Oklahoma Mathematics

Grade 7

Adopted 2022

Numbers & Operations

1. **Read, write, represent, and compare rational numbers, expressed as integers, fractions, and decimals. Explain and apply the concept of absolute value.** 7.N.1
    1. Compare and order rational numbers expressed in various forms using the symbols "<", ">", and "=". 7.N.1.1
    2. Recognize and generate equivalent representations of rational numbers, including equivalent fractions. 7.N.1.2
    3. Explain the relationship between the absolute value of a rational number and the distance of that number from zero on a number line. Use the symbol for absolute value. Apply the concept of absolute value to model and solve problems. 7.N.1.3
2. **Calculate with rational numbers, with and without positive integer exponents, to model and solve mathematical problems.** 7.N.2
    1. Estimate solutions to multiplication and division of integers in order to assess the reasonableness of results. 7.N.2.1
    2. Illustrate multiplication and division of integers using a variety of representations. 7.N.2.2
    3. Multiply and divide integers in a variety of situations; use efficient and generalizable procedures, including standard algorithms. 7.N.2.3
    4. Raise rational numbers (integers, fractions, and decimals) to positive integer exponents. 7.N.2.4
    5. Model and solve problems using rational numbers involving addition, subtraction, multiplication, division, and positive integer exponents. 7.N.2.5

Algebraic Reasoning & Algebra

1. **Explain the concept of proportionality in mathematical models and situations and distinguish between proportional and non-proportional relationships.** 7.A.1
    1. Identify a relationship between two varying quantities, x and y, as proportional if it can be expressed in the form y/x = k or y = kx; distinguish proportional relationships from non-proportional relationships. 7.A.1.1
    2. Recognize that the graph of a proportional relationship is a line through the origin and the coordinate (1, r), where r is the slope and the unit rate (constant of proportionality, k). 7.A.1.2
2. **Identify and justify proportional relationships using mathematical models and situations; solve problems involving proportional relationships and interpret results in the original context.** 7.A.2

Skip to main content

1. Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations. 7.A.2.1
2. Solve multi-step problems with proportional relationships (e.g., distance-time, percent increase or decrease, discounts, tips, unit pricing, mixtures and concentrations, similar figures, other mathematical situations). 7.A.2.2
3. Use proportional reasoning to solve problems involving ratios. 7.A.2.3
4. Use proportional reasoning to assess the reasonableness of solutions. 7.A.2.4

3. Represent mathematical situations using equations and inequalities involving variables and rational numbers. 7.A.3

1. Write and solve problems leading to linear equations with one variable in the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are rational numbers. 7.A.3.1
2. Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $x + p > q$ and $x + p < q$, where p, and q are nonnegative rational numbers. 7.A.3.2

4. Use order of operations and properties of operations to generate and evaluate equivalent numerical and algebraic expressions. 7.A.4

1. Use properties of operations (associative, commutative, and distributive) to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents. 7.A.4.1
2. Evaluate numerical expressions using calculators and other technologies and justify solutions using order of operations and grouping symbols. 7.A.4.2

Geometry & Measurement

1. Develop and understand the concept of surface area and volume of rectangular prisms with rational-valued edge lengths. 7.GM.1

1. Recognize that the surface area of a rectangular prism can be found by finding the area of each component of the net of that figure. Know that rectangular prisms of different dimensions can have the same surface area. 7.GM.1.1
2. Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements (e.g., cm^2). 7.GM.1.2
3. Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements (e.g., cm^3). 7.GM.1.3

2. Use mathematical models and problems to calculate and justify the area of trapezoids and the area and perimeter of composite figures with rational measurements. 7.GM.2

Skip to main content

1. Develop and use the formula to determine the area of a trapezoid. 7.GM.2.1

2. Find the area and perimeter of composite figures. 7.GM.2.2

3. **Use mathematical models and reasoning with proportions and ratios to determine measurements, justify formulas, and solve problems.** 7.GM.3

    1. Solve problems that require the conversion of weights and capacities within the same measurement systems using appropriate units. 7.GM.3.1
    2. Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is pi (π) and can be approximated by rational numbers such as 22/7 and 3.14. 7.GM.3.2
    3. Calculate the circumference and area of circles to solve problems in various contexts, in terms of pi (π) and using approximations for pi (π). 7.GM.3.3

4. **Analyze the effect of translations, reflections, rotations, and dilations on the attributes of two-dimensional figures on and off the coordinate plane.** 7.GM.4

    1. Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations. 7.GM.4.1
    2. Apply proportions, ratios, and scale factors to solve problems involving scale drawings and to determine side lengths and areas of similar triangles and rectangles. 7.GM.4.2
    3. Graph and describe translations (with directional and algebraic instructions), reflections across the x- and y-axes, and rotations in 90̊ increments about the origin of figures on a coordinate plane, and determine the coordinates of the vertices of a figure after a transformation. 7.GM.4.3

Data & Probability

1. **Interpret and analyze data, creating the most appropriate display, using a variety of tools.** 7.D.1

    1. Design simple experiments, collect data, and calculate measures of center (mean, median, and mode) and spread (range and interquartile range). Use these quantities to draw conclusions about the data collected and make predictions. 7.D.1.1
    2. Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. 7.D.1.2
    3. Use technology to create and analyze box plots. 7.D.1.3

Skip to main content

2. **Calculate and use proportional reasoning with probabilities to model and solve mathematical problems.** 7.D.2

    1. Determine the theoretical 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. 7.D.2.1
    2. Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions. 7.D.2.2
    3. Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on theoretical probabilities. 7.D.2.3