

Advanced Algebra I

Course Description

Advanced Algebra I is a comprehensive college preparatory course focused on high school Algebra I concepts. This class teaches and requires students to demonstrate fluent understanding of concepts and procedures, reason abstractly and quantitatively, communicate reasoning, model with mathematics, solve problems, and analyze data. Throughout the course, students will learn how math topics are related to daily life and solve real-world problems. Students who successfully complete this course, will have mastered Algebra I math standards and will be ready to continue to Geometry.

In alignment with the skills detailed in the *Portrait of the Crusader*, students practice solving problems with innovation and imagination, and they are taught to think critically about the synthesis of data and respond with defensible, original work.

Assessment Practices

Throughout the course, teachers strive to include varied assessments, including traditional quizzes and tests to measure discrete skills; problem/solution/explanation opportunities where students solve a complex problem and communicate their reasoning; and real-world scenarios where students define the problem, develop a plan, and solve the problem, adjusting as necessary and communicating their reasoning when required.

Essential Questions

1. How do we represent patterns and operations using algebra?
2. How do we interpret and analyze real life situations using algebra?
3. How do we use technology to solve and/or visualize mathematical sentences?

Course Curriculum

First Quarter:

Introduction to Algebra

- Define variable, expression, and equation.
- Perform number operations and accurately apply order of operations.
- Interpret algebraic expressions using academic vocabulary (term, coefficient, degree, like terms).
- Use the distributive property to simplify algebraic expressions with like terms.
- Identify equivalent algebraic expressions.
- Translate words into symbols; represent math relationships using symbolic algebra.
- Write basic algebraic expressions from word problems.

Equations

- Define the term linear equation and identify linear equations.
- Solve simple linear equations using multiplication, division and reciprocals.
- Solve multi-step linear equations and equations with variables on both sides.
- Interpret and solve fractional equations.
- Define *absolute value* and solve absolute value equations.
- Apply the skills used in this unit to solve real-world problems using linear equations.

Second Quarter:

Inequalities

- Define the term linear inequality. Contrast linear equation with linear inequality.
- Interpret, graph, and write linear inequalities.
- Solve inequalities and compound inequalities; communicate steps/reasoning.
- Represent math relationships using algebra and solve problems with inequalities.
- Apply problem-solving strategies to word problems.

Functions

- Define the categories of graphing relationships.
- Compare and contrast relations and functions.
- Recognize how functions are represented in graphs and tables.
- Determine the domain and range of relations and functions.
- Apply the vertical line test to determine if a given relation is a function.
- Write functions; use $f(x)$; evaluate functions.
- Graph functions.
- Differentiate between linear and nonlinear functions.
- Solve variable (literal) equations.
- Model problems using functions.

Third Quarter:

Linear Functions

- Identify linear functions by equations, tables, graphs.
- Graph intercepts.
- Model and describe slope as a rate of change.
- Explain the rule of direct variation; determine if a given example is direct variation.
- Solve direct variations with variables.
- Explain Slope-Intercept Form and Point-Slope Form.
- Find the slope, including parallel lines.
- Write equations of lines.
- Analyze functions by investigating domain, range, rates of change, intercepts and zeros.

Systems of Linear Equations

- Solve linear systems by graphing, substitution and elimination.
- Define and solve special systems of linear equations.
- Solve linear inequalities by graphing.
- Solve systems of linear inequalities by graphing.
- Apply the skills used in this unit and in previous units to solve real-world problems.

Probability and Statistics

- Define terms: rate, ratio, proportion
- Solve problems with rates, ratios and proportions

Fourth Quarter:

Exponents and Polynomials

- Define the terms power and exponent; explain the rules for exponents.
- Define and simplify using integer exponents, zero exponents, negative exponents.
- Explain powers of 10 and scientific notation; interpret and convert.
- Multiply exponents.
- Define and apply the power of a product property.

- Divide exponents.
- Define polynomials and explain types.
- Perform operations using polynomials (add, subtract, multiply).
- Expand and simplify using special products of polynomials.

Factoring Polynomials

- Explain the purpose of factoring.
- Factor polynomials by greatest common factor (GCF).
- Factor trinomials.
- Factor using the difference of 2 squares.

Solving Equations

- Solve equations by factoring using the zero product property
- Solve equations by graphing and using Technology.

Quadratic Functions

- Discover the properties and characteristics of quadratic functions through technology.
- Explain the properties and characteristics of quadratic functions; identify quadratic functions
- Graph quadratics using technology.

Resources

Algebra 1 Martin-Gay

MyMathLab. (mymathlabforschool.com)

Graphing Calculator (Suggested TI-84+)

Desmos application (ISO/Android or [web](#))

Grading Policy

20 % MyMathLab,

25% Quizzes

25% Student Work

30 % Tests