



STAFFORD COUNTY PUBLIC SCHOOLS

Curriculum Overview Algebra II

Course Description:

Algebra II expands and clarifies the concepts introduced in Algebra I. New topics include sequence and series, polynomial functions, introduction to logarithms, exponential functions, quadratic systems and conic sections. Emphasis is on algebraic processes and their use in problem solving. The course will enhance students understanding of the function concept.

Students enrolled in this course will take the Standards of Learning Algebra II test. Students who successfully complete this course may take Algebra III with Trigonometry or Statistics/Probability with Discrete Topics.

Essential Skills/Processes:

Algebra has its own language. The vocabulary and symbols are very important to a student's understanding of algebraic concepts. Students will use mathematical skills, symbols, and vocabulary to read and communicate about algebra. Students will apply algebraic concepts in solving practical problems.

The secondary mathematics program will provide the opportunity for students to develop strong mathematical knowledge and skills in order to pursue higher education, to compete in a technologically oriented workforce, and to see mathematics as an integrated field of study. 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.

- Students will develop a wide range of mathematical skills and strategies for understanding and solving a variety of problem types.
- Students will be able to clearly communicate mathematical ideas and use mathematical representations, such as graphs, tables, and charts to model and interpret practical situations.
- Students will recognize that graphical numerical, algebraic, verbal, and physical representations are both to organize one's thinking and a way to represent the solution to a problem.
- Students will use technology to appropriately estimate and reason logically and to effectively explore and verify mathematical concepts.
- Students will be active participants in the learning process and accept responsibility for mastery of the course content objectives.

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 (13 items)

- Add, subtract, multiply, divide, and simplify rational algebraic expressions
- Add, subtract, multiply, divide, and simplify radical expressions containing rational numbers and variables, and expressions containing rational exponents
- Write radical expressions as expressions containing rational exponents and vice versa
- Factor polynomials completely
- Perform operations on complex numbers, express the results in simplest form using patterns of the powers of i , and identify field properties that are valid for the complex numbers.

Equations and Inequalities (13 items)

- Solve, algebraically and graphically, absolute value equations and inequalities
- Solve, algebraically and graphically, quadratic equations over the set of complex numbers

- Solve, algebraically and graphically, equations containing rational algebraic expressions
 - Solve, algebraically and graphically, equations containing radical expressions
- Graphing calculators will be used for solving and for confirming the algebraic solutions.*
- Solve nonlinear systems of equations, including linear-quadratic and quadratic-quadratic, algebraically and graphically
- Graphing calculators will be used as a tool to visualize graphs and predict the number of solutions.*

Functions and Statistics (24 items)

- Investigate and apply the properties of arithmetic and geometric sequences and series to solve real-world problems, including writing the first n terms, finding the n^{th} term, and evaluating summation formulas. Notation will include \sum and a
- Recognize the general shape of function (absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic) families and will convert between graphic and symbolic forms of functions.

A transformational approach to graphing will be employed. Graphing calculators will be used as a tool to investigate the shapes and behaviors of these functions.

- Investigate and analyze functions algebraically and graphically to determine domain and range, including limited and discontinuous domains and ranges; zeros; x - and y -intercepts; intervals in which a function is increasing or decreasing; asymptotes; end behavior; inverse of a function; and composition of multiple functions

Graphing calculators will be used as a tool to assist in investigation of functions.

- Investigate and describe the relationships between solutions of an equation, zeros of a function, x -intercepts of a graph, and factors of a polynomial expression
- Collect and analyze data, determine the equation of the curve of best fit, make predictions, and solve real-world problems, using mathematical models.

Mathematical models will include polynomial, exponential, and logarithmic functions.

- Identify, create, and solve real-world problems involving inverse variation, joint variation, and a combination of direct and inverse variations
- Identify properties of a normal distribution and apply those properties to determine probabilities associated with areas under the standard normal curve
- Compute and distinguish between permutations and combinations and use technology for applications

Resources:

- Stafford County Public Schools: <http://stafford.schoolfusion.us/>
- High School Course Catalog: <http://stafford.schoolfusion.us/> and click on “For Parents/Students”.
- VA Mathematics Standards of Learning: http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/index.shtml
- School Report Card (VA Department of Education): http://www.doe.virginia.gov/statistics_reports/school_report_card/index.shtml
- Holt McDougal textbook: http://www.classzone.com/cz/books/algebra_2_2011_na/book_home.htm?state=VA