South Carolina Employability Credential

Essentials of Math 4: Practical Applications and Modeling

DATA, PROBABILITY, AND STATISTICAL REASONING

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

1 Summarize and interpret trends to make predictions in real-world situations. Applications could include forecasting growth and decline of various career fields by interpreting data from charts and graphs, or predicting trends about population change that will affect employment rate. AM.DPSR.1.1

2 Calculate and explain pay scale based on occupational outlook projections. Use student career path predictions to develop spreadsheets of occupational projections. AM.DPSR.1.2

3 Calculate and explain operating costs, including cost of materials, supplies, equipment, license fees, and insurance fees. Community members and educational business partners could provide estimated operational costs. AM.DPSR.1.3

4 Construct and analyze charts that reflect current demographics in various industries. Use community information to determine industry needs in the area. 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

1 Determine the probability of simple and compound events in real-world situations. Probability Rules: general addition rule, general multiplication rule. AM.DPSR.2.1

2 Use probabilities to make and justify decisions about risk in real-world situations. Real-world applications could include analyzing insurance rates and utilizing risk analysis to develop a job safety analysis plan. AM.DPSR.2.2

3 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

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

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

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

1. Determine dimensions by scaling plans or blueprints. Demonstrate an understanding of blueprints and drawings. AM.MGSR.2.1
2. Apply knowledge of fractions for reading a ruler to 1/ 16 inch to interpreting blueprints and measuring materials, for example (sheetrock, wood, flooring per box). Identify various measuring tools and demonstrate their use to verify precision, accuracy, and approximate error. AM.MGSR.2.2
3. 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

1. Calculate lengths utilizing the Pythagorean Theorem. Use a blueprint or scale drawing of a house to determine the amount of materials to be purchased. Identify functions of various plumbing components. AM.MGSR.3.1
2. Apply the concepts of area, volume, scale factors, and scale drawings to applied problems for a specific project. Calculate estimates for construction, house planning, or repair projects. AM.MGSR.3.2
3. 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. Create drawings to represent a given solid structure, using technology where appropriate, and determine which measurements cannot be taken directly and must be calculated based on other measurements when constructing two dimensional and three-dimensional figures. AM.MGSR.3.3
4. 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

1. Plot coordinates on a three-dimensional Cartesian coordinate system and use relationships between coordinates to solve design problems. Consider using dynamic geometric software to model real-world situations and design solutions to real-world situations. AM.MGSR.4.1
2. 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

1. Apply vectors to mathematical and real-world situations by recognizing vectors as mathematical objects having both magnitude and direction. Solve problems using vectors in areas such as transportation, computer graphics, and the physics of force and motion. AM.MGSR.5.1

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2 Use and apply matrices to represent geometric transformations in real-world situations. AM.MGSR.5.2

NUMERICAL REASONING

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

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

PATTERNS, ALGEBRA, AND FUNCTIONAL REASONING

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

1 Use exponential functions to model change in a variety of financial situations. Use exponential models related to earning, investing, spending, and borrowing money. AM.PAFR.1.1

2 Compare the various means of paying for an automobile, including leasing, purchasing by cash, and purchasing by loan. Investigate financing options for leasing and purchasing and the difference between finance companies and banks. AM.PAFR.1.2

3 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

1 Apply variations to mathematical and real-world situations to describe troubleshooting in business and industrial applications. Applications could include calculating the proper size of a water service line and drainage fixture units for a given pipe size. AM.PAFR.2.1

2 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

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