Grade Eight

The eighth-grade standards are intended to serve two purposes. First, the standards contain content that reviews or extends concepts and skills learned in previous grades. Second, they contain new content that prepares students for more abstract concepts in algebra and geometry. The eighth-grade standards provide students additional instruction and time to acquire the concepts and skills necessary for success in Algebra I. Students will gain proficiency in computation with rational numbers and will use proportions to solve a variety of problems. New concepts include solving multistep equations and inequalities, graphing linear equations, visualizing three-dimensional shapes represented in two-dimensional drawings, and applying transformations to geometric shapes in the coordinate plane. Students will verify and apply the Pythagorean Theorem and represent relations and functions, using tables, graphs, and rules. The eighth-grade standards provide a more solid foundation in Algebra I for those students not ready for Algebra I in grade eight.

While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies. However, facility in the use of technology shall not be regarded as a substitute for a student's understanding of quantitative concepts and relationships or for proficiency in basic computations. Students will also identify real-life applications of the mathematical principles they are learning that can be applied to science and other disciplines they are studying.

Mathematics has its own language, and the acquisition of specialized vocabulary and language patterns is crucial to a student's understanding and appreciation of the subject. Students should be encouraged to use correctly the concepts, skills, symbols, and vocabulary identified in the following set of standards.

Problem solving has been integrated throughout the six content strands. The development of problem-solving skills should be a major goal of the mathematics program at every grade level. Instruction in the process of problem solving will need to be integrated early and continuously into each student's mathematics education. Students must be helped to develop a wide range of skills and strategies for solving a variety of problem types.

Number and Number Sense

Focus: Relationships within the Real Number System

8.1 The student will
- a) simplify numerical expressions involving positive exponents, using rational numbers, order of operations, and properties of operations with real numbers; and
- b) compare and order decimals, fractions, percents, and numbers written in scientific notation.

8.2 The student will describe orally and in writing the relationships between the subsets of the real number system.

Computation and Estimation

Focus: Practical Applications of Operations with Real Numbers

8.3 The student will
- a) solve practical problems involving rational numbers, percents, ratios, and proportions; and
- b) determine the percent increase or decrease for a given situation.

8.4 The student will apply the order of operations to evaluate algebraic expressions for given replacement values of the variables.

8.5 The student will
- a) determine whether a given number is a perfect square; and
- b) find the two consecutive whole numbers between which a square root lies.

Measurement
Focus: Problem Solving

8.6 The student will
- a) verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles; and
- b) measure angles of less than 360°.

8.7 The student will
- a) investigate and solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids; and
- b) describe how changing one measured attribute of a figure affects the volume and surface area.

Geometry
Focus: Problem Solving with 2- and 3-Dimensional Figures

8.8 The student will
- a) apply transformations to plane figures; and
- b) identify applications of transformations.

8.9 The student will construct a three-dimensional model, given the top or bottom, side, and front views.

8.10 The student will
- a) verify the Pythagorean Theorem; and
- b) apply the Pythagorean Theorem.

8.11 The student will solve practical area and perimeter problems involving composite plane figures.

Probability and Statistics
Focus: Statistical Analysis of Graphs and Problem Situations

8.12 The student will determine the probability of independent and dependent events with and without replacement.

8.13 The student will
- a) make comparisons, predictions, and inferences, using information displayed in graphs; and
- b) construct and analyze scatterplots.

Patterns, Functions, and Algebra
Focus: Linear Relationships

8.14 The student will make connections between any two representations (tables, graphs, words, and rules) of a given relationship.

8.15 The student will
- a) solve multistep linear equations in one variable with the variable on one and two sides of the equation;
- b) solve two-step linear inequalities and graph the results on a number line; and
- c) identify properties of operations used to solve an equation.

8.16 The student will graph a linear equation in two variables.

8.17 The student will identify the domain, range, independent variable, or dependent variable in a given situation.