

**FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT**

**Course Outline  
Algebra 2**

**Date: March 2002**

**Proposed Grade Level(s): 8-12**

**Grading: A-F**

**Prerequisites: 'C' or better in Algebra 1 (or Year 2) and Geometry**

**Subject Area: Mathematics**

**Course Length: 1 Year**

**Number of Credits: 5/semester**

**COURSE DESCRIPTION:**

Algebra 2 will cover content in the following areas: Absolute Value and Inequalities; Complex Numbers; Polynomials and Rational Expressions and Functions; Quadratic Functions; Logarithms; Arithmetic and Geometric Series; and the Binomial Theorem.

**GENERAL GOALS/PURPOSES:**

The state framework describes Algebra 2 as an expansion of the content of Geometry and Algebra 1. New concepts and techniques are introduced in this course, which will prove to be basic to more advanced courses in mathematics and the sciences. The emphasis is on abstract thinking skills, the function concept, and the algebraic solution of problems in various content areas.

**STUDENT READING COMPONENT:**

Students will receive instruction on the effective use of their textbook. Algebra 2 includes many applications where effective reading and analysis are taught as part of the course. Also, projects will emphasize reading across the curriculum.

**STUDENT WRITING/ORAL COMPONENT:**

Students will have opportunities to express their understanding of concepts in writing as well as orally presenting work to the class. All written work will follow standard rules of English. Any research projects will follow MLA format, which has been distributed at all secondary sites.

**FINAL ASSESSMENT:**

There is no district final for this course. However, each high school has a departmental final for both the first and second semesters.

**DETAILED UNITS OF INSTRUCTION:**

*Note: The CA Mathematics Content Standards for Algebra 2 and other advanced math topics prior to Calculus are handled differently at every school in the state. The state standards for Algebra 2 represent a minimal course focused on algebraic topics. Most courses, including the ones taught at FHS and CHS include topics and standards from other areas denoted in the standards under the headings of "Trigonometry",*

*“Mathematical Analysis”, “Linear Algebra”, and “Probability and Statistics”. Portions of the detailed units of instruction that address standards in these areas are noted; otherwise the standard number refers to Algebra 2.*

### **Linear Relations and Functions**

- Properties of Real Numbers
- Expressions and Formulas
- Solving equations and inequalities
- Solving Absolute Value equations and inequalities
- Relations and Functions
- Graphing linear equations and inequalities
- Writing linear equations
- Modeling data from scatter plots/Lines of regression
- Special Functions

### **Systems of Equations and Inequalities**

- Graphing systems of linear equations and inequalities
- Solving systems of equations with Substitution and Linear Combinations
- Solving systems using Cramer’s Rule
- Linear Programming
- Solving systems of equations using 3 variables
- Introduction to Matrices and matrix computation
- Identify and find inverse matrices
- Solving systems of equations using matrices (inverse matrices as well as Augmented matrices)

### **Polynomials and Radical Expressions**

- Review computation of polynomials including long division
- Factoring polynomials
- Simplifying radical expressions
- Rational exponents
- Solving radical equations
- Complex numbers
- Simplifying expressions with complex numbers

### **Quadratic Functions and Inequalities**

- Solving quadratic equations by graphing, factoring, completing the square, and the quadratic formula
- The discriminant
- Sum and Product of roots
- Families of Parabolas
- Analyzing graphs of quadratic functions
- Graphing and solving quadratic inequalities

### **Conic Sections**

- Distance and Midpoint formulas
- Parabolas- vocabulary, standard form, and graph
- Circles- vocabulary, standard form, and graph
- Ellipses- vocabulary, standard form, and graph
- Hyperbolas- vocabulary, standard form, and graph
- Development of big picture of conic sections
- Solving quadratic systems

- Graphing systems of quadratic inequalities

### **Polynomial Functions**

- Remainder and Factor Theorems
- Approximating zeros
- Roots and zeros
- Analyzing and finding roots of a polynomial function algebraically
- Composition of functions
  
- Iteration
- Inverse functions and relations

### **Rational Expressions and Equations**

- Simplifying and computing with rational expressions
- Graphing rational functions
- Direct, inverse, and joint variation
- Solving rational equations

### **Exponential and Logarithmic Functions**

- Real exponents and exponential functions
- Logarithms and logarithmic functions
- Properties of logarithms
- Common logarithms
- Natural logarithms
- Solving exponential equations
- Growth and Decay applications

### **Sequences and Series**

- Arithmetic sequences and series
- Geometric sequences and series
- Infinite geometric series
- Recursion and special sequences
- Fractals (optional)
- Binomial Theorem

### **Statistics Applications, Discrete Mathematics and Probability (as time allows)**

- Scatter plots and curve fitting-modeling data using functions
- Measures of Central Tendency; Box-and-Whisker plots
- Standard Deviation and the Normal Curve
- The Counting Principle
- Permutations
- Combinations
- Probability
- Multiplying and Adding probabilities
- Binomial experiments

### **Topics from Trigonometry (optional)**

- Six trig functions
- Solving right triangles

- Law of Sines & Law of Cosines
- Graphs of trig functions
- Identities and Formulas
- Applications

**THIS COURSE WILL PREPARE STUDENTS FOR THE HSEE AND/OR FCUSD EXIT EXAMS IN:**

Math

**LAB FEE, IF REQUIRED:** None

**SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:**

See “Detailed Units of Instruction”

**DISTRICT ESLRs TO BE ADDRESSED:**

When students exit a secondary mathematics course, they will be:

- **Self-directed Learners** who will be able to use notes and a textbook to assist them in continuing their learning outside of the classroom setting.
- **Efficient Communicators** who can explain mathematical concepts to others and use mathematics to organize and explain data.
- **Quality Producers** who understand the importance of neat, organized work that demonstrates their thinking and understanding of the solution they’ve formed to solve a problem.
- **Constructive Thinkers** who are able to attack problems with organization, logic, and mathematical skills they’ve developed in a systematic fashion.
- **Collaborative Workers** who can work in a variety of settings in culturally diverse groups. They will be able to form and use study groups to strengthen their own understanding in addition to providing the same service for classmates.
- **Responsible Citizens** who accept the consequences of their actions and who demonstrate their understanding of their role in the learning process.