Georgia Mathematics

Grade 7

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. 7.MP

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

Numerical Reasoning

1 Solve relevant, mathematical problems, including multi-step problems, involving the four operations with rational numbers and quantities in any form (integers, percentages, fractions, and decimal numbers). 7.NR.1

- 1.1 Show that a number and its opposite have a sum of 0 (are additive inverses). Describe situations in which opposite quantities combine to make 0. 7.NR.1.1
- 1.2 Show and explain p + q as the number located a distance |q| from p, in the positive or negative direction, depending on whether q is positive or negative. Interpret sums of rational numbers by describing applicable situations. 7.NR.1.2
- 1.3 Represent addition and subtraction with rational numbers on a horizontal or a vertical number line diagram to solve authentic problems. 7.NR.1.3
- 1.4 Show and explain subtraction of rational numbers as adding the additive inverse, p − q − p + (−q). Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in contextual situations. 7.NR.1.4
- 1.5 Apply properties of operations, including part-whole reasoning, as strategies to add and subtract rational numbers. 7.NR.1.5
- 1.6 Make sense of multiplication of rational numbers using realistic applications. 7.NR.1.6
- .7 Show and explain that integers can be divided, assuming the divisor is not zero, and every quotient of integers is a rational number. 7.NR.1.7

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1.8 Represent the multiplication and division of integers using a variety of strategies and interpret products and quotients of rational numbers by describing them based on the relevant situation. 7.NR.1.8

1.9 Apply properties of operations as strategies to solve multiplication and division problems involving rational numbers represented in an applicable scenario. 7.NR.1.9

1.10 Convert rational numbers between forms to include fractions, decimal numbers and percentages, using understanding of the part divided by the whole. Know that the decimal form of a rational number terminates in 0s or eventually repeats. 7.NR.1.10

1.11 Solve multi-step, contextual problems involving rational numbers, converting between forms as appropriate, and assessing the reasonableness of answers using mental computation and estimation strategies. 7.NR.1.11

Patterning & Algebraic Reasoning

2 Use properties of operations, generate equivalent expressions and interpret the expressions to explain relevant contextual situations. 7.PAR.2

2.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.PAR.2.1

2.2 Rewrite an expression in different forms from a contextual problem to clarify the problem and show how the quantities in it are related. 7.PAR.2.2

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3 Represent authentic situations using equations and inequalities with variables; solve equations and inequalities symbolically, using the properties of equality. 7.PAR.3

3.1 Construct algebraic equations to solve practical problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Interpret the solution based on the situation. 7.PAR.3.1

3.2 Construct algebraic inequalities to solve problems, leading to inequalities of the form $px \pm q > r$, $px \pm q < r$, $px \pm q \leq r$, or $px \pm q \geq r$, where p, q, and r are specific rational numbers. Graph and interpret the solution based on the realistic situation that the inequalities represent. 7.PAR.3.2

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4 Recognize proportional relationships in relevant, mathematical problems; represent, solve, and explain these relationships with tables, graphs, and equations. 7.PAR.4

4.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units presented in realistic problems. 7.PAR.4.1

4.2 Determine the unit rate (constant of proportionality) in tables, graphs (1, r), equations, diagrams, and verbal descriptions of proportional relationships to solve realistic problems. 7.PAR.4.2

4.3 Determine whether two quantities presented in authentic problems are in a proportional relationship. 7.PAR.4.3

.4 Identify, represent, and use proportional relationships. 7.PAR.4.4

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4.5 Use context to explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. 7.PAR.4.5

4.6 Solve everyday problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.PAR.4.6

4.7 Use similar triangles to explain why the slope, m, is the same between any two distinct points on a nonvertical line in the coordinate plane. 7.PAR.4.7

4.8 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. 7.PAR.4.8

4.9 Use proportional relationships to solve multi-step ratio and percent problems presented in applicable situations. 7.PAR.4.9

4.10 Predict characteristics of a population by examining the characteristics of a representative sample. Recognize the potential limitations and scope of the sample to the population. 7.PAR.4.10

4.11 Analyze sampling methods and conclude that random sampling produces and supports valid inferences. 7.PAR.4.11

4.12 Use data from repeated random samples to evaluate how much a sample mean is expected to vary from a population mean. Simulate multiple samples of the same size. 7.PAR.4.12

Geometric & Spatial Reasoning

5 **Solve practical problems involving angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms.** 7.GSR.5

5.1 Measure angles in whole nonstandard units. 7.GSR.5.1

5.2 Measure angles in whole number degrees using a protractor. 7.GSR.5.2

5.3 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure. 7.GSR.5.3

5.4 Explore and describe the relationship between pi, radius, diameter, circumference, and area of a circle to derive the formulas for the circumference and area of a circle. 7.GSR.5.4

5.5 Given the formula for the area and circumference of a circle, solve problems that exist in everyday life. 7.GSR.5.5

5.6 Solve realistic problems involving surface area of right prisms and cylinders. 7.GSR.5.6

5.7 Describe the two-dimensional figures (cross sections) that result from slicing three-dimensional figures, as in the plane sections of right rectangular prisms, right rectangular pyramids, cones, cylinders, and spheres. 7.GSR.5.7

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.8 Explore volume as a measurable attribute of cylinders and right prisms. Find the volume of these geometric figures using concrete problems. 7.GSR.5.8

Probability Reasoning

6 Using mathematical reasoning, investigate chance processes and develop, evaluate, and use probability models to find probabilities of simple events presented in authentic situations. 7.PR.6

- 6.1 Represent the probability of a chance event as a number between 0 and 1 that expresses the likelihood of the event occurring. Describe that a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. 7.PR.6.1
- 6.2 Approximate the probability of a chance event by collecting data on an event and observing its long-run relative frequency will approach the theoretical probability. 7.PR.6.2
- 6.3 Develop a probability model and use it to find probabilities of simple events. Compare experimental and theoretical probabilities of events. If the probabilities are not close, explain possible sources of the discrepancy. 7.PR.6.3
- 6.4 Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. 7.PR.6.4
- 6.5 Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. 7.PR.6.5
- 6.6 Use appropriate graphical displays and numerical summaries from data distributions with categorical or quantitative (numerical) variables as probability models to draw informal inferences about two samples or populations. 7.PR.6.6