FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

Mathematical Reasoning

Date: May 2009 **Subject Area: Mathematics**

Proposed Grade Level(s): 10^{th}-12^{th} **Course Length: 1 Year**

Grading: A-F **Number of Credits: 5 per Semester**

Prerequisites: Completion of Algebra 1 and Geometry (Geometry exception possible if grade 11 or 12)

COURSE DESCRIPTION:

Mathematical Reasoning is a non-college prep option for students who want to strengthen their Algebra 1 and geometry skills prior to taking more advanced math classes such as Algebra 2. This course surveys a variety of math topics of interest to students including statistics, formal logic, set theory, historical number systems, and topics from consumer math, in addition to a number of state algebra, geometry, and statistics and probability standards.

GENERAL GOALS/PURPOSES:

Provide students who have completed Algebra 1 and Geometry but with low grades and incomplete understanding with an opportunity to strengthen their math skills prior to attempting advanced math courses such as Algebra 2 or future college math coursework.

STUDENT READING COMPONENT:

Students will receive instruction on the effective use of their textbook. Mathematical Reasoning includes many applications where effective reading and analysis are taught as part of the course. As students develop their mathematical thinking, they will also improve their ability to create a formal logical argument, as well as develop their ability to read analytically.

STUDENT WRITING/ORAL COMPONENT:

One of the goals of Mathematical Reasoning is to train students to think mathematically. The development of this skill is a critical part of a student's ability to create a persuasive logical argument in any setting and in any subject. Additionally, students will have opportunities to express their understanding of a variety of concepts in writing as well as present work orally to the class.

Final Assessment:
Comprehensive Fall and Spring semester finals.

DETAILED UNITS OF INSTRUCTION:

Suggested text: *Thinking Mathematically*, Robert Blitzer, Prentice Hall.

Fall Semester: Chapters 1 – 4; 8

- Problem Solving and Critical Thinking
- Set Theory

    - Venn Diagrams
    - Basic set concepts and operations
- Logic
    - Statements, negations, and quantified statements
    - Compound statements
    - Truth tables
    - Equivalent statements, conditional statements, and De Morgan's Laws
    - Arguments and Euler Diagrams
- Number Representation and Calculation
    - Hindu-Arabic system
    - Early positional systems
    - Number bases
    - Early numeration systems
- Consumer Mathematics and Financial Management
    - Percent
    - Interest
    - Installment buying
    - Cost of home ownership
    - Investing in Stocks, bonds, and mutual funds

Spring Semester: Chapters 5 – 7; 9 - 11

- Number Theory and the Real Number System
    - Prime and composite numbers
    - Integers
    - Order of operations
    - Rational and irrational numbers
    - Real numbers and their properties
    - Exponents and scientific notation
    - Arithmetic and geometric sequences
- Algebra: Equations and Inequalities
    - Algebraic expressions and formulas
    - Solving linear equations
    - Applications of linear equations
    - Ratio, proportion, and variation
    - Solving linear inequalities
    - Solving quadratic equations
- Algebra: Graphs, Functions, and Linear Systems
    - Graphing and functions
    - Linear functions and their graphs
    - Quadratic functions and their graphs
    - Exponential functions
    - Systems of linear equations
    - Linear inequalities in two variables
    - Linear programming
- Measurement
    - Measuring length
    - The metric system
    - Area and volume
    - Weight and temperature
- Counting Methods and Probability Theory
    - Fundamental counting principle

    - Permutations and combinations
    - Probability
    - Events involving *not, and, or*; odds
    - Conditional probability
    - Expected value
- Statistics
    - Sampling, frequency distributions, and graphs
    - Measures of central tendency
    - Measures of dispersion
    - Normal distribution
    - Scatter plots, correlation, and regression lines

SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:

Selected math standards from Algebra 1, Geometry, Statistics and Probability

THIS COURSE WILL PREPARE STUDENTS FOR THE HSEE AND/OR CSTs:

Math

LAB FEE, IF REQUIRED:

None

DISTRICT ESLRs TO BE ADDRESSED:

Students will be:

- **Self-directed Learners:** who will be able to use notes and a textbook to assist them in continued 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 understanding of their role in the learning process.