South Carolina Mathematics

Eighth Grade & Geometry Compacted Math

Mathematical Process Standards

PROBLEM SOLVING

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

REPRESENTATION & COMMUNICATION

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

CONNECTIONS

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

ANALYZE & JUSTIFY

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

STRUCTURE & PATTERNS

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

Data, Probability, and Statistical Reasoning

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

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

2 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

3 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 data sets to identify their statistical elements. 8.DPSR.1

1 Create and analyze scatter plots to represent numerical data sets in mathematical and real-world situations. 8.DPSR.1.1

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2 Draw inferences about data sets from two populations using the shape of the distribution, measures of center, and measures of variability. Limit measures to mean, median, mode, range, mean absolute deviation, and interquartile range. 8.DPSR.1.2

3 Describe how adding and deleting data throughout the data set can affect the mean, median, mode, and distribution of the data set. 8.DPSR.1.3

4 For two data sets (numerical or graphical), compare and interpret the centers, spreads, and overlap of data to draw inferences about data in mathematical and real-world situations. Limit displays to double line graphs, backto-back stem-and-leaf plots, and double box plots. 8.DPSR.1.4

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

1 Distinguish between correlation and causation. GS.DPSR.2.1

4 Calculate and interpret probability. 8.DPSR.2

1 Determine the sample space for a compound event. 8.DPSR.2.1

2 Calculate and interpret the probability of compound independent and dependent events. 8.DPSR.2.2

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

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

2 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

3 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

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

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

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

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

2 Determine the measurements of geometric figures. 8.MGSR.1

2 Find the distance between any two points in the coordinate plane using the Pythagorean Theorem. 8.MGSR.1.2

3 Given the Pythagorean Theorem, determine unknown side lengths in right triangles in mathematical and real-world situations. 8.MGSR.1.3

Determine if a given set of sides forms a right triangle. 8.MGSR.1.4

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

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

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

4 **Determine angle and/or side relationships.** 8.MGSR.2

4 Discover and apply the Exterior Angle Theorem of triangles to find a missing angle. 8.MGSR.2.4

5 **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

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

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

3 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-SideSide, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions. GS.MGSR.3.3

6 **Graph on a coordinate plane.** 8.MGSR.3

2 Identify congruent angles and congruent line segments of a preimage and its image. 8.MGSR.3.2

7 **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

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

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

3 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, SideSide-Side, and Side-Angle-Side similarity conditions. GS.MGSR.4.3

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

1 Justify and apply the attributes of angle relationships/lines in mathematical and real-world situations. GS.MGSR.5.1

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Apply the attributes of triangles in mathematical and real-world situations. GS.MGSR.5.2

3 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

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

1 Discover and apply the converse of the Pythagorean Theorem. GS.MGSR.6.1

2 Discover and apply the constant ratios of the sides in 30-60-90 and 45-45-90 right triangles. GS.MGSR.6.2

3 Define the trigonometric ratios using the properties of similar right triangles. GS.MGSR.6.3

4 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

5 Apply trigonometric ratios (sine, cosine, tangent) and the Pythagorean Theorem to solve right triangle problems in real-life situations. GS.MGSR.6.5

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

1 Use angle and segment relationships in circles to solve mathematical and realworld situations. G.MGSR.7.1

2 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. G.MGSR.7.2

Numerical Reasoning

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

1 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

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

1 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

2 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 Determine if a table, graph, verbal description, or equation represents a function and describe its characteristics. 8.PAFR.1

5 Use multiple representations including mappings, tables, graphs, verbal description, and equations (only when linear) of two functions to compare the functions and draw conclusions. 8.PAFR.1.5

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

1 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

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

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

4 **Write, simplify, and evaluate algebraic expressions; write and solve algebraic equations and inequalities.** 8.PAFR.2

2 Describe single-variable equations as having one solution, no solution, or an infinite number of solutions. 8.PAFR.2.2

4 Explain why the slope, m, is the same between any two distinct points on a linear graph. 8.PAFR.2.4

5 Given a table or a graph, identify the slope and the y-intercept of a line and write a linear equation to express that line. 8.PAFR.2.5

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

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

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

6 **Apply mathematical patterns, properties, and algorithms to the set of rational numbers to find sums, differences, products, and quotients and to write equivalent expressions.** 8.PAFR.3

1 Analyze patterns of perfect squares and perfect cubes to evaluate square roots and cube roots. Limit to square roots less than or equal to 400 and cube roots less than or equal to 1,000. 8.PAFR.3.1

2 Approximate non-perfect square roots and cube roots to nearest tenth. Limit to square roots less than or equal to 400 and cube roots less than or equal to 1,000. 8.PAFR.3.2