: Trigonometric Ratios in Real-Life Problems  p. 13: Evaluate Trigonometric Expressions With Your Calculator

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9.3.4.3	Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.	Unit 8: Right Triangles and Trigonometry	Section B, p. 14: Finding Angles Using Trigonometric Ratios
9.3.4.4	Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments.	Unit 3: Lines and the Coordinate Plane	Section A, p. 12: Tutorial: The Distance Formula p. 15: The Midpoint Formula  Section C, p. 5: Slope-Intercept Form
9.3.4.5	Know the equation for the graph of a circle with radius $r$ and center $(h,k)$ , $(x - h)^2 + (y - k)^2 = r^2$ , and justify this equation using the Pythagorean Theorem and properties of translations.	Unit 7: Circles	Section C, p. 4: Equations of a Circle Centered at the Origin  p. 5: Equations of a Circle Centered at the Point $(h, k)$
9.3.4.6	Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of $90^\circ$ , to solve problems involving figures on a coordinate grid.	Unit 10: Transformations	Section A  Section B, p. 6: Think & Click: Rotations p. 8: Dilations on a Coordinate Axis
9.3.4.7	Use algebra to solve geometric problems unrelated to coordinate geometry, such as solving for an unknown length in a figure involving similar triangles, or using the Pythagorean Theorem to obtain a quadratic equation for a length in a geometric figure.	Unit 6: Similarity	Section C, p. 15: Think & Click: Similar Polygons in Real World Problems