Grade Seven

The seventh-grade standards continue to emphasize the foundations of algebra. Students who successfully complete the seventh-grade standards should be prepared to study Algebra I in grade eight. Topics in grade seven include proportional reasoning, integer computation, solving two-step linear equations, and recognizing different representations for relationships. Students will apply the properties of real numbers in solving equations, solve inequalities, and use data analysis techniques to make inferences, conjectures, and predictions.

While learning mathematics, students will be actively engaged, using concrete materials and appropriate technology such as calculators, computers, and spreadsheets. 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 and apply these 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: Proportional Reasoning

7.1 The student will
- a) investigate and describe the concept of negative exponents for powers of ten;
- b) determine scientific notation for numbers greater than zero;
- c) compare and order fractions, decimals, percents, and numbers written in scientific notation;
- d) determine square roots; and
- e) identify and describe absolute value for rational numbers.

7.2 The student will describe and represent arithmetic and geometric sequences, using variable expressions.

Computation and Estimation

Focus: Integer Operations and Proportional Reasoning

7.3 The student will
- a) model addition, subtraction, multiplication, and division of integers; and
- b) add, subtract, multiply, and divide integers.

7.4 The student will solve single-step and multistep practical problems, using proportional reasoning.

Measurement
Focus: Proportional Reasoning

7.5 The student will
- a) describe volume and surface area of cylinders;
- b) solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and
- c) describe how changing one measured attribute of a rectangular prism affects its volume and surface area.

7.6 The student will determine whether plane figures—quadrilaterals and triangles—are similar and write proportions to express the relationships between corresponding sides of similar figures.

Geometry
Focus: Relationships between Figures

7.7 The student will compare and contrast the following quadrilaterals based on properties: parallelogram, rectangle, square, rhombus, and trapezoid.

7.8 The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.

Probability and Statistics
Focus: Applications of Statistics and Probability

7.9 The student will investigate and describe the difference between the experimental probability and theoretical probability of an event.

7.10 The student will determine the probability of compound events, using the Fundamental (Basic) Counting Principle.

7.11 The student, given data for a practical situation, will
- a) construct and analyze histograms; and
- b) compare and contrast histograms with other types of graphs presenting information from the same data set.

Patterns, Functions, and Algebra
Focus: Linear Equations

7.12 The student will represent relationships with tables, graphs, rules, and words.

7.13 The student will
- a) write verbal expressions as algebraic expressions and sentences as equations and vice versa; and
- b) evaluate algebraic expressions for given replacement values of the variables.

7.14 The student will
- a) solve one- and two-step linear equations in one variable; and
- b) solve practical problems requiring the solution of one- and two-step linear equations.

7.15 The student will
- a) solve one-step inequalities in one variable; and
- b) graph solutions to inequalities on the number line.

7.16 The student will apply the following properties of operations with real numbers:

a) the commutative and associative properties for addition and multiplication;
b) the distributive property;
c) the additive and multiplicative identity properties;
d) the additive and multiplicative inverse properties; and
e) the multiplicative property of zero.