



Radnor High School Course Syllabus



ALGEBRA 1 421

I. Course Description

The goal of this course is to develop algebraic skills and concepts and to enhance problem solving ability. Topics will include: polynomial expressions and equations, quadratic functions, irrational numbers, coordinate graphing, graphing linear and quadratic functions, basic statistics, determining and analyzing the slope of lines, and factoring polynomial expressions. Algebra skills and concepts needed to solve equations, inequalities, and systems of equations/inequalities will be developed. Algebraic problem solving techniques will be employed to solve relevant applications.

II. Materials & Equipment

- Algebra 1– McDougal, Littell & Co. – 2001 ed.
- Scientific or graphing calculator

III. Course Goals & Objectives

Enduring Understandings: Students will understand (that)

- Solving equations requires knowledge of order of operations and inverse operations.
- Some equations will require Algebra skills prior to finding a solution.
- Algebra is a language with an essential vocabulary.
- Unwritten numerical values and inclusion are inferential in mathematical phrases and sentences.
- Solving inequalities is similar to solving equations except that shading (on a number line) is required to show all solutions.
- Solving one-dimensional and two-dimensional equations have similarities and differences.
- Problem solving may involve translating English phrases/sentences into mathematical expressions or equations.
- Rates of change are ratios or rates which can be used to assist in solving two variable equations or problems involving rates.
- Rates of change are used to help mathematicians explain some real world phenomena.
- Solving equations of degree higher than 1 involves other Algebra skills.
- Graphing is required to solve all two variable equations and inequalities.
- Data can be organized using statistical tools of mean, median, mode, box and whisker plots, and stem and leaf plots.
- Functions are relations in which each input value is paired with exactly one output value.
- Functions/Relations are an important part of Algebra.
- Slope is a numerical value that describes the orientation of a line.

IV. Course Topics (Summary Outline)

I. Basics of Algebra

- Variables in Algebra
- Exponents & Powers
- Order of Operations
- Solutions to Equations & Inequalities
- Translating Variable Expressions
- Reading Bar and Line Graphs, Data
- Introduction to Relations & Functions, Domain and Range.

II. Properties of Real Numbers

- Number Systems, the Real Number Line, Absolute value and Opposites.
- Addition of Real Numbers
- Subtraction of Real Numbers
- Multiplication of Real Numbers
- The Distributive Property & Combining Like Terms
- Division of Real Numbers, Definition of Reciprocals
- Probability (theoretical & experimental) and Odds

III. Signed Numbers

- Solving Equations Using Addition and Subtraction
- Solving Equations Using Multiplication and Division
- Solving Multi-Step Equations
- Solving Equations with Variables on Both Sides
- Solving Decimal Equations
- Formulas and Solving Literal Equations
- Rates, Ratios, and Percents

IV. Solving Two-Variable Linear Equations

- Cartesian Coordinate Plane and Plotting Points
- Graphing Linear Equations, Solutions to Linear Equations, Horizontal & vertical Lines
- Graphing Using Intercepts
- Slope as a Definition, Formula
- Direct Variation
- Graph Using Slope-Intercept Form, Parallel Lines
- Functions and Relations, Function Notation

V. Writing Linear Equations

- Writing Linear Equations in Slope-Intercept Form
- Writing Linear Equations in Point-Slope Form
- Writing Linear Equations in Point-Slope Form Using Two Points
- Point-Slope Form of a Linear Equation
- General Linear Form

VI. Graphing

- Solving One-Step Linear Inequalities
- Solving Multi-Step Linear Inequalities
- Solving Compound Inequalities
- Solving Absolute-Value Equations and Inequalities
- Graphing Linear Inequalities in Two Variables
- Stem-and-Leaf Plots and Mean, Median, and Mode
- Box-and-Whisker Plots, Quartiles

VII. Systems of Linear Equations and Inequalities

- Solving Linear Systems by Graphing
- Solving Linear Systems by Substitution
- Solving Linear Systems by Linear Combinations
- Applications of Linear Systems
- Special Types of Linear Systems
- Solving Systems of Linear Inequalities

VIII. Polynomials & Factor

- Adding and Subtracting Polynomials
- Multiplying Polynomials
- Special Products of Polynomials
- Solving Polynomial Equations in Factored Form
- Factoring $x^2 + bx + c$
- Factoring $ax^2 + bx + c$
- Factoring Special Products

IX. Quadratics Equations and Functions

- Solving Quadratic Equations by Extracting Square Roots
- Simplifying Radicals
- Solving Quadratics Using the Quadratic Formula
- Quadratic Functions in Standard & Vertex Forms
- Finding x and y-intercepts
- Projectile Motion

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.