

# 2003/2010 ACOS MATHEMATICS CONTENT CORRELATION GEOMETRY

<b>2003 ACOS</b>		<b>2010 ACOS</b>
<b>CURRENT ALABAMA CONTENT PLACEMENT</b>		<b>2010 GEOMETRY CONTENT</b>
<b>G.1</b>	Determine the equation of a line parallel or perpendicular to a second line through a given point.	G.32. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). [G-GPE5]
<b>G.2</b>	Justify theorems related to pairs of angles, including angles formed by parallel and perpendicular lines, vertical angles, adjacent angles, complementary angles, and supplementary angles.	G.9. Prove theorems about lines and angles. <i>Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</i> [G-CO9]
<b>G.3</b>	Verify the relationships among different classes of polygons by using their properties.	G.11. Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i> [G-CO11]
<b>G.3.B.1</b>	Determining the missing lengths of sides or measures of angles in similar polygons	G.15. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. [G-SRT2]
<b>G.4</b>	Determine the measure of interior and exterior angles associated with polygons.	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
<b>G.4.B.1</b>	Verifying the formulas for the measures of interior and exterior angles of polygons inductively and deductively	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
<b>G.5</b>	Solve real-life and mathematical problems using properties and theorems related to circles, quadrilaterals, and other geometric shapes.	G.11. Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i> [G-CO11] G.25. Prove that all circles are similar. [G-C1] G.26. Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i> [G-C2] G.36. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. <i>Use dissection arguments, Cavalieri's principle, and informal limit arguments.</i> [G-GMD1] G.42. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).* [G-MG3]
<b>G.5.B.1</b>	Determining the equation of a circle given its center and radius	G.30. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.[G-GPE1]
<b>G.6</b>	Apply the Pythagorean Theorem to solve application problems, expressing answers in simplified radical form or as decimal approximations, using Pythagorean triples when applicable	G.21. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.* [G-SRT8]

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G.7	Use the ratios of the sides of special right triangles to find lengths of missing sides.	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
G.7.B.1	Deriving the ratios of the sides of 30-60-90 and 45-45-90 triangles	G.19. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. [G-SRT6]
G.8	Deduce relationships between two triangles, including proving congruence or similarity of the triangles from given information, using the relationships to solve problems and to establish other relationships.	G.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. [G-CO6] G.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. [G-CO7] G.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. [G-CO8] G.10. Prove theorems about triangles. <i>Theorems include: measures of interior angles of a triangle sum to 180 degrees; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i> [G-CO10] G.16. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. [G-SRT3] G.17. Prove theorems about triangles. <i>Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.</i> [G-SRT4]
G.8.B.1	Determining the geometric mean to find missing lengths in right triangles	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
G.9	Use inductive reasoning to make conjectures and deductive reasoning to justify conclusions.	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
G.9.B.1.	Recognizing the limitations of justifying a conclusion through inductive reasoning	<b>CONTENT NO LONGER ADDRESSED IN GEOMETRY</b>
G.10	Find the missing measures of sides and angles in right triangles by applying the right triangle definitions of sine, cosine, and tangent.	G.20. Explain and use the relationship between the sine and cosine of complementary angles. [G-SRT7] G.21. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.* [G-SRT8] G.22. <i>Derive the formula <math>A = (1/2)ab \sin(C)</math> for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.</i> [G-SRT9]
G.11	Determine the areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.	G.13. <i>Construct</i> an equilateral triangle, a square, and a regular hexagon inscribed in a circle. [G-CO13] G.26. Identify and describe relationships among inscribed angles, radii, and chords. <i>Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</i> [G-C2] G.27. <i>Construct</i> the inscribed and circumscribed circles of a triangle, and <i>prove properties of angles for a quadrilateral inscribed in a circle.</i> [G-C3] G.34. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.* [G-GPE7] G.35. Determine areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.(AL)

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G.12	Apply distance, midpoint, and slope formulas to solve problems and to confirm properties of polygons.	G.31. Use coordinates to prove simple geometric theorems algebraically. [G-GPE4] G.32. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). [G-GPE5] G.33. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. [G-GPE6]
G.13	Identify the coordinates of the vertices of the image of a given polygon that is translated, rotated, reflected, or dilated.	G.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). [G-CO2] G.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. [G-CO3] G.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. [G-CO4] G.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. [G-CO5] G.14. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. [G-SRT1], [G-SRT1a] b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. [G-SRT1], [G-SRT1b] G.15. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. [G-SRT2] G.18. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [G-SRT5]
G.14	Classify polyhedrons according to their properties, including the number of faces.	G.39. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. [G-GMD4]
G.14.B.1	Identifying Euclidean solids	G.39. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. [G-GMD4] G.40. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).* [G-MG1]
G.15	Calculate measures of arcs and sectors of a circle from given information.	G.29. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. [G-C5]
G.16	Calculate surface areas and volumes of solid figures, including spheres, cones, and pyramids.	G.37. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.* [G-GMD3] G.35. Determine areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.(AL)

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G.16.B.1	Developing formulas for surface area and volume of spheres, cones, and pyramids	G.36. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. <i>Use dissection arguments, Cavalieri's principle, and informal limit arguments.</i> [G-GMD1]
G.16.B.2	Calculating specific missing dimensions of solid figures from surface area or volume	G.35. Determine areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics. (AL) G.37. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.* [G-GMD3]
G.16.B.3	Determining the relationship between the surface areas of similar figures and volumes of similar figures	G.38. Determine the relationship between surface areas of similar figures and volumes of similar figures. (AL)
G.17	Analyze sets of data from geometric contexts to determine what, if any, relationships exist.	G.43. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$ , and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.* [S-CP3] G.45. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.* [S-CP5]
G.17.B.1	Distinguishing between conclusions drawn when using deductive and statistical reasoning	G.43. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$ , and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.* [S-CP3] G.45. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.* [S-CP5]
G.17.B.2	Calculating probabilities arising in geometric contexts	G.43. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$ , and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.* [S-CP3] G.44. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. * [S-CP4] G.45. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.* [S-CP5] G.46. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.* [S-CP6]
G.18	Construct with precision a circle graph to represent data from given tables or classroom experiments.	G.44. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. * [S-CP4] G.46. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.* [S-CP6]
<b>CONTENT MOVED TO GEOMETRY IN 2010 ACOS</b>		
A2T.10	Solve general triangles, mathematical problems, and real-world applications using the Law of Sines and the Law of Cosines.	G.24. Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces). [G-SRT11]
A2T.10.B.1	Deriving formulas for Law of Sines and Law of Cosines	G.23. Prove the Laws of Sines and Cosines and use them to solve problems. [G-SRT10]
A2T.14.B.1	Examining data to determine if a linear, quadratic, or exponential relationship exists and to predict outcomes	G.51. Analyze decisions and strategies using probability concepts (e.g, product testing, medical testing, pulling a hockey goalie at the end of the game). [S-MD7]
A2.11.B.1	Examining data to determine if a linear, quadratic, or exponential relationship exists and to predict outcomes	

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A2T.15 A2.12.B.1	Using permutations and combinations to calculate probabilities	G.49. Use permutations and combinations to compute probabilities of compound events and solve problems.* [S-CP9]
AI.15.B.1	Comparing theoretical and experimental probabilities	G.51. Analyze decisions and strategies using probability concepts (e.g. product testing, medical testing, pulling a hockey goalie at the end of the game). [S-MD7]
A2T.15.B.3	Calculating probabilities of mutually exclusive events, independent events, and dependent events	G.47. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.* [S-CP7]
A2.12.B.3	Calculating probabilities of mutually exclusive events, independent events, and dependent events	G.48. Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B A)] = [P(B)] \times [P(A B)]$ , and interpret the answer in terms of the model.* [S-CP8]
8.8.B.3	Constructing congruent and similar polygons, congruent angles, congruent segments, and parallel and perpendicular lines	G.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). <i>Constructions include copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</i> [G-CO12]
8.9	Determine the measures of special angle pairs, including adjacent, vertical, supplementary, and complementary angles, and angles formed by parallel lines cut by a transversal.	G.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.[G-CO1]
8.11.B.2	Determining the appropriate units of measure to describe surface area and volume	G.41. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).* [G-MG2]
8.14.B.3	Computing the probability of two independent events and two dependent events	G.48. Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B A)] = [P(B)] \times [P(A B)]$ , and interpret the answer in terms of the model.* [S-CP8]
8.14.B.4	Determining the probability of an event through simulation	G.50. Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).* [S-MD6]
7.13.B.3	Modeling the probability of events through simulations with random numbers	G.50. Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).* [S-MD6]
3.8	Identify geometric representations for points, lines, perpendicular lines, parallel lines, angles, and rays.	G.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.[G-CO1]
<b>NEW GEOMETRY CONTENT IN 2010 ACOS</b>		
		G.28. Construct a tangent line from a point outside a given circle to the circle. [G-C4]