Geometry

This document provides correlations between the 2023 Indiana Academic Standards and the 2020 Indiana Academic Standards for easy reference.

The 2023 Indiana Academic Standards resulted from the standards streamlining process required by Indiana Code 20-31-3-1(c-d) and were adopted by the Indiana State Board of Education in June 2023. Standards designated as essential (E) are shaded in gray and all standards were renumbered to avoid gaps in sequencing.

2023 Indiana Academic Standard		2020 Indiana Academic Standard	
Domain: Geometry Foundations		**Domain: Logic and Proofs**	
Number	**Text**	**Number**	**Text**
G.GF.1	Describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems) and explain differences among supporting evidence, counterexamples, and actual proofs. (E)	**G.LP.1**	Understand and describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems). Understand the differences among supporting evidence, counterexamples, and actual proofs.
G.GF.2	State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and bi-conditional ("if and only if") statements.	**G.LP.3**	State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and biconditional ("if and only if") statements.
G.GF.3	Develop geometric proofs, including those involving coordinate geometry, using two-column, paragraph, and flow chart formats.	**G.LP.4**	Understand that proof is the means used to demonstrate whether a statement is true or false mathematically. Develop geometric proofs, including those involving coordinate geometry, using two-column, paragraph, and flow chart

			formats.
		G.LP.2	Use precise definitions for angle, circle, perpendicular lines, parallel lines, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation.
2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Geometry Foundations		**Domain: Points, Lines, and Angles**	
Number	**Text**	**Number**	**Text**
G.GF.4	Prove, construct, and apply theorems about parallel and perpendicular lines, parallel lines and transversals, vertical angles, and perpendicular bisectors. (E)	**G.PL.1**	Prove and apply theorems about lines and angles, including the following: a. Vertical angles are congruent. b. When a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent. c. When a transversal crosses parallel lines, same side interior angles are supplementary. d. Points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment.
G.GF.5	Determine if a pair of lines are parallel, perpendicular, or neither by comparing the slopes in coordinate graphs and equations. (E)	**G.PL.2**	Explore the relationships of the slopes of parallel and perpendicular lines. Determine if a pair of lines are parallel, perpendicular, or neither by comparing the slopes in coordinate graphs and equations.
G.GF.6	Use tools to explain and justify the process to	**G.PL.3**	Use tools to explain and justify the process to

	construct congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, parallel and perpendicular lines, and parallel lines and transversals.		construct congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines.
G.GF.7	Develop the distance formula using the Pythagorean Theorem. Find the lengths and midpoints of line segments in the two-dimensional coordinate system. (E)	G.PL.4	Develop the distance formula using the Pythagorean Theorem. Find the lengths and midpoints of line segments in the two-dimensional coordinate system.
2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Triangles		**Domain: Triangles**	
Number	**Text**	**Number**	**Text**
G.T.1	Prove and apply theorems about triangles, including: a. Interior angles of a triangle sum to 180° b. The Isosceles Triangle Theorem and its converse c. The Pythagorean Theorem d. The segment joining midpoints of two sides of a triangle is parallel to the third side and half the length e. A line parallel to one side of a triangle divides the other two proportionally, and its converse f. The Angle Bisector Theorem g. Triangle inequality h. Inequality in one triangle i. Hinge Theorem and its converse (E)	**G.T.1**	Prove and apply theorems about triangles, including the following: a. Measures of interior angles of a triangle sum to 180° b. The Isosceles Triangle Theorem and its converse c. The Pythagorean Theorem d. The segment joining midpoints of two sides of a triangle is parallel to the third side and half the length e. A line parallel to one side of a triangle divides the other two proportionally, and its converse f. The Angle Bisector Theorem
G.T.2	Prove and apply criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) from the definition of	**G.T.2**	Explore and explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow

	congruence in terms of rigid motions. (E)		from the definition of congruence in terms of rigid motions.
G.T.3	Use the definition of similarity in terms of similarity transformations to determine if two given triangles are similar. Explore and develop the meaning of similarity for triangles.	**G.T.4**	Use the definition of similarity in terms of similarity transformations, to determine if two given triangles are similar. Explore and develop the meaning of similarity for triangles.
G.T.4	Use congruent and similar triangles to solve real-world and mathematical problems involving sides, perimeters, and areas of triangles. (E)	**G.T.5**	Use congruent and similar triangles to solve real-world and mathematical problems involving sides, perimeters, and areas of triangles.
G.T.5	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.T.8**	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.T.6	Use trigonometric ratios (sine, cosine, tangent, and their inverses) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles. (E)	**G.T.9**	Use trigonometric ratios (sine, cosine, tangent and their inverses) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles.
G.T.7	Use the relationship between the sides of special right triangles (30° - 60° and 45° - 45°) to solve real-world and other mathematical problems. (E)	**G.T.10**	Explore the relationship between the sides of special right triangles (30° - 60° and 45° - 45°) and use them to solve real world and other mathematical problems.
		G.T.3	Use tools to explain and justify the process to construct congruent triangles.
		G.T.6	Prove and apply the inequality theorems, including the following: a. Triangle inequality. b. Inequality in one triangle. c. The hinge theorem and its

		G.T.7	Explore the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle. Understand and use the geometric mean to solve for missing parts of triangles.
2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Quadrilaterals and Other Polygons		**Domain: Quadrilaterals and Other Polygons**	
Number	**Text**	**Number**	**Text**
G.QP.1	Prove and apply theorems about parallelograms, including those involving angles, diagonals, and sides. (E)	**G.QP.1**	Prove and apply theorems about parallelograms, including those involving angles, diagonals, and sides.
G.QP.2	Prove that given quadrilaterals are parallelograms, rhombuses, rectangles, squares, kites, or trapezoids. Include coordinate proofs of quadrilaterals in the coordinate plane.	**G.QP.2**	Prove that given quadrilaterals are parallelograms, rhombuses, rectangles, squares, kites, or trapezoids. Include coordinate proofs of quadrilaterals in the coordinate plane.
G.QP.3	Develop and use formulas to find measures of interior and exterior angles of polygons.	**G.QP.3**	Develop and use formulas to find measures of interior and exterior angles of polygons.
G.QP.4	Compute perimeters and areas of regular and irregular polygons to solve real-world and other mathematical problems. (E)	**G.QP.5**	Compute perimeters and areas of polygons in the coordinate plane to solve real-world and other mathematical problems.
		G.QP.4	Identify types of symmetry of polygons, including line, point, rotational, and self-congruences.
		G.QP.6	Develop and use formulas for areas of regular polygons.

2023 Indiana Academic Standard		2020 Indiana Academic Standard	
Domain: Circles		**Domain: Circles**	
Number	**Text**	**Number**	**Text**
G.CI.1	Define, identify, and use relationships among the following: radius, diameter, arc, measure of an arc, chord, secant, tangent, congruent circles, and concentric circles.	**G.CI.1**	Define, identify and use relationships among the following: radius, diameter, arc, measure of an arc, chord, secant, tangent, congruent circles, and concentric circles.
G.CI.2	Explore and use relationships among inscribed angles, radii, and chords, including the following: a. The relationship that exists between central, inscribed, and circumscribed angles; b. Inscribed angles on a diameter are right angles; and c. The radius of a circle is perpendicular to a tangent where the radius intersects the circle.	**G.CI.3**	Explore and use relationships among inscribed angles, radii, and chords, including the following: a. The relationship that exists between central, inscribed, and circumscribed angles. b. Inscribed angles on a diameter are right angles. c. The radius of a circle is perpendicular to a tangent where the radius intersects the circle.
G.CI.3	Solve real-world and other mathematical problems that involve finding measures of circumference, areas of circles and sectors, and arc lengths and related angles (central, inscribed, and intersections of secants and tangents). (E)	**G.CI.4**	Solve real-world and other mathematical problems that involve finding measures of circumference, areas of circles and sectors, and arc lengths and related angles (central, inscribed, and intersections of secants and tangents).
		G.CI.2	Derive the fact that the length of the arc intercepted by an angle is proportional to the radius; derive the formula for the area of a sector.
		G.CI.5	Use tools to explain and justify the process to construct a circle that passes through three given

		G.CI.6	points not on a line, a tangent line to a circle through a point on the circle, and a tangent line from a point outside a given circle to the circle.
		G.CI.6	Use tools to construct the inscribed and circumscribed circles of a triangle. Prove properties of angles for a quadrilateral inscribed in a circle.

2023 Indiana Academic Standard		2020 Indiana Academic Standard	
Domain: Transformations and Three-Dimensional Solids		**Domain: Transformations**	
Number	**Text**	**Number**	**Text**
G.TS.1	Use geometric descriptions of rigid motions to transform figures and to predict and describe the results of translations, reflections and rotations on a given figure. Describe a motion or series of motions that will show two shapes are congruent. (E)	**G.TR.1**	Use geometric descriptions of rigid motions to transform figures and to predict and describe the results of translations, reflections and rotations on a given figure. Describe a motion or series of motions that will show two shapes are congruent.
G.TS.2	Verify experimentally the properties of dilations given by a center and a scale factor. Understand the dilation of a line segment is longer or shorter in the ratio given by the scale factor.	**G.TR.2**	Verify experimentally the properties of dilations given by a center and a scale factor. Understand the dilation of a line segment is longer or shorter in the ratio given by the scale factor.

2023 Indiana Academic Standard		2020 Indiana Academic Standard	
Domain: Transformations and Three-Dimensional Solids		**Domain: Three-Dimensional Solids**	
Number	**Text**	**Number**	**Text**
G.TS.3	Explore properties of congruent and similar solids, including prisms, regular pyramids, cylinders, cones, and spheres, and use them to solve problems.	**G.TS.3**	Explore properties of congruent and similar solids, including prisms, regular pyramids, cylinders, cones, and spheres and use them to solve problems.

G.TS.4	Solve real-world and other mathematical problems involving volume and surface area of prisms, cylinders, cones, spheres, and pyramids, including problems that involve composite solids and algebraic expressions. (E)	**G.TS.4**	Solve real-world and other mathematical problems involving volume and surface area of prisms, cylinders, cones, spheres, and pyramids, including problems that involve composite solids and algebraic expressions.
G.TS.5	Apply geometric methods to create and solve design problems. (E)	**G.TS.5**	Apply geometric methods to create and solve design problems.
		G.TS.1	Create a net for a given three-dimensional solid. Describe the three-dimensional solid that can be made from a given net (or pattern).
		G.TS.2	Explore and use symmetries of three-dimensional solids to solve problems.