Geometry with Data Analysis Alignment Checklist

Lesson	ACOS #	Standard
1.01, 1.02, 1.03	1	Extend understanding of irrational and rational numbers by rewriting expressions involving radicals, including addition, subtraction, multiplication, and division, in order to recognize geometric patterns.
1.04, 1.06	2	Use units as a way to understand problems and to guide the solution of multi-step problems.
1.04, 1.06	2a	Choose and interpret units consistently in formulas.
3.01, 3.03	2b	Choose and interpret the scale and the origin in graphs and data displays.
1.06	2c	Define appropriate quantities for the purpose of descriptive modeling.
1.06	2d	Choose a level of accuracy appropriate to limitations of measurements when reporting quantities.
6.04, 6.05, 7.01	3	Find the coordinates of the vertices of a polygon determined by a set of lines, given their equations, by setting their function rules equal and solving, or by using their graphs.
1.05, 1.06	4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Example: Rearrange the formula for the area of a trapezoid to highlight one of the bases.
3.01, 3.03, 3.04, 3.05, 13.04	5	Verify that the graph of a linear equation in two variables is the set of all its solutions plotted in the coordinate plane, which forms a line.
11.07	6	Derive the equation of a circle of given center and radius using the Pythagorean Theorem.
11.07	6a	Given the endpoints of the diameter of a circle, use the midpoint formula to find its center and then use the Pythagorean Theorem to find its equation.
2.02	6b	Derive the distance formula from the Pythagorean Theorem.
13.04, 13.05	7	Use mathematical and statistical reasoning with quantitative data, both univariate data (set of values) and bivariate data (set of pairs of values) that suggest a linear association, in order to draw conclusions and assess risk. Example: Estimate the typical age at which a lung cancer patient is diagnosed, and estimate how the typical age differs depending on the number of cigarettes smoked per day.
13.03, 13.04, 13.05	8	Use technology to organize data, including very large data sets, into a useful and manageable structure.
13.01. 13.03	9	Represent the distribution of univariate quantitative data with plots on the real number line, choosing a format (dot plot, histogram, or box plot) most appropriate to the data set, and represent the distribution of bivariate quantitative data with a scatter plot. Extend from simple cases by hand to more complex cases involving large data sets using technology.

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13.01, 13.02. 13,03	10	Use statistics appropriate to the shape of the data distribution to compare and contrast two or more data sets, utilizing the mean and median for center and the interquartile range and standard deviation for variability.
13.03	10a	Explain how standard deviation develops from mean absolute deviation.
13.03	10b	Calculate the standard deviation for a data set, using technology where appropriate.
13.01, 13.02, 13.03	11	Interpret differences in shape, center, and spread in the context of data sets, accounting for possible effects of extreme data points (outliers) on mean and standard deviation.
13.04, 13.05	12	Represent data of two quantitative variables on a scatter plot, and describe how the variables are related.
13.05	12a	Find a linear function for a scatter plot that suggests a linear association and informally assess its fit by plotting and analyzing residuals, including the squares of the residuals, in order to improve its fit.
13.05	12b	Use technology to find the least-squares line of best fit for two quantitative variables.
13.05	13	Compute (using technology) and interpret the correlation coefficient of a linear relationship.
	14	Distinguish between correlation and causation.
3.03, 13.05	15	Evaluate possible solutions to real-life problems by developing linear models of contextual situations and using them to predict unknown values.
3.03, 13.05	15a	Use the linear model to solve problems in the context of the given data.
3.02, 3.03, 13.05	15b	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the given data.
12.02	16	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
12.03, 12.04, 12.05, 12.06, 12.07, 12.08	17	Model and solve problems using surface area and volume of solids, including composite solids and solids with portions removed.
12.05, 12.06, 12.07	17a	Give an informal argument for the formulas for the surface area and volume of a sphere, cylinder, pyramid, and cone using dissection arguments, Cavalieri's Principle, and informal limit arguments.
12.03, 12.04, 12.05, 12.06, 12.07, 12.08	17b	Apply geometric concepts to find missing dimensions to solve surface area or volume problems.
6.03, 7.08	18	Given the coordinates of the vertices of a polygon, compute its perimeter and area using a variety of methods, including the distance formula and dynamic geometry software, and evaluate the accuracy of the results.
12.09	19	Derive and apply the relationships between the lengths, perimeters, areas, and volumes of similar figures in relation to their scale factor.

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11.08, 11.09	20	Derive and apply the formula for the length of an arc and the formula for the area of a sector.
8.01, 8.02, 8.03, 8.04, 8.05, 8.06	21	Represent transformations and compositions of transformations in the plane (coordinate and otherwise) using tools such as tracing paper and geometry software.
8.01, 8.02, 8.03, 8.04, 8.05, 8.06	21a	Describe transformations and compositions of transformations as functions that take points in the plane as inputs and give other points as outputs, using informal and formal notation.
6.04, 8.05	21b	Compare transformations which preserve distance and angle measure to those that do not.
8.01, 8.02, 8.03, 8.04, 8.06	22	Explore rotations, reflections, and translations using graph paper, tracing paper, and geometry software.
8.02, 8.03, 8.04, 8.06, 8.07	22a	Given a geometric figure and a rotation, reflection, or translation, draw the image of the transformed figure using graph paper, tracing paper, or geometry software.
8.01, 8.02, 8.03, 8.04, 8.06	22b	Specify a sequence of rotations, reflections, or translations that will carry a given figure onto another.
8.01	22c	Draw figures with different types of symmetries and describe their attributes.
8.01	23	Develop definitions of rotation, reflection, and translation in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
8.06	24	Define congruence of two figures in terms of rigid motions (a sequence of translations, rotations, and reflections); show that two figures are congruent by finding a sequence of rigid motions that maps one figure to the other. Example: $\triangle ABC$ is congruent to $\triangle XYZ$ since a reflection followed by a translation maps $\triangle ABC$ onto $\triangle XYZ$.
	25	Verify criteria for showing triangles are congruent using a sequence of rigid motions that map one triangle to another.
6.05, 6.06, 6.07	25a	Verify that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
6.05, 6.06, 6.07	25b	Verify that two triangles are congruent if (but not only if) the following groups of corresponding parts are congruent: angle-side-angle (ASA), side-angle-side (SAS), side-side-side (SSS), and angle-angle-side (AAS). *Example: Given two triangles with two pairs of congruent corresponding sides and a pair of congruent included angles, show that there must be a sequence of rigid motions will map one onto the other.*
8.05	26	Verify experimentally the properties of dilations given by a center and a scale factor.
8.05	26a	Verify that 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.
8.05	26b	Verify that the dilation of a line segment is longer or shorter in the ratio given by the scale factor.
8.05	27	Given two figures, determine whether they are similar by identifying a similarity transformation (sequence of rigid motions and dilations) that maps one figure to the other.

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10.02, 8.05	28	Verify criteria for showing triangles are similar using a similarity transformation (sequence of rigid motions and dilations) that maps one triangle to another.
9.03	28a	Verify that two triangles are similar if and only if corresponding pairs of sides are proportional and corresponding pairs of angles are congruent.
9.03	28b	Verify that two triangles are similar if (but not only if) two pairs of corresponding angles are congruent (AA), the corresponding sides are proportional (SSS), or two pairs of corresponding sides are proportional and the pair of included angles is congruent (SAS). *Example: Given two triangles with two pairs of congruent corresponding sides and a pair of congruent included angles, show there must be a set of rigid motions that maps one onto the other. Example: Given two triangles with two pairs of congruent corresponding sides and a pair of congruent included angles, show that there must be a sequence of rigid motions will map one onto the other.*
2.04, 5.02, 6.01, 6.02, 7.02, 7.03, 10.03, 10.05, 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.08, 11.09	29	Find patterns and relationships in figures including lines, triangles, quadrilaterals, and circles, using technology and other tools.
2.04, 5.02, 6.01, 6.02, 7.01, 7.02, 7.03, 7.07, 10.02, 10.03, 10.05, 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.08, 11.09	29a	Construct figures, using technology and other tools, in order to make and test conjectures about their properties.
2.04, 5.02, 7.03, 7.07, 7.06	29b	Identify different sets of properties necessary to define and construct figures.
2.01, 2.02, 2.03, 2.04, 2.05, 2.06, 5.01, 5.02, 5.03, 5.04, 7.01, 11.01, 11.02, 11.03, 11.04, 11.05, 11.06, 11.08, 11.09	30	Develop and use precise definitions of figures such as angle, circle, perpendicular lines, parallel lines, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

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5.01, 5.03, 5.04	31	Justify whether conjectures are true or false in order to prove theorems and then apply those theorems in solving problems, communicating proofs in a variety of ways, including flow chart, two-column, and paragraph formats.
2.04, 5.01, 5.02, 5.03, 5.04, 5.05, 7.02	31a	Investigate, prove, and apply theorems about lines and angles, including but not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; the points on the perpendicular bisector of a line segment are those equidistant from the segment's endpoints.
6.01, 6.02, 6.05, 6.06, 6.07, 9.04, 9.05, 10.02, 10.03, 10.05	31b	Investigate, prove, and apply theorems about triangles, including but not limited to: the sum of the measures of the interior angles of a triangle is 180˚; the base angles of isosceles triangles are congruent; the segment joining the midpoints of two sides of a triangle is parallel to the third side and half the length; a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem using triangle similarity.
7.01, 7.03, 7.04, 7.05	31c	Investigate, prove, and apply theorems about parallelograms and other quadrilaterals, including but not limited to both necessary and sufficient conditions for parallelograms and other quadrilaterals, as well as relationships among kinds of quadrilaterals. Example: Prove that rectangles are parallelograms with congruent diagonals.
3.02, 7.01, 7.04	32	Use coordinates to prove simple geometric theorems algebraically.
3.02, 3.06, 3.07	33	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. Example: Find the equation of a line parallel or perpendicular to a given line that passes through a given point.
9.01, 9.02, 9.03, 9.04	34	Use congruence and similarity criteria for triangles to solve problems in real-world contexts.
9.05, 10.01	35	Discover and apply relationships in similar right triangles.
10.03	35a	Derive and apply the constant ratios of the sides in special right triangles (45˚-45˚-90˚ and 30˚-60˚-90˚).
10.02, 10.04	35b	Use similarity to explore and define basic trigonometric ratios, including sine ratio, cosine ratio, and tangent ratio.
10.05	35c	Explain and use the relationship between the sine and cosine of complementary angles.
	35d	Demonstrate the converse of the Pythagorean Theorem.
10.06, 12.01	35e	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems, including finding areas of regular polygons.
5.05, 7.03, 10.02, 10.06, 11.07, 12.08	36	Use geometric shapes, their measures, and their properties to model objects and use those models to solve problems.
11.02, 11.03, 11.04, 11.05,	37	Investigate and apply relationships among inscribed angles, radii, and chords, including but not limited to: 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.

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11.06, 11.08, 11.09		
12.08	38	Use the mathematical modeling cycle involving geometric methods to solve design problems. Examples: Design an object or structure to satisfy physical constraints or minimize cost; work with typographic grid systems based on ratios; apply concepts of density based on area and volume.