Analysis of *California Mathematics* standards to *Common Core* standards
Geometry

CA Math Standard	Domain	Common Core Standard (CCS)	Alignment	Comments in reference to CCS
1.0 Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.	Mathematical Practice	MP.3; Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	Partial	Not specifically referenced in CCS
2.0 Students write geometric proofs, including proofs by contradiction.	G-Congruence G-Similarity, Right Triangles and Trigonometry	G-CO.9; Prove theorems about lines and angles. G-CO.10; Prove theorems about triangles. G-CO.11; Prove theorems about parallelograms. G-SRT.4; Prove theorems about triangles. G-SRT.5; Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Partial	CCS does not specifically reference proofs by contradiction
3.0 Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.	Mathematical Practice	MP 3 MP4 MP5	Partial	Not specifically referenced in CCS

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4.0 Students prove basic theorems involving congruence and similarity.	8-Geometry G-Congruence G-Similarity, Right Triangles and Trigonometry	8-Cluster; Understand congruence and similarity using physical models, transparencies, or geometry software. G-CO.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; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* G-CO.10; Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; 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.* G-CO.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-SRT. 4; Prove theorems about triangles. *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.* G-SRT.5; Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Yes	
5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.	8-Geometry G-Congruence G-Similarity, Right Triangles and Trigonometry	8-Cluster; Understand congruence and similarity using physical models, transparencies, or geometry software. G.CO-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.CO8; Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. G-SRT. 5; Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Yes	
6.0 Students know and are able to use the triangle inequality theorem.			No	

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7.0 Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.	G-Congruence G-Circles	G-CO.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; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* G-C.1; Prove that all circles are similar.	Partial	CCS does not specifically reference properties of circles or quadrilateral properties
8.0 Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.	G- Expressing Geometric Properties with Equations G-Geometry Measurement and Dimension	G-GPE.7; Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Partial	CCS does not specifically reference derivation of perimeter etc.
9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.	8-Geometry G-Geometry Measurement and Dimension	8-G.9; Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. G-MD.3; Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Yes	
10.0 Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.	6-Geometry	6-G.1; Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	Partial	CCS does not specifically reference scalene
11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.			No	
12.0 Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.	8-Geometry G-Congruence	8-G.5; Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. G-CO.9; Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate*	Yes	

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		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.		
13.0 Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.	7-Geometry	7-G.5; Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	No	Covered in 7th grade
14.0 Students prove the Pythagorean theorem.	8-Geometry	8-G.6; Explain a proof of the Pythagorean Theorem and its converse.	No	Covered in 8th grade
15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.	8-Geometry	8-G.7; Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. 8-G.8; Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	No	Covered in 8th grade
16.0 Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.	G-Congruence G-Circles	G-CO.12; Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *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-CO.13; Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. G-C.3; Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. G-C.4; Construct a tangent line from a point outside a given circle to the circle.	Yes	
17.0 Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.	G-Expressing G-Geometric Properties with Equations	G-GPE.4; Use coordinates to prove simple geometric theorems algebraically. G-GPE.7; Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Partial	CCS does not specifically reference midpoint

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18.0 Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also know and are able to use elementary relationships between them. For example, $\tan(x) = \sin(x)/\cos(x)$, $(\sin(x))^2 + (\cos(x))^2 = 1$.	G-Similarity, Right Triangles and Trigonometry F-Trigonometric Functions	G-SRT.6; 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-SRT.7; Explain and use the relationship between the sine and cosine of complementary angles. G-SRT.8; Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. F-TF.8; Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.	Partial	CCS does not specifically reference elementary trigonometric relationships
19.0 Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.	G-Similarity, Right Triangles and Trigonometry	G-SRT.7; Explain and use the relationship between the sine and cosine of complementary angles. G-SRT.8; Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Yes	
20.0 Students know and are able to use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles.			No	
21.0 Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.	G-Circles	G-C.2; 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-C.3; Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. G-C.4; Construct a tangent line from a point outside a given circle to the circle.	Partial	CCS does not specifically reference all the listed relationships
22.0 Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.	8-Geometry G- Congruence	8-G.1; Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure.	Yes	

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		G-CO; Cluster Experiment with transformations in the plane. G-CO.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.3; Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. G-CO.4; Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. G-C0.5; 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-CO.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.		