QualityCore/ACCRS Correlation – GEOMETRY

QualityCore Course Standard	Geometry COS Standard	Comment
C. Using Logic and Proof to Reason Mathematically		
1. Logic and Proof		
a. Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems.	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] 4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. [G-CO4] 9. Prove theorems about lines and angles. *Theorems include vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; and points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* [G-CO9]	**These standards are explored in the ACOS by experimenting with transformations and rigid motions. Theorems are proved by using a variety of ways.**
b. Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions.		**Inductive and deductive reasoning is used throughout the ACOS.**
c. Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions.		
d. Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)	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]	
e. Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs.	**Prove geometric theorems. *(Focus on validity of underlying reasoning while using variety of ways of writing proofs.)*** 9. Prove theorems about lines and angles. *Theorems include vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; and points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* [G-CO9]	

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	10. Prove theorems about triangles. *Theorems include measures of interior angles of a triangle sum to 180º, 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, and the medians of a triangle meet at a point.* [G-CO10] 11. Prove theorems about parallelograms. *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.* [G-CO11]	
f. Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements.	8. Explain how the criteria for triangle congruence, angle-side-angle (ASA), side-angle-side (SAS), and side-side-side (SSS), follow from the definition of congruence in terms of rigid motions. [G-CO8]	**The ACOS does not address AAS and HL. Also, transformations and rigid motion are used to experiment and understand congruence.**
g. Use the principle that corresponding parts of congruent triangles are congruent to solve problems.	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]	**Again, note the emphasis on rigid motions**
h. Use several methods, including AA, SAS, and SSS, to prove that two triangles are similar, corresponding sides are proportional, and corresponding angles are congruent.	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] 16. Use the properties of similarity transformations to establish the angle-angle (AA) criterion for two triangles to be similar. [G-SRT3]	**SAS and SSS are not address in the ACOS and the CCSS. Similarity is explored in terms of similarity transformations in the ACOS and the CCSS.**
i. Use properties of special quadrilaterals in a proof	11. Prove theorems about parallelograms. *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.* [G-CO11]	
D. Identifying, Classifying, and Applying the Properties of Geometric Figures in Space		
1. Points, Lines, Planes, and Space		
a. Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols.	12. Make formal geometric constructions with a variety of tools and methods such as compass and straightedge, string, reflective devices, paper folding, and dynamic geometric software. *Constructions include copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular*	

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	bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. [G-CO12] 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]	
b. Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g., solve equations, use in proofs)		**Addressed in Grade 7**
c. Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)	9. Prove theorems about lines and angles. *Theorems include vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; and points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* [G-CO9] 12. Make formal geometric constructions with a variety of tools and methods such as compass and straightedge, string, reflective devices, paper folding, and dynamic geometric software. *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.* [G-CO12]	**The ACOS and the CCSS requires students to prove theorems about lines and angles and make formal geometric constructions.**
d. Use construction techniques, including straightedge and compass, to bisect and trisect segments and to create parallel and perpendicular lines, perpendicular bisectors, and angle bisectors.	12. Make formal geometric constructions with a variety of tools and methods such as compass and straightedge, string, reflective devices, paper folding, and dynamic geometric software. *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.* [G-CO12]	**Here the ACOS/CCSSM includes a broader variety of construction techniques.**
e. Locate, describe, and draw a locus in a plane or space		**The standards in the ACOS and CCSS do not address locus.**
f. Apply properties and theorems of parallel and perpendicular lines to solve problems.	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]	**The ACOS and CCSS require students to prove the slope as well as use. Quality Core requires students to apply properties and theorems.**
2. Polygons		

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a. Identify and classify triangles by their sides and angles		
b. Identify medians, altitudes, perpendicular bisectors, and angle bisectors of triangles and use their properties to solve problems	10. Prove theorems about triangles. *Theorems include measures of interior angles of a triangle sum to 180º, 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, and the medians of a triangle meet at a point.* [G-CO10] 27. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. [G-C3]	**The ACOS and CCSS require students to prove and construct, but the Quality Core requires students to identify and solve problems with these concepts.**
c. Apply the Triangle Inequality Theorem to determine if a triangle exists and the order of sides and angles.		**7th grade standard in ACOS and CCSS**
d. Solve problems involving the relationships formed when the altitude to the hypotenuse of a right triangle is drawn.	18. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [G-SRT5] 22. (+) Derive the formula $A = (1/2)ab\sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.[G-SRT9]	**This matches, but only in the most general sense.**
e. Apply the Pythagorean Theorem and its converse to triangles to solve mathematical and real-world problems.	17. Prove theorems about triangles. *Theorems include a line parallel to one side of a triangle divides the other two proportionally, and conversely; and the Pythagorean Theorem proved using triangle similarity.* [G-SRT4] 21. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.* [G-SRT8]	**In the 8th grade students should master the Pythagorean Theorem, the standard reads:** **21. Explain a proof of the Pythagorean Theorem and its converse. [8-G6]** **In Geometry, the converse of the Pythagorean Theorem is not explored. The Pythagorean Theorem is used to solve application problems.**
g. Identify and use Pythagorean triples in right triangles to find lengths of the unknown side.	22. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.[8-G7] 23. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. [8-G8]	**This is not a perfect match – Pythagorean triples are a particular case (whole numbers)..**
h. Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties.		**In the 5th grade, students classify and understand the properties of two-dimensional figures not just quadrilaterals.**

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		Also note the "hierarchy" requirement is more stringent.
i. Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the numbers of sides given angle measures, and to solve real-world problems.		**In the 8th grade ACOS and CCSS, students master the concept of the Angle Sum Theorem.**
j. Apply the Isosceles Triangle Theorem and its converse to triangles to solve mathematical and real-world problems.	10. Prove theorems about triangles. *Theorems include measures of interior angles of a triangle sum to 180º, 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, and the medians of a triangle meet at a point.* [G-CO10]	**This is an example of a broader standard**
3. Circles		
a. Identify and define lines segments associated with circles (e.g., radii, diameters, chords, secants, tangents)	26. Identify and describe *relationships* among inscribed angles, radii, and chords. *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.* [G-C2]	
b. Determine the measure of central and inscribed angles and their intercepted arcs.	26. Identify and describe *relationships* among inscribed angles, radii, and chords. *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.* [G-C2]	
c. Find segment lengths, angle measures, and intercepted arc measures formed by chords, secants, and tangents intersecting inside and outside circles.	26. Identify and describe *relationships* among inscribed angles, radii, and chords. *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.* [G-C2] 28. (+) Construct a tangent line from a point outside a given circle to the circle. [G-C4]	
d. Solve problems using inscribed and circumscribed polygons.	27. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. [G-C3]	
4. Solids		

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a. Identify and classify prisms, pyramids, cylinders, cones, and spheres and use their properties to solve problems.	36. Give an informal argument for the formulas for the circumference of a circle; area of a circle; and volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.* [G-GMD1] 37. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.* [G-GMD3] 38. Determine the relationship between surface areas of similar figures and volumes of similar figures.	**The Quality Core is about classification – this does not appear in ACOS and CCSSM.** **Note that work with solids can be found in grade 7 and grade 6.**
b. Describe and draw cross sections of prisms, cylinders, pyramids, and cones	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]	
E. Comparing Congruent and Similar Geometric Figures		
1. Similarity and Congruence		
a. Determine points or lines of symmetry and apply the properties of symmetry to figures		**Addressed in Grade 4**
b. Identify congruent figures and their corresponding parts	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]	**This is also implicit in 8.G.1**
c. Identify similar figures and use ratios and proportions to solve mathematical and real-world problems (e.g., finding the height of a tree using the shadow of the tree and the height and shadow of a person)	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]	
d. Use the definition of similarity to establish the congruence of angles, proportionality of sides, and scale factor of two similar polygons.	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]	
e. Identify and draw images of transformations and use their properties to solve problems.	18. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [G-SRT5]	**There is a range of CCSSM standards that apply from Grade 8.**
f. Apply relationships between perimeters of similar figures, areas of similar figures,		

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and volumes of similar figures, in terms of scale factor, to solve mathematical and real-world problems.		
g. Determine the geometric mean between two numbers and use it to solve problems (e.g., find the lengths of segments in right triangles)		
h. Identify and give properties of congruent or similar solids.		
F. Using Length, Area, Perimeter, and Volume to Find Quantities and Solve Problems		
1. Area and Perimeter		
a. Find the perimeter and area of common plane figures, including triangles, quadrilaterals, regular polygons, and irregular figures, from given information using appropriate units of measurement		**Triangle and quadrilateral area is in Grade 6.**
b. Manipulate perimeter and area formulas to solve problems (e.g., find missing lengths)	AI.7. Interpret expressions that represent a quantity in terms of its context.* [A-SSE1] a. Interpret parts of an expression, such as terms, factors, and coefficients. [A-SSE1a] b. Interpret complicated expressions by viewing one or more of their parts as a single entity. (Linear, exponential, quadratic)[A-SSE1b]	
c. Use area to solve problems involving geometric probability		
d. Find arc lengths and circumferences of circles from given information (e.g., radius, diameter, coordinates)	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]	
e. Find the area of a circle and the area of a sector of a circle from given information (e.g., radius, diameter, coordinates)	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]	
2. Lateral Area, Surface Area, and Volume		
a. Find the lateral area, surface area, and	22. (+) Derive the formula $A = (1/2)ab\sin(C)$ for the area of a triangle by	

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volume of prisms, cylinders, cone, and pyramids in mathematical and real-world settings.	drawing an auxiliary line from a vertex perpendicular to the opposite side. [G-SRT9] 34. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.* [G-GPE7] 36. Give an informal argument for the formulas for the circumference of a circle; area of a circle; and volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.* [G-GMD1] 37. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.* [G-GMD3] 38. Determine the relationship between surface areas of similar figures and volumes of similar figures.	
b. Use cross sections of prisms, cylinders, pyramids, and cones to solve volume problems	36. Give an informal argument for the formulas for the circumference of a circle; area of a circle; and volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.* [G-GMD1]	
c. Find the surface area and volume of a sphere in mathematical and real-world settings.	37. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.* [G-GMD3] 38. Determine the relationship between surface areas of similar figures and volumes of similar figures.	
G. Relating Geometric Ideas to the Coordinate Plane		
1. Coordinate Geometry		
a. Use slope to distinguish between and write equations for parallel and perpendicular lines.	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. Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information	31. Use coordinates to prove simple geometric theorems algebraically. [G-GPE4]	
c. Use coordinate geometry to solve	31. Use coordinates to prove simple geometric theorems algebraically.	

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problems about geometric figures (e.g., segments, triangles, quadrilaterals)	[G-GPE4] 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] 33. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. [G-GPE6] 34. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.* [G-GPE7] 35. Determine areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.	
d. Write equations for circles in standard form and solve problems using equations and graphs	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]	
e. Determine the effect of reflections, rotations, translations, and dilations and their compositions on the coordinate plane	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-CO]	
H. Investigating and Applying Basic Ideas of Trigonometry		
1. Introduction to Trigonometry		
a. Apply properties of 34-34-90 and 30-60-90 triangles to determine lengths of sides of triangles		
b. Find the sine, cosine, and tangent rations of acute angles given the side lengths of right triangles	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] 20. Explain and use the relationship between the sine and cosine of complementary angles. [G-SRT7] 21. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.* [G-SRT8]	
c. Use trigonometric ratios to find the sides or angles of right triangles and to solve	21. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.* [G-SRT8]	

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real-world problems (e.g. use angles of elevation and depression to find missing measures)		