

ALGEBRA I

This course begins with a review of basic operations performed on both numerical and algebraic expressions, using the order of operations. Methods for solving simple linear equations are developed. These methods include using the table feature of the graphing calculator as well as the traditional algebraic transformations. The use of the number line is reviewed and extended to the rectangular-coordinate plane and the graphing of linear equations. Graphing, including the use of the graphing calculator, and other methods of solving systems of linear equations are introduced. Students learn to perform basic operations on polynomials and then to factor polynomials which leads to solving quadratic equations. Additional topics to be studied are algebraic fractions, ratio and proportion, functions, radical expressions, the quadratic formula and the Pythagorean theorem.

OBJECTIVES

1. To extend arithmetic skills and concepts into the field of algebra
2. To develop logical thinking by working with technology and with the structure and properties of the real number system
3. To introduce the algebraic approach to problem solving
4. To encourage an appreciation of the role of a calculator in mathematics, including its capabilities as well as its limitations.

SCOPE

- I. Introduction
 - A. Statistics (mean, median, mode), variables, spreadsheet
 - B. Grouping symbols, order of operations
 - C. Evaluating algebraic expressions
 - D. Number line, integers, absolute value
 - E. Functions (notation, domain, range, evaluate)
- II. Operations and Properties
 - A. Add, subtract, multiply
 - B. Distributive property
 - C. Combine like terms
- III. Solving Linear Equations
 - A. Single transformation, multi-transformations
 - B. Simplify and solve
 - C. Variable on both sides, identity or no solution,
 - D. Graphing calculator
 - E. Percents, proportions
 - F. Literal equations
- IV. Solving Linear Inequalities
 - A. Graph on number line
 - B. Same transformations as linear equations
 - C. Combined inequalities

- V. Linear Graphing
 - A. Plot points, graph lines
 - B. Find slope given two points or an equation
 - C. Write an equation given two points or a point and slope or slope and y-intercept
 - D. Graphing calculator
 - E. Linear regression
- VI. Solving Systems of Linear Equations
 - A. Graphing
 - B. Substitution
 - C. Elimination
 - D. Graphing calculator
 - E. Determinants
- VII. Operations with Polynomials
 - A. Add and subtract polynomials
 - B. Multiply monomial by monomial
 - C. Multiply monomial by polynomial
 - D. Multiply polynomial by polynomial
 - E. FOIL
 - F. Long division
 - G. Simplify quotients of monomials (including negative exponents)
 - H. Add, subtract, multiply and divide rational expressions
 - I. Simplify complex rational expressions
- VIII. Factoring
 - A. Prime factorization
 - B. Common monomial factors
 - C. $x^2 + bx + c$, $ax^2 + bx + c$, difference of two squares
 - D. Several types combined
- IX. Radicals (square roots only)
 - A. Simplify(remove perfect square factors from radicand)
 - B. Multiply, divide, add, subtract
 - C. Rationalize denominators
 - D. Remove fractions in radicand
- X. Quadratic Formula, Pythagorean Theorem
 - A. Solving quadratic equations (factor, square root of both sides, quadratic formula, graphing calculator)
 - B. Pythagorean Theorem and its converse
 - C. Distance formula, midpoint formula
- XI. Variation and other word problems
 - A. Direct variation
 - B. Inverse variation
 - C. Joint variation
 - D. Combined variations

TEXT

Algebra I – An Integrated Approach, Gerver, Sgroi, Carter, Hansen, Molina and Westegaard, South-Western Educational Publishing, 1997