Oklahoma Mathematics

Grade 8

Adopted 2022

Numbers & Operations

1. **Read, write, compare, classify, and represent real numbers, and use them to solve problems in various contexts.** PA.N.1
    1. Develop and apply the properties of integer exponents, including a⁰= 1 (with a ≠ 0), to generate equivalent numerical and algebraic expressions. PA.N.1.1
    2. Express and compare approximations of very large and very small numbers using scientific notation. PA.N.1.2
    3. Multiply and divide numbers expressed in scientific notation and express the answer in scientific notation. PA.N.1.3
    4. Compare and order real numbers; locate real numbers on a number line. Identify the square roots of perfect squares to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers. PA.N.1.4

Algebraic Reasoning & Algebra

1. **Explain the concept of function in mathematical situations and distinguish between the concepts of linear and nonlinear functions.** PA.A.1
    1. Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable. PA.A.1.1
    2. Use linear functions to represent and model mathematical situations. PA.A.1.2
    3. Identify a function as linear if it can be expressed in the form y=mx + b or if its graph is a non-vertical straight line. PA.A.1.3
2. **Identify and justify linear functions using mathematical models and situations; solve problems involving linear functions and interpret results in the original context.** PA.A.2
    1. Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. PA.A.2.1
    2. Identify, describe, and analyze linear relationships between two variables. PA.A.2.2
    3. Identify graphical properties of linear functions, including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship. PA.A.2.3
    4. Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects. PA.A.2.4

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5. Solve problems involving linear functions and interpret results in the original context. PA.A.2.5

3. **Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.** PA.A.3

   1. Use substitution to simplify and evaluate algebraic expressions. PA.A.3.1
   2. Justify steps in generating equivalent expressions by combining like terms and using order of operations (to include grouping symbols). Identify the properties used, including the properties of operations (associative, commutative, and distributive). PA.A.3.2

4. **Represent and solve problems using mathematical models and situations with equations and inequalities involving linear expressions.** PA.A.4

   1. Solve mathematical problems using linear equations with one variable where there could be one, infinitely many, or no solutions. Represent situations using linear equations and interpret solutions in the original context. PA.A.4.1
   2. Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form px + q > r and px + q < r, where p, q, and r are rational numbers. PA.A.4.2
   3. Represent real-world situations using equations and inequalities involving one variable. PA.A.4.3

Geometry & Measurement

1. **Apply the Pythagorean theorem to solve problems involving triangles.** PA.GM.1

   1. Justify the Pythagorean theorem using measurements, diagrams, or dynamic software to solve problems in two dimensions involving right triangles. PA.GM.1.1
   2. Use the Pythagorean theorem to find the distance between any two points in a coordinate plane. PA.GM.1.2

2. **Justify and use formulas to calculate surface area and volume of three-dimensional figures.** PA.GM.2

   1. Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate units (e.g., cm^2). PA.GM.2.1
   2. Calculate the surface area of a cylinder, in terms of pi (Π) and using approximations for pi (Π), using decomposition or nets. Use appropriate units (e.g., cm^2). PA.GM.2.2
   3. Justify why base area (B) and height (h) in the formula V=Bh are multiplied to find the volume of a rectangular prism. Use appropriate units (e.g., cm^3). PA.GM.2.3
   4. Develop and use the formulas V = (πr)h and V = Bh to determine the volume of right cylinders, in terms of π and using approximations for pi (Τ). Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate units (e.g., cm^3). PA.GM.2.4

Da Skip to main content **Display and interpret data in a variety of ways, including using scatter plots and approximate lines of best fit. Use the line of best fit and average rate of change to**

make predictions and draw conclusions about data. PA.D.1

1. Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Create data displays using technology to examine this impact. PA.D.1.1
2. Explain how outliers affect measures of center and spread. PA.D.1.2
3. Collect, display, and interpret data using scatter plots. Use the shape of the scatter plot to find the informal line of best fit, make statements about the average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels, and units. PA.D.1.3

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2. **Calculate experimental probabilities and reason about probabilities to model and solve problems.** PA.D.2

    1. Calculate experimental probabilities and represent them as percents, fractions, and decimals between 0 and 1. Use experimental probabilities to predict relative frequencies when actual probabilities are unknown. PA.D.2.1
    2. Determine how samples are chosen (randomness) to draw and support conclusions about generalizing a sample to a population, including identifying limitations and biases. PA.D.2.2
    3. Define, compare, and contrast the probabilities of dependent and independent events. PA.D.2.3