



Ephrata High School
Course Syllabus
Algebra II
3035, 3036, 3205



I. Course Description

Algebra 2 is suggested for the student who has completed Algebra 1 and Geometry with at least an average grade of “C” or who has received a teacher recommendation. The emphasis is placed on the following: interpreting real life problems in terms of math model; statistical analysis, probability, permutations and combinations; study of the real number system (natural numbers, integers, rationals, irrationals); introduction of the complex number system; study of solutions of quadratic equations and inequalities; functions (linear, quadratic, exponential, logarithmic); polynomials; factoring; and matrices.

II. Materials & Equipment

Algebra 2 – McDougal, Littell & Co. – 2004 ed.
TI – 83+/TI – 84+ graphing calculator

III. Course Goals & Objectives

Enduring Understandings: Students will understand how to

- Evaluate and simplify numerical and algebraic expressions.
- Solve linear and absolute value equations and inequalities.
- Use algebra to model and solve real-life problems.
- Graph linear equations and inequalities in two variables.
- Write equations of lines.
- Solve real-life problems using graphs and equations.
- Solve a linear system in two variables.
- Write and use linear systems to solve real-life problems.
- Use a system of inequalities to solve real-life problems (linear programming).
- Add, subtract and multiply matrices.
- Solve a system using augmented matrices.
- Solve quadratic equations by graphing, factoring, and using the quadratic formula.
- Evaluate and use complex numbers.
- Write a quadratic function that models data from a real-life problem.
- Perform operations on polynomial and solve polynomial functions.
- Evaluate, graph, and find the zeros of polynomial functions.
- Use rational exponents and nth roots of numbers.
- Find the composition and inverse of functions.
- Solve radical functions.
- Find and use the measures of central tendency and dispersion to describe data sets.
- Use box plots to represent data graphically.
- Calculate and use permutations, combinations, and probability.
- Use normal distributions.
- Graph and use exponential and logarithmic functions.
- Simplify and solve rational expressions and equations.

IV. Course Topics

I. Equations and Inequalities

- Evaluate algebraic expressions
- Simplify algebraic expressions by combining like terms
- Solve linear equations
- Use a general problem-solving plan to solve real life problems
- Solve simple and compound inequalities
- Solve absolute value equations and inequalities

II. Linear Equations and Functions

- Represent relations and functions
 - Graph and evaluate linear functions
 - Calculate slopes
 - Use the slope-intercept form
 - Write linear equations
 - Write direct variation equations
 - Correlation and Best-fitting lines (scatter plots)
- III. Systems of Linear Equations and Inequalities
- Graph and solve systems of linear equations in two variables.
 - Use substitution and elimination to solve linear systems
 - Graph a system of linear inequalities to find the solutions
 - Solve linear programming problems
- IV. Matrices
- Add and subtract matrices
 - Multiply a matrix by a scalar
 - Multiply two matrices
 - Solve systems of linear equations using augmented matrices
- V. Quadratic Functions
- Graph a quadratic function by finding the vertex, axis of symmetry
 - Use $x = -b/2a$ to find vertex
 - Solve a quadratic equation by factoring
 - Use special factoring patterns
 - Find zeros of functions to find solutions of equation (Use TI 83+)
 - Solve quadratic equation by square roots
 - Solve equations with complex solutions
 - Solve quadratic equation using the quadratic formula
 - Graph quadratic inequalities
 - Write quadratic functions given characteristics of their graphs
 - Write quadratic functions given a set of data
- VI. Polynomials and Polynomial Functions
- Use properties of exponents to evaluate and simplify expressions involving powers.
 - Use synthetic substitution to evaluate a function at a given number
 - Add, subtract, and multiply polynomials
 - Factor polynomial expressions
 - Divide polynomials and relate the result to the Remainder Theorem and the Factor Theorem
 - Use synthetic division to divide polynomials
 - Use the Fundamental Theorem of Algebra to determine the number of zeros of a polynomial function.
 - Write polynomial functions of least degree and real coefficients when given the zeros
 - Analyze the graph of a polynomial function
 - Know the relationship between the zero of the function, factor of the polynomial, solution of the equation & x intercept
- VII. Powers, Roots and Radicals
- Evaluate nth roots of real numbers
 - Use the properties of rational exponents to evaluate and simplify expressions
 - Find the composition of functions
 - Find the inverses of linear functions
 - Find the inverses of nonlinear functions
 - Solve equations that contain radicals or radical exponents
 - Use measures of central tendency and measures of dispersion to describe data sets.
 - Use box-and-whiskers, histograms, and stem & leaf to represent data graphically
- VIII. Probability and Statistics
- Use fundamental counting principal to count the number of ways an event can happen
 - Use permutations to count the number of ways an event can happen
 - Use combinations to count the number of ways an event can happen
 - Find theoretical and experimental probabilities
 - Find probabilities of unions and intersections of two events
 - Find the probability of independent events
 - Find the probability of two dependent events
 - Calculate probabilities using normal distributions
- IX. Exponential and Logarithmic Functions
- Graph exponential functions.

- Use the number e as the base of exponential functions.
- Evaluate logarithmic functions
- Use the properties of logarithms to simplify expressions
- Solve exponential equations
- Model data with exponential functions (ex. decay)
- Model data with power functions

X. Rational Equations and Functions

- Write and use inverse variation models
- Write and use joint variation models
- Graph simple rational functions
- Multiply and divide rational expressions
- Add and subtract rational; expressions
- Solve rational equations

V. Assignments & Grading

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 mid-year and final exams. The Ephrata High School grading system and scale will be used to determine letter grades.