Missouri Mathematics

Grade 7

Adopted 2016

Ratios and Proportional Relationships

A. Analyze proportional relationships and use them to solve problems. 7.RP.A

1. Compute unit rates, including those that involve complex fractions, with like or different units. 7.RP.A.1
2. Recognize and represent proportional relationships between quantities. 7.RP.A.2
   a. Determine when two quantities are in a proportional relationship. 7.RP.A.2.A
   b. Identify and/or compute the constant of proportionality (unit rate). 7.RP.A.2.B
   c. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation. 7.RP.A.2.C
   d. Recognize that the graph of any proportional relationship will pass through the origin. 7.RP.A.2.D
3. Solve problems involving ratios, rates, percentages and proportional relationships. 7.RP.A.3

Number Sense and Operations

A. Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers. 7.NS.A

1. Apply and extend previous understandings of numbers to add and subtract rational numbers. 7.NS.A.1
   a. Add and subtract rational numbers. 7.NS.A.1.A
   b. Represent addition and subtraction on a horizontal or vertical number line. 7.NS.A.1.B
   c. Describe situations and show that a number and its opposite have a sum of 0 (additive inverses). 7.NS.A.1.C
   d. Understand subtraction of rational numbers as adding the additive inverse. 7.NS.A.1.D
   e. Determine the distance between two rational numbers on the number line is the absolute value of their difference. 7.NS.A.1.E
   f. Interpret sums and differences of rational numbers. 7.NS.A.1.F
2. Apply and extend previous understandings of numbers to multiply and divide rational numbers. 7.NS.A.2
   a. Multiply and divide rational numbers. 7.NS.A.2.A
   b. Determine that a number and its reciprocal have a product of 1 (multiplicative inverse). 7.NS.A.2.B
   c. Understand that every quotient of integers (with non-zero divisor) is a rational number. 7.NS.A.2.C
   d. Convert a rational number to a decimal. 7.NS.A.2.D
   e. Understand that all rational numbers can be written as fractions or decimal numbers that terminate or repeat. 7.NS.A.2.E
   f. Interpret products and quotients of rational numbers by describing real-world contexts. 7.NS.A.2.F
3. Solve problems involving the four arithmetic operations with rational numbers. 7.NS.A.3

Expressions, Equations and Inequalities

A. Use properties of operations to generate equivalent expressions. 7.EEI.A

1. Apply properties of operations to simplify and to factor linear algebraic expressions with rational coefficients. 7.EEI.A.1
2. Understand how to use equivalent expressions to clarify quantities in a problem. 7.EEI.A.2

B. Solve problems using numerical and algebraic expressions and equations. 7.EEI.B

3. Solve multi-step problems posed with rational numbers. 7.EEI.B.3
   a. Convert between equivalent forms of the same number. 7.EEI.B.3.A
   b. Assess the reasonableness of answers using mental computation and estimation strategies. 7.EEI.B.3.B
4. Write and/or solve linear equations and inequalities in one variable. 7.EEI.B.4
   a. Write and/or solve equations of the form x+p = q and px = q in which p and q are rational numbers. 7.EEI.B.4.A
   b. Write and/or solve two-step equations of the form px + q = r and p(x + q) = r, where p, q and r are rational numbers, and interpret the meaning of the solution in the context of the problem. 7.EEI.B.4.B
   c. Write, solve and/or graph inequalities of the form px + q > r or px + q < r, where p, q and r are rational numbers. 7.EEI.B.4.C

Geometry and Measurement

A. Draw and describe geometrical figures and describe the relationships between them. 7.GM.A

1. Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale. 7.GM.A.1
2. Use a variety of tools to construct geometric shapes. 7.GM.A.2
   a. Determine if provided constraints will create a unique triangle through construction. 7.GM.A.2.A
   b. Construct special quadrilaterals given specific parameters. 7.GM.A.2.B
3. Describe two-dimensional cross sections of pyramids, prisms, cones and cylinders. 7.GM.A.3
4. Understand concepts of circles. 7.GM.A.4
   a. Analyze the relationships among the circumference, the radius, the diameter, the area and Pi in a circle. 7.GM.A.4.A
   b. Know and apply the formulas for circumference and area of circles to solve problems. 7.GM.A.4.B

B. Apply and extend previous understanding of angle measure, area and volume. 7.GM.B

5. Use angle properties to write and solve equations for an unknown angle. 7.GM.B.5
6. Understand the relationship between area, surface area and volume. 7.GM.B.6
   a. Find the area of triangles, quadrilaterals and other polygons composed of triangles and rectangles. 7.GM.B.6.A
   b. Find the volume and surface area of prisms, pyramids and cylinders. 7.GM.B.6.B

Data Analysis, Statistics and Probability

A. Use random sampling to draw inferences about a population. 7.DSP.A

1. Understand that statistics can be used to gain information about a population by examining a sample of the population. 7.DSP.A.1
   a. Understand that a sample is a subset of a population. 7.DSP.A.1.A
   b. Understand that generalizations from a sample are valid only if the sample is representative of the population. 7.DSP.A.1.B
   c. Understand that random sampling is used to produce representative samples and support valid inferences. 7.DSP.A.1.C
2. Use data from multiple samples to draw inferences about a population and investigate variability in estimates of the characteristic of interest. 7.DSP.A.2

B. Draw informal comparative inferences about two populations. 7.DSP.B

3. Analyze different data distributions using statistical measures. 7.DSP.B.3
4. Compare the numerical measures of center, measures of frequency and measures of variability from two random samples to draw inferences about the population. 7.DSP.B.4

C. Develop, use and evaluate probability models. 7.DSP.C

5. Investigate the probability of chance events. 7.DSP.C.5
   a. Determine probabilities of simple events. 7.DSP.C.5.A
   b. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. 7.DSP.C.5.B
6. Investigate the relationship between theoretical and experimental probabilities for simple events. 7.DSP.C.6
   a. Predict outcomes using theoretical probability. 7.DSP.C.6.A
   b. Perform experiments that model theoretical probability. 7.DSP.C.6.B
   c. Compare theoretical and experimental probabilities. 7.DSP.C.6.C
7. Explain possible discrepancies between a developed probability model and observed frequencies. 7.DSP.C.7
   a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. 7.DSP.C.7.A
   b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. 7.DSP.C.7.B
8. Find probabilities of compound events using organized lists, tables, tree diagrams and simulations. 7.DSP.C.8
   a. Represent the sample space of a compound event. 7.DSP.C.8.A
   b. Design and use a simulation to generate frequencies for compound events. 7.DSP.C.8.B