Grade Eight Mathematics

The eighth-grade standards are designed to prepare students for Algebra I. The standards contain both content that reviews or extends concepts and skills learned in previous grades and new content that prepares students for more abstract concepts in algebra. New concepts include solving multistep equations, graphing linear equations, applying transformations to geometric figures, and using matrices to organize and interpret data. While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies such as fraction calculators, computers, spreadsheets, laser discs, and videos. 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

8.1 The student will use proportions to solve scale-model problems with fractions and decimals.

8.2 The student will simplify numerical expressions involving exponents, using order of operations.

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

Computation and Estimation

8.4 The student will solve practical problems involving whole numbers, integers, and rational numbers, including percents. Problems will be of varying complexities, involving real-life data.

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

8.6 The student, given a whole number from 0 to 100, will identify it as a perfect square or find the two consecutive whole numbers between which the square root lies.

Measurement

8.7 The student will verify by measuring and describe the relationships between vertical angles and angles that are supplementary and complementary.

8.8 The student will investigate and solve problems involving volume and surface area of cones and pyramids, using concrete materials and practical situations.

Geometry

8.9 The student will apply transformations (rotate or turn, reflect or flip, translate or slide, and dilate or scale) to geometric figures represented on graph paper. The student will identify applications of transformations such as tiling, fabric design, art, and scaling.

8.10 The student will describe, classify, and construct plane figures and solid figures, including prisms, pyramids, cylinders, and cones.

8.11 The student will verify the Pythagorean Theorem by measuring and then applying the Pythagorean Theorem to find the missing length of a side of a right triangle when the lengths of the other two sides are given.

Probability and Statistics

8.12 The student will analyze problem situations, such as games of chance, board games, or grading scales, and make predictions, using knowledge of probability.

8.13 The student will use information displayed in line, bar, circle, and picture graphs and histograms to make comparisons, predictions, and inferences.

8.14 The student will use a matrix to organize and describe data.

Patterns, Functions, and Algebra

8.15 The student will investigate and describe functional relationships, including the number of sides of a regular polygon and the maximum number of possible diagonals, expressing the algebraic concept of the number of diagonals of the nth-sided polygon.

8.16 The student will solve multistep equations in one variable.

8.17 The student will graph a linear equation in two variables on the coordinate plane, using a table of ordered pairs.

8.18 The student will describe and represent relations using tables, graphs, and rules.

8.19 The student will create and solve problems using proportions, formulas, and functions.