Oklahoma Mathematics

Grade 6

Adopted 2022

Numbers & Operations

1. **Read, write, and represent rational numbers expressed as integers, fractions, decimals, percents, and ratios; use these representations in real-world and mathematical situations.** 6.N.1
    1. Use manipulatives and models (e.g., number lines) to determine positive and negative numbers and their contexts, identify opposites, and explain the meaning of 0 (zero) in a variety of situations. 6.N.1.1
    2. Compare and order positive rational numbers, represented in various forms, or integers using the symbols "<", ">", and "=". 6.N.1.2
    3. Explain that a percent represents parts "out of 100" and ratios "to 100." 6.N.1.3
    4. Determine equivalencies among fractions, mixed numbers, decimals, and percents. 6.N.1.4

2. **Read, write, and model whole number and integer operations to solve problems.** 6.N.2
    1. Estimate solutions for integer addition and subtraction of problems in order to assess the reasonableness of results. 6.N.2.1
    2. Illustrate addition and subtraction of integers using a variety of representations. 6.N.2.2
    3. Add and subtract integers in a variety of situations; use efficient and generalizable procedures including but not limited to standard algorithms. 6.N.2.3
    4. Identify and represent patterns with whole-number exponents and perfect squares. Evaluate powers with whole-number bases and exponents. 6.N.2.4
    5. Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents. 6.N.2.5
    6. Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions, and express the sum of two-digit numbers with a common factor using the distributive property. 6.N.2.6

3. **Explain and use the concept of ratio and its relationship to other rational numbers and to the multiplication and division of whole numbers. Use ratios to solve problems.** 6.N.3
    1. Identify and use ratios to compare and relate quantities in multiple ways. Recognize that multiplicative comparison and additive comparison are different. 6.N.3.1

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2. Determine the unit rate for ratios. 6.N.3.2
3. Apply the relationship between ratios, equivalent fractions, unit rates, and percents to solve problems in various contexts. 6.N.3.3

4. **Multiply and divide decimals, fractions, and mixed numbers; solve real-world and mathematical problems with rational numbers.** 6.N.4
   1. Estimate solutions to problems with whole numbers, decimals, fractions, and mixed numbers, and use the estimates to assess the reasonableness of results in the context of the problem. 6.N.4.1
   2. Illustrate multiplication and division of fractions and decimals to show connections to fractions, whole number multiplication, and inverse relationships. 6.N.4.2
   3. Multiply and divide fractions and decimals using efficient and generalizable procedures. 6.N.4.3
   4. Use mathematical modeling to solve and interpret problems including money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers. 6.N.4.4

Algebraic Reasoning & Algebra

1. **Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs, and rules to model and solve mathematical problems.** 6.A.1
   1. Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs. 6.A.1.1
   2. Represent relationships between two varying positive quantities involving no more than two operations with rules, graphs, and tables; translate between any two of these representations. 6.A.1.2
   3. Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false. 6.A.1.3

2. **Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers.** 6.A.2
   1. Generate equivalent expressions and evaluate expressions involving positive rational numbers by applying the commutative, associative, and distributive properties and order of operations to model and solve mathematical problems. 6.A.2.1

3. **Use equations and inequalities to model and solve mathematical problems and use the idea of maintaining equality to solve equations. Interpret solutions in the original context.** 6.A.3
   1. Model mathematical situations using expressions, equations and inequalities involving variables and rational numbers. 6.A.3.1

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2. Use number sense and properties of operations and equality to model and solve mathematical problems involving equations in the form x + p = q and px = q, where p and q are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution. 6.A.3.2

Geometry & Measurement

1. **Use translations, reflections, and rotations to establish congruence and understand symmetry (not on a coordinate plane).** 6.GM.1
    1. Predict, describe, and apply translations (slides), reflections (flips), and rotations (turns) to a two-dimensional figure. 6.GM.1.1
    2. Recognize that translations, reflections, and rotations preserve congruence and use them to show that two figures are congruent. 6.GM.1.2
    3. Identify and describe the line(s) of symmetry in two-dimensional shapes. 6.GM.1.3
2. **Use mathematical modeling to calculate the area of squares, parallelograms, and triangles to solve problems.** 6.GM.2
    1. Develop and use formulas for the area of squares and parallelograms using a variety of methods including but not limited to the standard algorithms and finding unknown measures. 6.GM.2.1
    2. Develop and use formulas to determine the area of triangles and find unknown measures. 6.GM.2.2
    3. Find the area of right triangles, other triangles, special quadrilaterals, and polygons that can be decomposed into triangles and other shapes. 6.GM.2.3
3. **Understand and use relationships between angles in geometric figures.** 6.GM.3
    1. Solve problems using the relationships between the angles (vertical, complementary, and supplementary) formed by intersecting lines. 6.GM.3.1
    2. Develop and use the fact that the sum of the interior angles of a triangle is 180̊ to determine missing angle measures in a triangle. 6.GM.3.2
4. **Choose appropriate units of measurement and use ratios to convert within measurement systems to model and solve real-world and mathematical problems.** 6.GM.4
    1. Estimate weights and capacities using benchmarks in customary and metric measurement systems with appropriate units. 6.GM.4.1
    2. Solve problems that require the conversion of lengths within the same measurement systems using appropriate units. 6.GM.4.2

Data & Probability

1. **Interpret and analyze data.** 6.D.1
    1. Interpret the mean, median, and mode for a set of data. 6.D.1.1
    2. Explain and justify which measure of center (mean, median, or mode) would provide the most descriptive information for a given set of data. 6.D.1.2

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2. **Use probability to model and solve mathematical problems; represent probabilities using fractions and decimals.** 6.D.2

    1. Represent possible outcomes using a probability continuum from impossible to certain. 6.D.2.1
    2. Determine the sample space 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.D.2.2
    3. Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results. 6.D.2.3