FAME Public Charter School
Course Description
Algebra I

Description:
Students will develop an organized approach to solving a wide variety of algebraic problems utilizing the symbols, methodologies, and language necessary to understanding Algebra. Algebraic skills and concepts are developed and used in a wide variety of problem-solving situations. Topics covered include basic operations with real numbers, linear and quadratic equations, inequalities, polynomials, rational expressions, radicals, problem solving, factoring, and graphing. Pre-Requisites: Grade of "C" or better in Pre-Algebra. This is a one-year course, 5 credits each semester will be awarded with a passing grade.

Course Objectives
Students completing this course will be able to do the following:

- Write, solve, and graph linear and quadratic equations.
- Solve quadratic equations by factoring, completing the square, and graphically.
- Understand monomial and polynomial expressions, inequalities, exponents, functions, rational expressions, ratio, and proportion.
  Understand the practical applications and real-world uses of algebra.

Course Goals and/or Major Student Outcomes
Coursework will include a thorough understanding and application of the following topics:

- Students identify and use the arithmetic properties of subset of integers, rational, irrational and real numbers. This includes closure properties for basic arithmetic operations where applicable. Students use properties of numbers to demonstrate that assertions are true or false.
- Students understand and use such operations as taking the opposite, reciprocal, rising to a power, and taking a root. This includes the understanding and use of the rules of exponents.
- Students solve equations and inequalities involving absolute values.
- Students simplify expressions prior to solving linear equations and inequalities in one variable.
- Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in on variable, with justification of each step.
- Students graph a linear equation, and compute the x- and y- intercepts. They are also able to sketch the region defined by linear inequality.
- Students verify that a point lies on a line given an equation of the line. Students are able to derive linear equations using the point-slope formula.
- Students understand the concepts of parallel and perpendicular lines and how their slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.
- Students solve a system of two linear equations in two variables algebraically, and are able to interpret the answer graphically. Students are able to use this to solve a system of two linear equalities in two variables, and to sketch the solution sets.

- Students add, subtract, multiply and divide monomials, and polynomials. Students solve multi-step problems, including word problems, using these techniques.
- Students apply basic factoring techniques to second and simple third degree polynomials. These techniques include finding a common factor to all of the terms in a polynomial and recognizing the difference of two squares, and recognizing perfect squares of binomials.
- Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing to lowest terms.
- Students add, subtract, multiply, and divide rational expression and functions. Students solve both computationally and conceptually challenging problems using these techniques.
- Students solve a quadratic equation by factoring or completing the square.
- Students apply algebraic techniques to rate problems, work problems, and percent mixture problems.
- Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.
- Students determine the domain of independent variables, and range of dependent variables defined by a graph, a set of ordered pairs, or symbolic expression.
- Students determine whether a relation defined by a graph, a set of ordered pairs, or symbolic expression is a function and justify the conclusion.
- Students know the quadratic formula and are familiar with its proof by completing the square.
- Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.
- Students graph quadratic functions and know that their roots are the x-intercepts.
- Students use the quadratic formula and/or factoring techniques to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.
- Students apply quadratic equations to physical problems such as the motion of an object under the force of gravity.
- Students use properties of the number system to judge the validity of results, to justify each step of a procedure and to prove or disprove statements. Students use properties of numbers to construct simple valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. Students judge the validity of an argument based on whether the properties of the real number system and order of operations have been applied correctly at each step.

Key Assignments and Assessment:	**Grading Scale:**
Unit by Unit problem Sets	20%
End of Chapter Tests	60%
Final Examination	20%

Curriculum:
May be selected from the following:

Holt, Rinehart, Winston
Algebra 1, co. 2003, isbn 0030660513

Prentice Hall
Algebra 1, co. 2004, isbn 013052316X

Prentice Hall
Algebra 1-Classics Edition, co. 2006, isbn 013133770X

Prentice Hall
Algebra 1-Classics Edition, co. 1999, isbn 0201860988

Glencoe,
Algebra 1, co 2005, isbn 0078651131

*Videotext, Algebra 1
*North Dakota Independent Study, Algebra, semester 1 and 2
*University Nebraska-Lincoln, I.S.H.S., Algebra, MTHH 031 and 032
*Laurel Springs, Algebra 1, Text or Online

NOTE: Students wishing to use Saxon curriculum must follow the Algebra 1-S course description found under the college prep course section of this manual.

Basis Revised 12/2004
FAME revised 6/13/06