Georgia Mathematics

College Readiness Mathematics (Mathematics Capstone Course)

Mathematical Practices

0 Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration, and expression. Seek help and apply feedback. Set and monitor goals. CRM.MP

- 0.1 Make sense of problems and persevere in solving them. CRM.MP.1
- 0.2 Reason abstractly and quantitatively. CRM.MP.2
- 0.3 Construct viable arguments and critique the reasoning of others. CRM.MP.3
- 0.4 Model with mathematics. CRM.MP.4
- 0.5 Use appropriate tools strategically. CRM.MP.5
- 0.6 Attend to precision. CRM.MP.6
- 0.7 Look for and make use of structure. CRM.MP.7
- 0.8 Look for and express regularity in repeated reasoning. CRM.MP.8

Mathematical Modeling

1 Apply mathematics to real-life situations; model real-life phenomena using mathematics. CRM.MM.1

- 1.1 Explain contextual, mathematical problems using a mathematical model. CRM.MM.1.1
- 1.2 Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts. CRM.MM.1.2
- 1.3 Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation. CRM.MM.1.3
- 1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems. CRM.MM.1.4

Numerical Reasoning

2 Utilize exact and approximate calculations to quantify real-world phenomena and solve problems. CRM.NR.2

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2.1 Through multi-step/multi-operational problems, perform mathematical operations on real numbers demonstrating fluency using the order of operations. CRM.NR.2.1

2.2 Represent and solve problems using proportional reasoning with ratios, rates, proportions, and scaling. CRM.NR.2.2

2.3 Apply the rules of exponents to simplify numerical expressions, extending the properties of exponents to rational exponents. CRM.NR.2.3

2.4 Perform mathematical operations on real numbers to include numerical radical expressions and complex fractions. CRM.NR.2.4

2.5 Estimate solutions to problems with real numbers and use the estimates to assess the reasonableness of results in the context of the problem. CRM.NR.2.5

Patterning & Algebraic Reasoning

3 Construct expressions, equations, and inequalities, and use them to represent and solve problems by choosing appropriate procedures and interpreting solutions in context. CRM.PAR.3

3.1 Create equations in one variable and use them to solve problems. CRM.PAR.3.1

3.2 Create inequalities in one variable and use them to solve problems. CRM.PAR.3.2

3.3 Using multiple representations, solve equations and inequalities and use the solutions to draw reasonable conclusions about a situation being modeled, including possible constraints. CRM.PAR.3.3

3.4 Solve quadratic equations using a variety of methods. CRM.PAR.3.4

3.5 Rearrange literal equations to highlight a specified variable using the same reasoning as in solving equations. CRM.PAR.3.5

3.6 Solve inequalities in one variable graphically and algebraically. CRM.PAR.3.6

3.7 Using multiple methods, create and solve systems of linear equations and inequalities. CRM.PAR.3.7

3.8 Solve a simple system of equations consisting of a linear and a quadratic equation in two variables. algebraically and graphically. CRM.PAR.3.8

Functional & Graphical Reasoning

4 Define, build and interpret functions that arise in various contexts by applying knowledge of the characteristics of the different families of functions, and analyze the effects of parameters. CRM.FGR.4

4.1 Define a function through maps, sets, equations and graphs using function notation. CRM.FGR.4.1

4.2 Identify and sketch by hand the parent graph of functions expressed algebraically and show key characteristics of the graph using technology. CRM.FGR.4.2

4.3 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function. CRM.FGR.4.3

4.4 Calculate and interpret the average rate of change of a function over a specified interval. Estimate the rate of change from a graph. CRM.FGR.4.4

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4.5 Compare characteristics of two functions each represented in a different way. CRM.FGR.4.5

4.6 Construct linear and exponential functions, given a graph, a description of a relationship, or two input-output pairs. CRM.FGR.4.6

4.7 Construct arithmetic and geometric sequences recursively and explicitly, use them to model situations, and translate between the two forms. Connect linear functions to arithmetic sequences and exponential functions to geometric sequences. CRM.FGR.4.7

4.8 Identify the effect on the parent graph of replacing f(x) by f(x) + k, kf(x), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. CRM.FGR.4.8

Geometric & Spatial Reasoning

5 Reason deductively and inductively about figures and their properties and make sense of geometric situations using measurements in real-world contexts. CRM.GSR.5

5.1 Use the distance formula, midpoint formula or slope to verify simple geometric properties. CRM.GSR.5.1

5.2 Use coordinates to compute perimeters of polygons, circumference of circles and areas of triangles, rectangles and circles. CRM.GSR.5.2

5.3 Informally derive the formulas for the volume and surface area of a cylinder, sphere, prism, pyramid, and cone. CRM.GSR.5.3

5.4 Use formulas for finding the volume and surface area of spheres, right and oblique prisms, cylinders, pyramids, and cones. CRM.GSR.5.4

5.5 Apply the Pythagorean Theorem and trigonometric ratios to solve problems involving right triangles. CRM.GSR.5.5

Data & Statistical Reasoning

6 Make sense of and reason about variation in data using graphs, tables and probability models to solve problems and draw appropriate conclusions from solutions. CRM.DSR.6

6.1 Represent univariate data on the real number line. CRM.DSR.6.1

6.2 Calculate, compare, and interpret shape, center, and spread of two or more univariate data sets, accounting for possible effects of extreme data points. CRM.DSR.6.2

6.3 Summarize categorical data for two categories in two-way frequency tables using relative frequencies in the context of the data. CRM.DSR.6.3

6.4 Represent bivariate data on a scatter plot and describe how the variables are related in terms of strength and direction. CRM.DSR.6.4

6.5 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. CRM.DSR.6.5

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.6 Compute using technology and interpret the correlation coefficient “r” of a linear fit. CRM.DSR.6.6

6.7 Distinguish between correlation and causation, and interpolation and extrapolation. CRM.DSR.6.7

6.8 Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events. CRM.DSR.6.8

6.9 Use the two-way frequency table to calculate conditional probabilities. CRM.DSR.6.9

6.10 Calculate the conditional probability of A given B. CRM.DSR.6.10