

# MATH CURRICULUM

## ALGEBRA I

### Goal

Students in the Algebra I program will continue with the study of algebraic concepts, including operations with real numbers and polynomials, relations and functions, and the creation and application of linear functions and relations. In addition, students will receive an introduction to nonlinear functions.

Algebra I students should be actively engaged and using appropriate technologies, such as calculators, computers, spreadsheets, laser discs, and videos to enhance their understanding of concepts and for proficiency in basic computations. Students should be prepared to show their work when solving problems. In addition, students should correctly use the concepts, skills, symbols, and vocabulary associated with mathematics.

### Number Sense and Operations

#### 1. The student will perform basic operations on the set of real numbers.

- a. Simplify and evaluate:
  - \*Absolute value expressions
  - \*Radical expressions
  - \*Algebraic expressions
  - \*Rational numbers
- b. Translate word phrases into algebraic expressions and word sentences into equations or inequalities.
- c. Apply the laws of exponents to perform operations.

#### 2. The student will operate with polynomials.

- a. Add, subtract, and multiply polynomials.
- b. Divide polynomials by monomial divisors.
- c. Factor polynomials using various algebraic methods.
- d. Find the greatest common factor of a polynomial.
- e. Classify and determine the degree of types of polynomials (e.g. monomial, binomial, and trinomial).
- f. Use the rules of exponents to simplify polynomials.

## Patterns, Relations, and Algebra

- 1. The student will graph and use relations and functions to solve problems.**
  - a. Define and distinguish between relations and functions, dependent and independent variables, domain and range.
  - b. Evaluate a function using tables, graphs, and equations.
  
- 2. The student will determine, and use, slopes of linear relationships to solve problems.**
  - a. Find the slope of a line given:
    - \*The graph of the line
    - \*An equation of the line
    - \*Two points on the line
    - \*A set of data points
  - b. Write the equation of, and graph, linear relationships given the following information:
    - \*Slope and y-intercept
    - \*Slope and one point on the line
    - \*Two points on the line
    - \*X-intercept and y-intercept
    - \*A set of data points
  - c. Use slope to determine if lines are parallel, perpendicular, horizontal, or vertical.
  
- 3. The student will use linear equations or inequalities to solve problems.**
  - a. Solve two-step linear equations and inequalities, in one variable, over the rational numbers.
  - b. Solve linear equations, or inequalities, by graphing, or using properties of equality, or by using properties of inequality.
  - c. Plot the values of quantities whose ratios remain the same. Recognize that the slope of the line equals the quantities.
  - d. Solve a system of linear equations or inequalities by:
    - \*Graphing
    - \*Substitution
    - \*EliminationSolve multi-step problems involving rate, average speed, and distance.
  
- 4. The student will solve quadratic equations.**
  - a. Use the quadratic formula to solve problems.
  - b. Solve a quadratic equation by completing the square.
  - c. Use quadratic equations to solve problems by factoring or by locating points on the graph.
  - d. Graph quadratic functions.

## **Geometry**

### **1. The student will solve geometric problems.**

- a. Compute the length, perimeter, circumference, area, volume, and surface area of geometric objects with missing information. Correctly identify the appropriate unit of measure.
- b. Correctly identify the appropriate unit of measure.

## **Measurement**

### **1. The student will use formulas to solve measurement problems.**

- a. Evaluate and apply formulas (e.g. circumference, perimeter, area, volume, Pythagorean theorem, interest, distance, rate, and time) to solve problems within an algebraic context.
- b. Use the appropriate formula to determine the length, midpoint, and slope of a segment in a coordinate plane.

## **Data Analysis, Statistics, and Probability**

### **1. The student will collect and interpret data to solve problems.**

- a. Use matrices to display and interpret data.
- b. Analyze a relation to determine whether a direct variation exists.
- c. Write an equation from a given set of data points, for a line of best fit. Use the equation to make predictions.
- d. Recognize and identify linear and non-linear data.

### **2. The student will use counting techniques, permutations, and combinations to solve probability problems.**