

# Kendall Park Learning Center

## Course Title: Algebra I (Advanced Credit)

**Course Length:** Six weeks (120 hours)

### **Description:**

The symbols and the algebraic patterns in Algebra 1 give the students the ability to analyze mathematical concepts. This course is outlined to encourage students to incorporate algebraic reasoning skills in their learning processes. The students will also take part in critical thinking which are important skills that are used in our everyday lives.

Algebra 1 is intended to prepare students for Geometry and Algebra II. Students will cover integral and rational numbers, techniques of graphing and solving linear equations, polynomials and their operations, special products and factoring, fractional expressions and equations, quadratic equations and methods of solution, radical expressions, and inequalities.

### **Prerequisites:**

Algebra 1 is a course offered to students who have successfully completed Pre-Algebra with at least a B+.

### **Requirement:**

Students must pass with at least an A- to receive full credit for this class.

### **Topics Covered:**

#### **Variables and Equations**

- Variables
- Exponents and Powers
- Order of Operations
- Equations and Inequalities
- Introduction to Functions

#### **Properties of Real Numbers**

- Real Number Line
- Addition of Real Numbers
- Subtraction of Real Numbers
- Division of Real Numbers
- Adding and Subtracting Matrices
- Multiplying Real Numbers
- Distributive Property
- Probability

#### **Solving Linear Equations**

- Equations – One Step Using Addition, Subtraction, Multiplication and Division
- Equations – Multi-Step Equations
- Equations With Variables on Both Sides
- Equations With Decimals
- Rate –Time –Distance Problems, Ratio, and Percents

## **Graphing Linear Equations and Functions**

- Coordinates and Scatter Plots
- Graphing Linear Equations
- Graphing Equations Using Intercepts
- Slope of the Line
- Direct Variation, Inverse Variation
- Graphing Equations Using Slope Intercept Form
- Solving Linear Equations Using Graphs
- Functions and Relations

## **Writing Linear Equations**

- Writing Equations in Slope Intercept form
- Writing Equations Given the Slope and a Point
- Writing Equations Given Two Points
- Point – Slope Form of a Linear Equation
- Writing Equations in Standard Form
- Predicting With Linear Models

## **Solving and Graphing Linear Inequalities**

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

## **Solving Systems of Linear Equations and Inequalities**

- Systems of Equations by Graphing
- Systems of Equations by Substitution
- Systems of Equations by Linear Combinations
- Identifying The Number of Solutions
- Systems of Equations of Linear Inequalities

## **Exponents and Exponential Functions**

- Multiplication Properties of Exponents
- Zero and Negative Exponents
- Division Properties of Exponents
- Scientific Notation
- Exponential Growth and Decay Functions

## **Quadratic Equations and Functions**

- Solving Quadratic Equations by Finding Square Roots
- Simplifying Radicals
- Graphing Quadratic Equations by Solving for the X Coordinate of the Vertex, Making a Table, and Graphing the Axis of Symmetry
- Solving Quadratic Equations by Graphing by Solving for the Roots
- Solving Quadratic Equations by the Quadratic Formula
- Finding the Number of Solutions of a Quadratic by Finding the Value of the Discriminant
- Graphing Quadratic Inequalities

## Comparing Linear, Exponential and Quadratic Models

### **Polynomials and Factoring**

- Adding and Subtracting Polynomials
- Multiplying Polynomials
- Using Special Product Patterns
- Solving Polynomial Equations in Factored Form
- Factoring
- Factoring Using the Distributive Property

### **Rational Equations and Functions**

- Ratio and Proportion
- Percents
- Direct and Inverse Variation
- Simplifying Rational Expressions
- Adding and Subtracting Rational Expressions
- Multiplying and Dividing Rational Expressions
- Applying Rational Expressions by Solving for Geometric Probability
- Dividing Polynomials
- Solving Rational Equations
- Graphing Rational Functions

### **Radical Expressions and Irrational Numbers**

- Rational Square Roots
- Irrational Square Roots
- Square Roots of Variable Expressions
- Adding and Subtracting Radicals
- Multiplying, Dividing and Simplifying Radicals
- Multiplication of Binomials Containing Radicals
- Solving Radical Equations
- Completing the Square

### **Radicals and Connections to Geometry**

- Pythagorean Theorem and Its Converse
- Distance and Midpoint Formulas
- Trigonometric Functions
- Logical Reasoning and Proof

### **Text:**

Larson, Boswell, Kanold, Stiff, Algebra 1: Applications, Equations, Graphs, McDougal Littell, A Houghton Mifflin Co., Evanston, Illinois, 2001.

New Jersey Department of Education Core Curriculum Standards for Mathematics.  
[www.state.nj.us/njded/cccs](http://www.state.nj.us/njded/cccs).