

ALGEBRA I - PART ONE

I. Course Description

The purpose of Algebra I - Part One is to develop the skills needed to solve a variety of mathematical and real world problems and to thereby provide the foundation for more advanced mathematics courses.

II. Contents of the Course

- A. The Real Number System. Introduction to number sets. Operations on sets of numbers. Properties of real numbers. Evaluating expressions. Graphing in one dimension.
- B. Mathematical expressions. Writing and interpreting mathematical expressions, both arithmetic and algebraic. Simplifying mathematical expressions. Evaluating expressions.
- C. Equations and Inequalities. Finding solutions of equations/inequalities. Solving linear equations/inequalities and quadratic equations. Writing equations/inequalities from word descriptions. Solving systems of linear equations/inequalities by graphing and/or algebraic methods. Solving absolute value equations/inequalities.
- D. Polynomials. Identification and classification of polynomials. Factoring polynomials. Methods of solving polynomial equations. Graphing polynomial equations on the Cartesian coordinate plane. Introducing the 'function' concept.
- E. Radical Expressions. Operations on radical expressions. Solving radical equations.
- F. Rational Expressions. Operations on rational expressions.

III. Objectives

After successfully completing this course the student will be able to:

- A. Perform operations on the real numbers
 - 1. Use order of operations and grouping symbols to evaluate expressions
 - 2. Identify and apply the Properties of the real numbers
 - a. Use the commutative properties
 - b. Use the identity properties
 - c. Use the associative properties
 - d. Use the distributive properties
 - 3. Add, subtract, multiply, and divide real numbers
 - 4. Identify algebraic expressions
 - a. Translate word expressions into algebraic expressions
 - b. Interpret algebraic expressions
 - c. Simplify algebraic expressions
- B. Write and solve one-variable equations
 - 1. Understand and apply the addition and multiplication properties of equality
 - 2. Solve equations using the addition and multiplication properties of equality
 - 3. Translate word statements into algebraic statements
 - 4. Solve formulae for a specific variable
- C. Write and solve linear inequalities in one variable
 - 1. Understand and apply the addition and multiplication properties of inequality
 - 2. Solve linear inequalities
 - 3. Graph inequalities and solutions of inequalities on the number line

- D. Perform operations involving exponential expressions
 - 1. Know the laws of exponents to algebraic expressions
 - 2. Apply exponential laws to simplifying algebraic expressions
 - 3. Multiply and divide exponential expressions
 - 4. Convert standard notation into scientific notation and vice-versa
- E. Work with polynomials and polynomial open sentences
 - 1. Identify terms and coefficients of polynomials
 - 2. Classify polynomials according to number of terms and degree
 - 3. Simplify polynomials
 - 4. Understand the use of the distributive property in simplifying polynomials
 - 5. Factor polynomials
 - 6. Solve quadratic equations by factoring
- F. Graph linear equations in two-variables on the Cartesian coordinate plane
 - 1. Identify the parts of the Cartesian coordinate plane
 - 2. Plot ordered pairs
 - 3. Identify the ordered pair of a point
 - 4. Know the definition of the slope of a line
 - 5. Calculate the slope of a line
 - 6. Distinguish among the different forms of linear equations
 - 7. Convert one form of a linear equation into another
 - 8. Graph linear equations
 - 9. Determine linear graphs to be parallel or perpendicular based on slopes
- G. Solve systems of equations
 - 1. Find the solution of a system of equations by graphing
 - 2. Solve a system of equations by algebraic methods
 - 3. Solve word problems using a system of equations
- H. Solve compound sentences
 - 1. Name sets using set-builder notation
 - 2. Find the intersection of sets
 - 3. Find the union of sets
 - 4. Identify compound sentences as a conjunction or a disjunction
 - 5. Find and graph the solution set of a compound sentence on the number line
 - 6. Solve and graph absolute value equations and inequalities
 - 7. Graph inequalities in two variables
 - 8. Graph the solution of a system of linear inequalities
- I. Work with rational expressions
 - 1. Identify rational expressions
 - 2. Simplify a rational expression by factoring
 - 3. Multiply and divide rational expressions
 - 4. Find the least common denominator of several rational expressions
 - 5. Add and subtract rational expressions
 - 6. Solve equations containing rational expressions
- J. Work with and apply radical expressions
 - 1. Find the square roots of perfect squares
 - 2. Identify a real number as rational or irrational
 - 3. Determine acceptable replacements for radicands

4. Simplify radical expressions
 5. Perform basic operations on expressions containing radicals
 6. Know and apply the Pythagorean Theorem
 7. Solve equations involving radicals
 8. Solve equations using Quadratic Formula
- K. Use relations and functions in mathematics
1. Identify a relation
 2. Determine whether a relation is a function
 3. Write a function using functional notation
 4. Find the value of a function
 5. Demonstrate the ability to recognize and to use direct, inverse, joint, and combined variations

IV. Methods of Assessment

- A. Daily assignments
- B. Quizzes: announced and unannounced (short answer questions should be included)
- C. Tests: chapter, quarter, and semester (short answer questions should be included)
- D. Projects pertaining to the material
- E. Cooperative group learning