

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.

ACT Strand and Score Range: Equations and Inequalities 20-23 Solve routine first-degree equations (MCG p. 31, 51, 62, 83, 95)

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.

ACT Strand and Score Range: Equations and Inequalities 24-27, 28-32 Solve routine first-degree inequalities that do not require reversing the inequality sign. (no examples) Solve linear inequalities that require reversing the inequality sign. (no examples)

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.

ACT Strand and Score Range: Number Concepts 20-23 Exhibit knowledge of elementary number concepts including the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor (MCG p. 29)

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).

ACT Strand and Score Range: Basic Operations & Applications 20-23 Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, computing an average with negative integers, and computing with a given average (MCG p. 56)

c. Apply ratios and proportions to solve problems.

ACT Strand and Score Range: Basic Operations & Applications 20-23 Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, computing an average with negative integers, and computing with a given average (MCG p. 27)

2. Exponents

a. Use the rules of exponents, including integer exponents, to solve problems (e.g.,

$7_2 \bullet 7_3 = 7_5$).

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- 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).

ACT Strand and Score Range: Measurement 20-23 Use geometric formulas when all necessary information is given (MCG p. 34)

- 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).

ACT Strand and Score Range: Measurement 13-15 Estimate or calculate the length of a line segment based on other lengths given on a geometric figure (MCG p. 68, 100)

3. Formulas

- a. Select and apply appropriate formulas for given situations:

I. an equation (e.g., $d = rt$, $i = prt$)

ACT Strand and Score Range: Equations and Inequalities 24-27 Write equations and inequalities with a single variable for common pre-algebra settings (e.g. rate and distance problems and problems that can be solved by using proportions) (MCG p. 95)

II. measurement problems (e.g., $p = 2l + 2w$, $v = lwh$)

ACT Strand and Score Range: Measurement 16-19, 20-23 Compute the area of rectangles when whole number dimensions are given. Compute the perimeter of polygons when all side lengths are given (MCG p. 68, 100) Compute the area and perimeter of triangles and rectangles in simple problems (MCG p. 68, 100) Use geometric formulas when all necessary information is given (MCG p. 34)

- b. Find the area of a “region of a region” for simple composite figures (e.g., area of a rectangular picture frame).

ACT Strand and Score Range: Measurement 24-27 Compute areas of rectangles and triangles when one or more additional simple steps are required. (MCG p. 26, 85)

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

MCG - EPAS Math Content Guide located at www.okhighered.org/epas

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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.

ACT Strand and Score Range: Probability, Statistics & Data Analysis 20-23 Translate from one representation of data to another (e.g., a bar graph to a circle graph) (No examples)

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.

ACT Strand and Score Range: Probability, Statistics & Data Analysis 16-19 Perform computations on data from tables and graphs. (MCG p. 89)

ACT Strand and Score Range: Basic Operations & Applications 16-19 Solve routine two-step arithmetic problems such as single-step percent and calculate a simple average of whole numbers. (MCG p. 27, 50, 56)

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.

ACT Strand and Score Range: Basic Operations & Applications 20-23 Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, computing with a given average. (MCG p. 24)

*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?).