



## Algebra I Course Description

### Chapter 1: Introduction to Algebra Terms and Concepts

This chapter introduces students to basic terms and concepts used in algebra. Time is taken to ensure the student understands basic number operations, variables and their applications. Additionally, the student gains a fundamental sense of equations, inequalities and their solutions.

Sections:

- Number Operations
- Variables
- Order of Operations
- Translating Verbal and Algebraic Phrases
- Equations/Inequalities/Solutions

### Chapter 2: Real Numbers and Simplifying Variable Expressions

This chapter focuses on getting the student to master working with the Real Numbers. Students learn the rules of integers and practice through many examples. Also, students will learn to apply the Distributive property and simplify variable expressions by combining like terms.

Sections:

- Real Numbers/Simplifying Variable Expressions
- Real Number System
- Adding Real Numbers
- Subtracting Real Numbers
- Multiplying and Dividing Real Numbers
- Distributive Property
- Simplifying by Combining Like Terms

### Chapter 3: Solving Equations

The chapter breaks down the steps to solve multi-step linear equations. Students will build up their skills as they progress from one and two-step equations to more advance equations. Core concepts involved will be reviewed to include the distributive property and combining like terms.

Sections:

- One Step Equations
- Solving Two Step Equations
- Solving Multi-Step Equations
- Formulas and Literal Equations



#### **Chapter 4: Graphing Linear Equations**

This very important chapter walks the student step-by-step to master how to graph linear equations. Concepts involving the coordinate plane, slope and methods to graph lines are thoroughly reviewed and introduced. Upon completion of the chapter students will gain the necessary knowledge and skills needed to learn more advance topics involving linear equations.

Sections:

- Graphing Lines with One Variable
- Graphing Lines with Two Variables
- The Slope of a Line
- Slope Intercept Method
- XY Intercept Method

#### **Chapter 5: Writing the Equations of Lines**

The chapter builds on the student's prior knowledge and skill of linear equations. Various methods to find and write the equation of a line are introduced and practiced. The chapter focuses on the proper way to set-up and use formulas to write linear equations. Additional related topics are explored to include linear models, linear regression and word problems.

Sections:

- Using Slope-Intercept Form
- Using Point-Slope intercept
- Given the Slope and a Point
- Given Two Points
- Standard Form of Linear Equations
- Best Fitting Line
- Linear Models/Word Problems

#### **Chapter 6: Inequalities**

In this chapter students will apply their equation solving skills to solve linear inequalities. Basic concepts and terms are introduced first, along with how to graph inequalities.

Sections:

- Linear Inequalities
- Compound Inequalities
- Graphing Linear Inequalities in Two Variables



### **Chapter 7: Systems**

Understanding systems and the methods to solve them are vital in algebra. This chapter introduces/reviews techniques to solve linear systems. Students will also explore special systems, word problems and systems of linear inequalities. Lastly, the topic of Linear Programming will be introduced. This powerful way to use systems in business and industry will connect the chapter's concepts to "real world" applications.

Sections:

- Solving Systems by Graphing
- Solving Systems Substitution Method
- Solving Systems by Elimination/Linear Combination
- Solving Linear System Word Problems
- Special Linear Systems
- Solving Systems of Linear Inequalities
- Linear Programming

### **Chapter 8: Absolute Value**

Absolute value problems can be challenging for some students to grasp. Time is taken to teach students core concepts and build understanding. Students will learn how to graph absolute value functions and apply the steps to solve absolute value equations/inequalities.

Sections:

- Introduction to Absolute Value
- Graphing Absolute Value Equations
- Solving Absolute Value Equations
- Absolute Value Inequalities

### **Chapter 9: Powers and Exponents**

This chapter covers the rules of powers and exponents a student needs to learn in algebra. Also, important applications of these rules are covered to include scientific notation, compound interest and exponential growth and decay.

Sections:

- Product and Power Rules of Exponents
- Negative and Zero Exponents Rules
- Division Rules of Exponents
- Scientific Notation
- Compound Interest
- Exponential Growth and Decay



### Chapter 10: Polynomials and Factoring

The first part of the chapter covers the parts of a polynomial, related terminology and how to perform polynomial operations. A special focus is placed on avoiding common mistakes. The second part of the chapter focuses on the extremely important skill of factoring polynomials. Students will first understand how to factor out a polynomial GCF and build on this to learn many techniques to factor polynomials.

Sections:

- Introduction to Polynomials
- Adding and Subtracting Polynomials
- Multiplying Polynomials
- Multiplying Polynomials Special Cases
- Sum and Difference of Two Cubes
- Factoring Greatest Common Factor
- Factoring Quadratic Trinomials
- Special Factoring Rules

### Chapter 11: Introduction to Quadratic Equations

Understanding the properties and methods to solve quadratic equations is essential for the student to advance in algebra. This chapter explains each concept in a very specific and focused manner. After students have been introduced to quadratic equations they build up their knowledge by learning various techniques to solve them. Additionally, they will learn the connection between solutions and graphs of quadratic functions. The chapter ends by covering quadratic inequalities and word problems.

Sections:

- Introduction to Quadratic Equations
- Solving Quadratic Equations by Square Roots
- Graphing Quadratic Equations
- The Quadratic Formula
- Solving Quadratic Equations by Factoring
- The Discriminant - Types of Roots
- Completing the Square
- Quadratic Equation Word Problems
- Graphing Quadratic Inequalities

### Chapter 12: Functions and Relations

Functions and relations transcend all through mathematics. This chapter explains core concepts at the algebra level and prepares the student for more advance study of the topic. Time is taken to explain the difference between a function and relation; and introduce the student to the language of functions to include the domain, range and linear/nonlinear functions. Students will also learn function operations, composite functions and graphing.

Sections:

- Introduction to Functions and Relations
- Function Operations
- Inverse Functions
- Graphing Functions
- Linear and Nonlinear Functions
- Special Functions
- Composite Functions



### **Chapter 13: Rational Expressions/Equations**

The first part of the chapter takes the student through fundamental rational expressions to include ratios, proportions, percent and variation. Special emphasis is placed on learning different methods to solve rational expression problems. The section on simplifying rational algebraic expressions starts by reviewing basic examples using numbers before introducing variable examples. The second part of the chapter builds from the student's knowledge of polynomials and covers operations with rational expressions. Instruction will focus on learning to multiply, divide, find the LCD and solve rational equations.

Sections:

- Ratios and Proportions
- Percent
- Direct and Inverse Variation
- Simplifying Rational Expressions
- Multiplying and Dividing Rational Expressions
- Finding the LCD of Rational Expressions
- Solving Rational Equations
- Adding and Subtracting Rational Expressions

### **Chapter 14: Radical Expressions/Equations**

This chapter introduces the concept of radical expressions/equations at the algebra 1 level. Students will first learn the properties of square roots and associated operations to include solving basic radical equations. Next the chapter looks at the application of radicals and how they help solve many problems in algebra. Specifically, the chapter will focus on the Pythagorean Theorem and the Distance and Mid-Point formula.

Sections:

- Simplifying Radicals
- Operations with Radicals
- Solving Radical Equations
- The Distance and Mid-Point Formula
- The Pythagorean Theorem