Radnor High School
Course Syllabus

Advanced Algebra 2
437

I. Course Description

This course reviews and extends an understanding of the number system, formulas, equations and graphs. Subject matter includes quadratics, radicals, exponents, and complex numbers. An emphasis is placed on both the development of the concept of function and graphing functions using a transformational approach. Logarithms, exponential functions, and theory of equations are introduced during the course. Students are challenged to apply skills to new problems and to connect skills and concepts. Students are expected to handle a demanding workload. A graphing calculator is required.

II. Materials & Equipment

- Algebra 2 and Trigonometry – McDougal Littell/Houghton Mifflin, Copyright 1995
- Graphing Calculator, preferably TI-84 Plus

III. Course Goals & Objectives

- To develop the ability to think mathematically.
- To enhance problem solving ability.
- To utilize technology appropriately.
- To understand algebra as a study of the structure of the real and complex number systems.
- To appreciate the usefulness of algebraic techniques.
- To continue to understand the concept of function as a unifying concept in mathematics.
- To develop algebraic skills and concepts as a foundation for subsequent study of mathematics.
- To reason and communicate mathematically.
- To represent situations which involve variable quantities with expressions, equations, and inequalities.
- To challenge and expand the inquisitive and logical minds of the accelerated mathematics students.

IV. Course Topics (Summary Outline)

I. Problem Solving
- Introduction to Problem Solving
- Using Diagrams
- Finding a Pattern

II. The Language of Algebra
- The Language of Expressions
- Solving Equations
- Solving Inequalities
- Introduction to Graphing
- Matrices
- Probability
- Exponents & Radicals

III. Linear Relationships
- Graphing Linear Equations
- Systems of Linear Equations
- Graphing Inequalities
- Functions and Direct Variation
- Fitting a Line to Data
- Compound Functions

IV. Quadratic Functions
- Definition of Quadratics
- Factoring Quadratics
- Graphing Quadratic Functions
- Solving Quadratic Equations
- Completing the Square
- Applications of Quadratic Functions

V. Functions
- Relations and Functions
- Domain and Range
- Inverse Functions
- Operations on Functions
- Discrete Functions
- Recursively Defined Functions

VI. Graphing By Transformation
- Beyond Plotting Points
- Translating Graphs
- Reflections and Symmetry
- Dilations
- Graphing Other Functions

VII. Systems
- Solving Problems with Systems of Equations
- Linear Systems with Three Variables
- Systems of Inequalities
- Linear Programming
- Inverse Variations
- Nonlinear Systems
- Factoring

VIII. Extending the Real-Number System
- Rational Exponents
- Solving Radical Functions
- Introduction to Complex Numbers
- Algebra of Complex Numbers

IX. Polynomials & Polynomial Functions
- The Remainder and Factor Theorems
- Long Division and Synthetic Division
- Four Useful Theorems

X. Rational Expressions, Equations and Functions
- Multiplying and Dividing Rational Expressions
- Rational Equations and Inequalities
- Adding and Subtracting Rational Expressions With Like Denominators
- Adding and Subtracting Rational Expressions With Unlike Denominators
- Complex Fractions

XI. Exponential and Logarithmic Functions
- Definitions and Graphs of Exponential & Logarithmic Functions
- Two Important Exponential and Logarithmic Functions
- Properties of Logarithms
- Solving Exponential and Logarithmic Equations
- Applications of Exponential and Logarithmic Functions

XII. Sequences and Series
- Definitions
- Arithmetic Sequences and Series
- Geometric Sequences and Series
- Binomial Theorem

V. Assignments & Grading

Assignment sheets will be distributed periodically throughout the school year. Homework will be assigned on a daily basis. Grades will be based on quizzes and tests. In addition, teachers may use homework, group activities, and/or projects for grading purposes. All students will take departmental midyear and final exams. The Radnor High School grading system and scale will be used to determine letter grades.