South Carolina Mathematics

Geometry with Statistics

Mathematical Process Standards MSP

1 Problem Solving MPS.PS

1a Make sense of problems and persevere in solving them strategically. MPS.PS.1

2 Representation & Communication MPS.RC

2a Explain ideas using precise and contextually appropriate mathematical language, tools, and models. MPS.RC.1

3 Connections MPS.C

3a Demonstrate a deep and flexible conceptual understanding of mathematical ideas, operations, and relationships while making real-world connections. MPS.C.1

4 Analyze & Justify MPS.AJ

4a Use critical thinking skills to reason both abstractly and quantitatively. MPS.AJ.1

5 Structure & Patterns MPS.SP

5a Identify and apply regularity in repeated reasoning to make generalizations. MPS.SP.1

Data, Probability, and Statistical Reasoning GS.DPSR

1 Summarize, represent, and interpret data on two categorical and quantitative variables. GS.DPSR.1.

1a Represent data for two quantitative variables on a scatter plot and describe how the variables are related. GS.DPSR.1.1

1b Use two representative points from the data to find an approximate line of fit and compare it to the line of best fit. GS.DPSR.1.2

1c Conduct an investigation for a statistical question, interpret statistical significance in the context of a situation, and answer investigative questions appropriately. GS.DPSR.1.3

2 Analyze and interpret models for two quantitative variables. GS.DPSR.2.

2a Distinguish between correlation and causation. GS.DPSR.2.1

3 Solve problems involving the probability of compound events in real-world situations. GS.DPSR.3.

3a Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events. GS.DPSR.3.1

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3b Apply the Addition Rule to find the probability of both mutually exclusive and not mutually exclusive events and interpret the answers in context. GS.DPSR.3.2

3c Apply the Multiplication Rule to determine the probability of independent events and interpret the answers in context. GS.DPSR.3.3

Measurement, Geometry, and Spatial Reasoning GS.MGSR

1 Compute area and volume of figures by determining how the figure might be obtained from simpler figures by dissection and recombination. GS.MGSR.1.

1a Apply area and volume formulas of two- and three-dimensional figures to solve real-world situations. GS.MGSR.1.1

1b Identify the shape of a two-dimensional cross-section of a three-dimensional figure. GS.MGSR.1.2

1c Use cross-sections of three-dimensional figures to model and solve mathematical and real-world situations. GS.MGSR.1.3

2 Apply rigid geometric transformations to figures, describing their attributes and symmetries. GS.MGSR.2.

2a Describe the results of transformations on a given figure using geometric terminology from the definitions of the transformations. GS.MGSR.2.1

2b Describe and apply a sequence of transformations that maps a pre-image onto its image. GS.MGSR.2.2

3 Determine that two figures are congruent by demonstrating that a rigid motion or a sequence of rigid motions maps one figure onto the other. GS.MGSR.3.

3a Identify types of symmetry of polygons, including line, point, rotational, and self-congruence, and use symmetry to analyze mathematical situations. GS.MGSR.3.1

3b Demonstrate that triangles and quadrilaterals are congruent by a combination of translations, rotations, and reflections. GS.MGSR.3.2

3c Recognize the criteria for showing triangles are congruent using a sequence of rigid motions that map one triangle to another and justify that the two triangles are congruent by applying the Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions. GS.MGSR.3.3

4 Determine that two figures are similar by demonstrating a similarity transformation or a sequence of similarity transformations that maps one figure onto the other. GS.MGSR.4.

4a Demonstrate experimentally the properties of dilations given by a center and a scale factor. GS.MGSR.4.1

4b Justify experimentally that a dilation of a line segment is longer or shorter, given the ratio. GS.MGSR.4.2

4c Recognize that the criteria for showing triangles are similar using a similarity transformation that maps one figure to the other and justify the two triangles are similar by applying the Angle-Angle, Side-Side-Side, and Side-Angle-Side similarity conditions. GS.MGSR.4.3

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5 Demonstrate whether a conjecture or theorem is true or false using a variety of algebraic and geometric explanations. GS.MGSR.5.

- 5a Justify and apply the attributes of angle relationships/lines in mathematical and real-world situations. GS.MGSR.5.1
- 5b Apply the attributes of triangles in mathematical and real-world situations. GS.MGSR.5.2
- 5c Apply the attributes of quadrilaterals, including diagonals, sides, and angles, to prove that a given quadrilateral is a parallelogram in mathematical and real-world situations. GS.MGSR.5.3

6 Discover and apply relationships in similar right triangles. GS.MGSR.6.

- 6a Discover and apply the converse of the Pythagorean Theorem. GS.MGSR.6.1
- 6b Discover and apply the constant ratios of the sides in 30-60-90 and 45-45-90 right triangles. GS.MGSR.6.2
- 6c Define the trigonometric ratios using the properties of similar right triangles. GS.MGSR.6.3
- 6d Determine the sine, cosine, and tangent of an acute angle in a right triangle in the context of mathematical and real-world situations. GS.MGSR.6.4
- 6e Apply trigonometric ratios (sine, cosine, tangent) and the Pythagorean Theorem to solve right triangle problems in real-life situations. GS.MGSR.6.5

7 Investigate and apply relationships among segments and angles in circles. GS.MGSR.7.

- 7a Use angle and segment relationships in circles to solve mathematical and real-world situations. GS.MGSR.7.1
- 7b Investigate and apply relationships in circles, inscribed angles, radii, secants, and chords; among inscribed angles, central angles, and circumscribed angles; and between radii and tangents to circles. GS.MGSR.7.2

Numerical Reasoning GS.NR

1 Represent all points on the number line as irrational and rational numbers in the real number system. GS.NR.1.

- 1a Rewrite numerical expressions of irrational and rational numbers involving radicals, including addition, subtraction, multiplication, and division, to recognize geometric patterns. GS.NR.1.1

Patterns, Algebra, and Functional Reasoning GS.PAFR

1 Analyze the structure of an equation or inequality to determine an efficient strategy to find a solution, if one exists, then justify the solution. GS.PAFR.1.

- 1a Discover and apply the formulas for the length of an arc and the area of a sector in a circle to develop mathematical models and solve mathematical and real-world situations. GS.PAFR.1.1

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1b Analyze and apply the derivations of the formulas for the circumference of a circle, area of a circle, and volume of a cylinder, pyramid, and cone to model real phenomena and solve mathematical and real-world situations. GS.PAFR.1.2

2 Interpret the structure of expressions, equations, and inequalities to analyze and make predictions in different contexts. GS.PAFR.2.

2a Apply surface area and volume formulas for prisms, cylinders, pyramids, cones, spheres, and/or compositions of figures to solve problems and justify results. GS.PAFR.2.1

2b Analyze slopes of lines to determine whether lines are parallel, perpendicular, or neither. GS.PAFR.2.2

2c Determine the equation of a line passing through a given point that is parallel or perpendicular to a given line. GS.PAFR.2.3

3 Determine the exact or approximate solutions of equations and inequalities using graphs on the coordinate plane. GS.PAFR.3.

3a Use coordinates to prove simple geometric theorems algebraically. GS.PAFR.3.1

3b Determine distance and midpoint of segments in a coordinate plane to find areas of triangles and quadrilaterals, when given coordinates. GS.PAFR.3.2