

MATHEMATICS CONTENT STANDARDS

Grade 8

Standard 1: Algebraic Reasoning—The student will graph and solve linear equations and inequalities in problem-solving situations.

1. Equations

- a. Model, write, and solve 2-step linear equations using a variety of methods.
- b. Graph and interpret the solution to linear equations on a number line with one variable and on a coordinate plane with two variables.
- c. Predict the effect on the graph of a linear equation when the slope changes (e.g., make predictions from graphs, identify the slope in the equation $y = mx + b$ and relate to a graph).

2. Inequalities

- a. Model, write, and solve 1-step and 2-step linear inequalities with one variable.
- b. Graph the solution to linear inequalities with one variable on a number line.

Standard 2: Number Sense—The student will use numbers and number relationships to solve problems.

1. Rational Numbers and Proportional Reasoning

- a. Compare and order rational numbers (positive and negative integers, fractions, decimals) in real-life situations.
- b. Use the basic operations on rational numbers to solve problems in real-life situations (e.g., describe the effect of multiplying whole numbers by a fraction or a decimal less than 1).
- c. Apply ratios and proportions to solve problems.

2. Exponents

- a. Use the rules of exponents, including integer exponents, to solve problems (e.g., $72 \cdot 73 = 75$).
- b. Represent and interpret large numbers and numbers less than one in exponential and scientific notation.
- c. Use estimation strategies (e.g., rounding) to describe the magnitude of large numbers and numbers less than one.

Standard 3: Geometry—The student will use geometric properties to solve problems in a variety of contexts.

1. Construct models, sketch (from different perspectives), and classify solid figures such as rectangular solids, prisms, cones, cylinders, pyramids, and combined forms (e.g., draw a figure that could result from making 1, 2, or 3 cuts in a given solid).
2. Develop the Pythagorean Theorem and apply the formula to find the length of missing sides of a right triangle and the length of other line segments.

Standard 4: Measurement—The student will use measurement to solve problems in a variety of contexts.

1. Estimate and find the surface area and volume in real world settings (e.g., unwrap a box to explore surface area; use rice, 1-inch cubes, centimeter cubes, cups . . . to estimate the volume of boxes, irregular shaped objects, containers).
2. Apply knowledge of ratio and proportion to solve relationships between similar geometric figures (e.g., build a model of a 3-dimensional object to scale).
3. Formulas
 - a. Select and apply appropriate formulas for given situations:
 - I. an equation (e.g., $d = rt$, $i = prt$)
 - II. measurement problems (e.g., $p = 2l + 2w$, $v = lwh$)
 - b. Find the area of a “region of a region” for simple composite figures (e.g., area of a rectangular picture frame).

Standard 5: Data Analysis and Statistics—The student will use data analysis and statistics to interpret data in a variety of contexts.

1. Select and apply appropriate formats (e.g., line plots, bar graphs, stem-and-leaf plots, scatter plots, histograms, circle graphs) to display collected data.
2. Measures of Central Tendency
 - a. Find the measures of central tendency (mean, median and mode) of a set of data and understand why a specific measure provides the most useful information in a given context.
 - b. Compute the mean, median, and mode for data sets and understand how additional data in a set may affect the measures of central tendency.
- *3. Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population (e.g., is the average height of a men’s college basketball team a good representative sample for height predictions?).