Grade Eight

The eighth-grade standards continue to build on the concepts needed for success in high school level algebra, geometry, and statistics. Students will explore real numbers and the subsets of the real number system. Proportional reasoning is expounded upon as students solve a variety of problems. Students find the volume and surface area of more complex three-dimensional figures and apply transformations to geometric shapes in the coordinate plane. Students will verify and apply the Pythagorean Theorem creating a foundation for further study of triangular relationships in geometry. Students will represent data, both univariate and bivariate data, and make predictions by observing data patterns. Students build upon the algebraic concepts developed in the standards for grades six and seven mathematics, which include simplifying algebraic expressions, solving multistep equations and inequalities, and graphing linear functions. The grade eight standards are vital to providing a solid foundation in Algebra I for students in middle school mathematics.

The use of appropriate technology and the interpretation of the results from applying technology tools must be an integral part of teaching, learning, and assessment. While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies to facilitate problem solving. However, facility in the use of technology shall not be regarded as a substitute for a student's understanding of quantitative and algebraic concepts or for proficiency in basic computations.

The acquisition of specialized mathematical vocabulary and language is crucial to a student's understanding and appreciation of the subject and fosters confidence in mathematics communication and problem solving.

Problem solving is integrated throughout the content strands. The development of problem-solving skills is a major goal of the mathematics program at every grade level. The development of skills and problem-solving strategies must be integrated early and continuously into each student's mathematics education.

Number and Number Sense

8.1   The student will compare and order real numbers.

8.2   The student will describe the relationships between the subsets of the real number system.

8.3   The student will
   a) estimate and determine the two consecutive integers between which a square root lies; and
   b) determine both the positive and negative square roots of a given perfect square.

Computation and Estimation

8. 4   The student will solve practical problems involving consumer applications.

Measurement and Geometry

8.5   The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles.

8.6   The student will
   a) solve problems, including practical problems, involving volume and surface area of cones and square-based pyramids; and
   b) describe how changing one measured attribute of a rectangular prism affects the volume and surface area.

8.7   The student will
    a) given a polygon, apply transformations, to include translations, reflections, and dilations, in the coordinate plane; and
    b) identify practical applications of transformations.

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

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

8.10   The student will solve area and perimeter problems, including practical problems, involving composite plane figures.

Probability and Statistics

8.11   The student will
    a) compare and contrast the probability of independent and dependent events; and
    b) determine probabilities for independent and dependent events.

8.12   The student will
    a) represent numerical data in boxplots;
    b) make observations and inferences about data represented in boxplots; and
    c) compare and analyze two data sets using boxplots.

8.13   The student will
    a) represent data in scatterplots;
    b) make observations about data represented in scatterplots; and
    c) use a drawing to estimate the line of best fit for data represented in a scatterplot.

Patterns, Functions, and Algebra

8.14   The student will
    a) evaluate an algebraic expression for given replacement values of the variables; and
    b) simplify algebraic expressions in one variable.

8.15   The student will
    a) determine whether a given relation is a function; and
    b) determine the domain and range of a function.

8.16   The student will
   a) recognize and describe the graph of a linear function with a slope that is positive, negative, or zero;
   b) identify the slope and *y*-intercept of a linear function, given a table of values, a graph, or an equation in *y* = *mx* + *b* form;
   c) determine the independent and dependent variable, given a practical situation modeled by a linear function;
   d) graph a linear function given the equation in *y* = *mx* + *b* form; and
   e) make connections between and among representations of a linear function using verbal descriptions, tables, equations, and graphs.

8.17   The student will solve multistep linear equations in one variable with the variable on one or both sides of the equation, including practical problems that require the solution of a multistep linear equation in one variable.

8.18   The student will solve multistep linear inequalities in one variable with the variable on one or both sides of the inequality symbol, including practical problems, and graph the solution on a number line.