Minnesota Mathematics

Grade 6

Adopted 2008

Number & Operation

1. **Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.** 6.1.1
    1. Locate positive rational numbers on a number line and plot pairs of positive rational numbers on a coordinate grid. 6.1.1.1
    2. Compare positive rational numbers represented in various forms. Use the symbols < , = and >. 6.1.1.2
    3. Understand that percent represents parts out of 100 and ratios to 100. 6.1.1.3
    4. Determine equivalences among fractions, decimals and percents; select among these representations to solve problems. 6.1.1.4
    5. Factor whole numbers; express a whole number as a product of prime factors with exponents. 6.1.1.5
    6. Determine greatest common factors and least common multiples. Use common factors and common multiples to calculate with fractions and find equivalent fractions. 6.1.1.6
    7. Convert between equivalent representations of positive rational numbers. 6.1.1.7
2. **Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.** 6.1.2
    1. Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction. 6.1.2.1
    2. Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixtures and concentrations. 6.1.2.2
    3. Determine the rate for ratios of quantities with different units. 6.1.2.3
    4. Use reasoning about multiplication and division to solve ratio and rate problems. 6.1.2.4
3. **Multiply and divide decimals, fractions and mixed numbers; solve real-world and mathematical problems using arithmetic with positive rational numbers.** 6.1.3

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1. Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms. 6.1.3.1
2. Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions. 6.1.3.2
3. Calculate the percent of a number and determine what percent one number is of another number to solve problems in various contexts. 6.1.3.3
4. Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers. 6.1.3.4
5. Estimate solutions to problems with whole numbers, fractions and decimals and use the estimates to assess the reasonableness of results in the context of the problem. 6.1.3.5

Algebra

1. **Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.** 6.2.1
    1. Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts. 6.2.1.1
    2. Represent the relationship between two varying quantities with function rules, graphs and tables; translate between any two of these representations. 6.2.1.2
2. **Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers.** 6.2.2
    1. Apply the associative, commutative and distributive properties and order of operations to generate equivalent expressions and to solve problems involving positive rational numbers. 6.2.2.1
3. **Understand and interpret equations and inequalities involving variables and positive rational numbers. Use equations and inequalities to represent realworld and mathematical problems; use the idea of maintaining equality to solve equations. Interpret solutions in the original context.** 6.2.3
    1. Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers. 6.2.3.1
    2. Solve equations involving positive rational numbers using number sense, properties of arithmetic and the idea of maintaining equality on both sides of the equation. Interpret a solution in the original context and assess the reasonableness of results. 6.2.3.2

Geometry & Measurement

1. **Calculate perimeter, area, surface area and volume of two- and three-dimensional figures to solve real-world and mathematical problems.** 6.3.1
    1. Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models. 6.3.1.1

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2. Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid. 6.3.1.2
3. Estimate the perimeter and area of irregular figures on a grid when they cannot be decomposed into common figures and use correct units, such as cm and cm^2. 6.3.1.3

2. Understand and use relationships between angles in geometric figures. 6.3.2

1. Solve problems using the relationships between the angles formed by intersecting lines. 6.3.2.1
2. Determine missing angle measures in a triangle using the fact that the sum of the interior angles of a triangle is 180°. Use models of triangles to illustrate this fact. 6.3.2.2
3. Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles. 6.3.2.3

3. Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems. 6.3.3

1. Solve problems in various contexts involving conversion of weights, capacities, geometric measurements and times within measurement systems using appropriate units. 6.3.3.1
2. Estimate weights, capacities and geometric measurements using benchmarks in measurement systems with appropriate units. 6.3.3.2

Data Analysis & Probability

1. Use probabilities to solve real-world and mathematical problems; represent probabilities using fractions, decimals and percents. 6.4.1

1. Determine the sample space (set of possible outcomes) for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations. 6.4.1.1
2. Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood. 6.4.1.2
3. Perform experiments for situations in which the probabilities are known, compare the resulting relative frequencies with the known probabilities; know that there may be differences. 6.4.1.3
4. Calculate experimental probabilities from experiments; represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown. 6.4.1.4