South Carolina Mathematics

Reasoning in Mathematics

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 RM.DPSR

1 Apply statistical reasoning to complete investigations. RM.DPSR.1

1a Formulate a statistical question and develop a statistical method to address questions/studies through exploration of the research cycle. RM.DPSR.1.1

1b Write and identify a null hypothesis and an alternative hypothesis, as well as what makes up an experimental study. RM.DPSR.1.2

1c Identify the population of interest and the variables to be used in each study. Determine the appropriate sampling design, sampling technique, and statistical analysis for each research question. RM.DPSR.1.3

2 Analyze data of a statistical experiment. RM.DPSR.2

- 2a Compare and contrast categorical and quantitative data. RM.DPSR.2.1
- 2b Identify the variable of interest, interpret a variety of graphical displays (particularly histograms and box plots), and estimate center, spread, shape, outliers, and unusual features. RM.DPSR.2.2
- 2c Analyze histograms in depth, analyzing the effect of changing the bin size (also known as interval width). RM.DPSR.2.3
- 2d Analyze the appropriateness and usefulness of the chosen measure of center and of the graphical display. RM.DPSR.2.4
- 2e Analyze the shape, spread, and unusual features of data sets and identify limitations based on data collection. RM.DPSR.2.5

3 Explore the sources of variability in sampling methods. RM.DPSR.3

- 3a Analyze possible sources of variability in the data, including biased sampling methods (such as non-representative sampling and under coverage) and biased statistics, as well as natural and induced variability. RM.DPSR.3.1
- 3b Identify and explore various possible sources of statistical bias (such as response bias, nonresponse bias, and observer effect) and examine the effects of statistical bias on the generalizability of results. RM.DPSR.3.2

Measurement, Geometry, and Spatial Reasoning RM.MGSR

1 Identify transformations using matrices. RM.MGSR.1

- 1a Use matrices to organize information and identify matrices that can be used to describe geometric transformations. RM.MGSR.1.1
- 1b Represent figures using matrices and explore ways of determining different transformations (translations, reflection, rotations, dilations, or combinations). RM.MGSR.1.2

2 Analyze truth tables to validate real-world situations. RM.MGSR.2

- 2a Analyze truth tables to determine and verify the validity of arguments. RM.MGSR.2.1
- 2b Create arguments and statements to validate arguments. RM.MGSR.2.2

Numerical Reasoning RM.NR

1 Analyze numerical data through estimation and approximation in real-world situations. RM.NR.1

- 1a Use various numerical techniques when estimating and calculating very large and small values. RM.NR.1.1
- 1b Apply proportional reasoning with aspect ratios. RM.NR.1.2
- 1c Use weighted averages and sums. RM.NR.1.3
- 1d Investigate and validate identification numbers. RM.NR.1.4

2 Analyze present and future value of investments involving interest. RM.NR.2

- 2a Compare and contrast the nominal interest rate with the annual percentage rate (APR). RM.NR.2.1
- 2b Determine the future value of an investment, given the present value. RM.NR.2.2

3 Analyze real-world scenarios involving credit card debt and loans. RM.NR.3

- 3a Determine the monthly payment to retire a debt at a fixed rate. RM.NR.3.1
- 3b Compare and contrast different credit card offers using minimum payments. RM.NR.3.2

Patterns, Algebra, and Functional Reasoning RM.PAFR

1 Analyze regression of linear functions. RM.PAFR.1

- 1a Compute and analyze the correlation coefficient of data to determine the strength of the linear model. RM.PAFR.1.1
- 1b Analyze data that follow a linear pattern using recursively defined rules and compare those rules to explicit function rules. RM.PAFR.1.2

2 Analyze step and piecewise functions in real-world situations. RM.PAFR.2

- 2a Explore step and piecewise functions to make predictions and decisions about a variety of mathematical and real-world situations. RM.PAFR.2.1

3 Analyze data that follow an exponential pattern using the idea of a common ratio between consecutive values. RM.PAFR.3

- 3a Find recursive rules to model data and make connections between the recursive rule and the explicit function rule of the exponential relationship. RM.PAFR.3.1