# STAFFORD COUNTY PUBLIC SCHOOLS

## Curriculum Overview
## Algebra 1 Part 1

**Course Description:**

Algebra I Part I is the first course of the two-course equivalent of Algebra I. Students who complete both Algebra I Part 1 and Algebra I Part 2 successfully will receive one math credit and one elective credit. Course topics include classes of numbers, expressions, equations, inequalities, linear functions, and operations with polynomials. There is no Standards of Learning test for this course. Students will take the Standards of Learning Algebra I test upon completion of Algebra I Part II. Students who successfully complete this course may enroll in Algebra I Part II.

**Essential Skills/Processes:**

The development of problem solving skills and logical reasoning is a major goal of the mathematics program at every level. Students will develop a wide range of mathematical skills and strategies for understanding and solving a variety of problem types. Consideration will be given to the sequential development of concepts and skills by using concrete materials and pictorial representations to assist students in making the transition from the numerical relationships in arithmetic to the symbolic relationships in algebra.

These standards require students to use algebra as a tool for representing and solving a variety of practical problems. Tables and graphs will be used to interpret algebraic expressions, equations, and inequalities and to analyze functions. Matrices will be used to organize and manipulate data.

Mathematics has its own language, the vocabulary and symbols are very important to a student's understanding of concepts and use of mathematics to solve problems. Students will use mathematical concepts, symbols, and vocabulary to read mathematics, discusses mathematics, write about mathematics, do mathematics, and solve problems.

Technology is an important tool in both learning mathematics and solving problems in mathematics. To use technology appropriately and effectively students must know the basic facts, understand concepts, and be able to estimate and reason logically. Graphing calculators as well as other appropriate technology will be used for teaching and learning. Additional topics such as solving complex multi-step problems, working with rational expressions and simplifying radical forms of algebraic expressions will also be explored.

Students are more likely to be successful if they are:
- self-motivated
- able to recall and use prior math skills
- willing to practice skills regularly, including homework, and
- persistent in problem solving.

**Essential Knowledge:**

### Expressions and Operations
- Represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.
- Apply the laws of exponents to perform operations on expressions
- Perform the following operations: adding, subtracting, multiplying, and dividing polynomials and factoring completely first- and second-degree binomials and trinomials in one or two variables. *Graphing calculators will be used as a tool for factoring and for confirming algebraic factorizations.*
- Express the square roots and cube roots of whole numbers and the square root of a monomial algebraic expression in simplest radical form

### Equations and Inequalities
- Solve multistep linear and quadratic equations in two variables, including solving literal equations (formulas) for a given variable
- Justify steps used in simplifying expressions and solving equations, using field properties and axioms of equality that are valid for the set of real numbers and its subsets
- Solve quadratic equations algebraically and graphically
- Solve multistep linear equations algebraically and graphically

- Solve systems of two linear equations in two variables algebraically and graphically and solve real-world problems involving equations and systems of equations

*Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.*

- Solve multistep linear inequalities in two variables, including solving multistep linear inequalities algebraically and graphically
- Justify steps used in solving inequalities, using axioms of inequality and properties of order that are valid for the set of real numbers and its subsets
- Solve real-world problems involving inequalities
- Solve systems of inequalities
- Graph linear equations and linear inequalities in two variables, including determining the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined
- Write the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line

## Functions and Statistics
- Investigate and analyze function (linear and quadratic) families and their characteristics both algebraically and graphically
- Determine whether a relation is a function,
- Determine the domain and range, zeros of a function, $x$- and $y$-intercepts
- Find the values of a function for elements in its domain
- Make connections between and among multiple representations of functions including concrete, verbal, numeric, graphic, and algebraic
- Given a situation in a real-world context, will analyze a relation to determine whether a direct or inverse variation exists, and represent a direct variation algebraically and graphically and an inverse variation algebraically
- Given a set of data, will interpret variation in real-world contexts and calculate and interpret mean absolute deviation, standard deviation, and z-scores
- Compare and contrast multiple univariate data sets, using box-and-whisker plots
- Collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve real-world problems, using mathematical models. Mathematical models will include linear and quadratic functions

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**Resources:**
- Stafford County Public Schools: http://stafford.schoolfusion.us/ .
- High School Course Catalog: http://stafford.schoolfusion.us/ . Click on For Parents/Students tab.
- VA Standards of Learning: http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/review.shtml
- School Report Card (VA Department of Education): http://www.doe.virginia.gov/statistics_reports/school_report_card/index.shtml
- Holt McDougal: Algebra I ©2011 http://www.classzone.com/cz/books/algebra_1_2011_na/book_home.htm?state=VA