South Carolina Mathematics

Applications and Modeling

Mathematical Process Standards MPS

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 AM.DPSR

1 Summarize and interpret data represented in tables or graphs to make predictions. AM.DPSR.1

1a Summarize and interpret trends to make predictions in real-world situations. AM.DPSR.1.1

1b Calculate and explain pay scale based on occupational outlook projections. AM.DPSR.1.2

1c Calculate and explain operating costs, including cost of materials, supplies, equipment, license fees, and insurance fees. AM.DPSR.1.3

1d Construct and analyze charts that reflect current demographics in various industries. AM.DPSR.1.4

2 **Solve problems involving probability and probability models, and use expected value to make informed decisions in real-world situations.** AM.DPSR.2

- 2a Determine the probability of simple and compound events in real-world situations. AM.DPSR.2.1
- 2b Use probabilities to make and justify decisions about risk in real-world situations. AM.DPSR.2.2
- 2c Calculate and analyze the expected value of a probability model (binominal, normal, and Poisson distributions) for a real-world situation to make decisions about fairness, payoff, and risk. AM.DPSR.2.3

Measurement, Geometry, and Spatial Reasoning AM.MGSR

1 **Apply trigonometric principles to solve real-world geometric situations involving inaccessible distances.** AM.MGSR.1

- 1a Apply sine, cosine, and tangent ratios and the Law of Sines and the Law of Cosines to discover distances. AM.MGSR.1.1

2 **Critique the appropriateness of measurements in terms of precision, accuracy, and approximate error.** AM.MGSR.2

- 2a Determine dimensions by scaling plans or blueprints. AM.MGSR.2.1
- 2b Apply knowledge of fractions for reading a ruler to 1/16 inch to interpreting blueprints and measuring materials. AM.MGSR.2.2
- 2c Compare the metric and the British imperial systems of measurements used in industry. AM.MGSR.2.3

3 **Apply two- and three-dimensional representations, geometric transformations, and scale models in planning, designing, and constructing solutions to real-world situations.** AM.MGSR.3

- 3a Calculate lengths utilizing the Pythagorean Theorem. AM.MGSR.3.1
- 3b Apply the concepts of area, volume, scale factors, and scale drawings to applied problems for a specific project. AM.MGSR.3.2
- 3c Determine the level of precision and the appropriate tools for taking the measurements in constructing a two-dimensional visual representation of a three-dimensional object or structure. AM.MGSR.3.3
- 3d Apply Heron's Formula for finding the area of a triangular region. AM.MGSR.3.4

4 **Apply two- and three-dimensional representations in coordinate systems to find solutions to real-world situations.** AM.MGSR.4

- 4a Plot coordinates on a three-dimensional Cartesian coordinate system and use relationships between coordinates to solve design problems. AM.MGSR.4.1
- 4b Use technology and other tools to explore the results of simple transformations using three-dimensional coordinates, including translations in the x, y, and/or z directions; rotations of 90°, 180°, or 270° about the x, y, and z axes; reflections over the xy, yz, and xz planes; and dilations from the origin. AM.MGSR.4.2

5 **Use vectors and matrices to represent, organize, and describe data to solve problems in mathematical and real-world situations.** AM.MGSR.5

- 5a Apply vectors to mathematical and real-world situations by recognizing vectors as mathematical objects having both magnitude and direction. AM.MGSR.5.1
- 5b Use and apply matrices to represent geometric transformations in real-world situations. AM.MGSR.5.2

Numerical Reasoning AM.NR

1 **Solve problems using fractions, percents, and ratios for real-world situations involving linear, quadratic, exponential, and absolute functions.** AM.NR.1

- 1a Apply numerical reasoning to real-world situations involving percent increase and decrease. AM.NR.1.1

Patterns, Algebra, and Functional Reasoning AM.PAFR

1 **Create and analyze mathematical models to make decisions on real-world situations.** AM.PAFR.1

- 1a Use exponential functions to model change in a variety of financial situations. AM.PAFR.1.1
- 1b Compare the various means of paying for an automobile, including leasing, purchasing by cash, and purchasing by loan. AM.PAFR.1.2
- 1c Use sequences to represent simple and compound interest and depreciation. AM.PAFR.1.3

2 **Analyze and solve application-based problems relating to direct, inverse, and joint variation.** AM.PAFR.2

- 2a Apply variations to mathematical and real-world situations to describe troubleshooting in business and industrial applications. AM.PAFR.2.1
- 2b Utilize mathematical skills for troubleshooting in business and industrial applications. AM.PAFR.2.2

3 **Analyze and apply linear programming to mathematical and real-world situations.** AM.PAFR.3

- 3a Calculate the values of the variables that maximize or minimize the objective function, given four or more constraints. AM.PAFR.3.1