



# College Algebra

## Detailed Topics List with Suggested Homework and Assessments

### CHAPTER 1 - PREREQUISITES

#### Section 1.1 – Real Numbers: Algebra Essentials

Topics:

- A. Classify a real number as a natural, whole, integer, rational, or irrational number
- B. Perform calculations using order of operations
- C. Use the properties of real numbers: commutative, associative, distributive, inverse, and identity.
- D. Evaluate algebraic expressions
- E. Simplify algebraic expressions

**Suggested Homework Exercises: 1 – 59 odd**

#### Section 1.2 – Exponents and Scientific Notation

Topics:

- A. Simplify expressions using properties of exponents
- B. Use scientific notation

**Suggested Homework Exercises: 1 – 49 odd**

#### Section 1.3 – Radicals and Rational Exponents

Topics:

- A. Evaluate square roots
- B. Use the product rule to simplify square roots
- C. Use the quotient rule to simplify square roots
- D. Add and subtract square roots
- E. Rationalize denominators
- F. Use rational roots

**Suggested Homework Exercises: 1 – 65 odd**

#### Section 1.4 – Polynomials

Topics:

- A. Identify the degree and leading coefficient of polynomials
- B. Add and subtract polynomials
- C. Multiply polynomials using the distributive property
- D. Perform operations with polynomials of several variables

**Suggested Homework Exercises: 1 – 53 odd**





### Section 1.5 – Factoring Polynomials

Topics:

- A. Factor the greatest common factor (GCF) of a polynomial
- B. Factor a trinomial by grouping (AC Method)
- C. Factor a trinomial by trial and error
- D. Factor a difference of squares
- E. Factor the sum and difference of cubes
- F. Factor expressions using fractional or negative exponents

**Suggested Homework Exercises: 1 – 49 odd**

### Section 1.6 – Rational Expressions

Topics:

- A. Simplify rational expressions
- B. Multiply rational expressions
- C. Divide rational expressions
- D. Add and subtract rational expressions
- E. Simplify complex rational expressions

**Suggested Homework Exercises: 1 – 53 odd**

### **SUGGESTED ASSESSMENT:** Chapter 1 Practice Test

\*Note: Practice Test Answer Keys are posted on the video library homepage

## CHAPTER 2 – EQUATIONS AND INEQUALITIES

### Section 2.1 – The Rectangular Coordinate System and Graphs

Topics:

- A. Plot ordered pairs in a Cartesian Coordinate System
- B. Graph equations by plotting points
- C. Find x and y-intercepts
- D. Use the distance formula
- E. Use the midpoint formula

**Suggested Homework Exercises: 1 – 47 odd**

### Section 2.2 – Linear Equations in One Variables

Topics:

- A. Solve equations in one variable algebraically
- B. Solve a rational equation
- C. Find a linear equation
- D. Given the equations of two lines, determine whether their graphs are parallel or perpendicular
- E. Write the equation of a line parallel or perpendicular to a given line

**Suggested Homework Exercises: 1 – 45 odd, 55 – 59 odd**





### **Section 2.3 – Models and Applications**

Topics:

- A. Set up a linear equation to solve a real-world application
- B. Use a formula to solve a real-world application
- C. Solve a formula for a given variable

**Suggested Homework Exercises: 1 – 53 odd**

### **Section 2.4 – Complex Numbers**

Topics:

- A. Express square roots of negative numbers as multiples of  $i$
- B. Plot a complex number on the complex plane
- C. Add and subtract complex numbers
- D. Multiply and divide complex numbers
- E. Simplify powers of  $i$

**Suggested Homework Exercises: 1 – 41 odd**

### **Section 2.5 – Quadratic Equations**

Topics:

- A. Solve quadratic equations by factoring
- B. Solve quadratic equations by using the square root property
- C. Solve quadratic equations by completing the square
- D. Solve quadratic equations by using the quadratic formula

**Suggested Homework Exercises: 1 – 43 odd, 55, 57**

### **Section 2.6 – Other Types of Equations – Part 1**

Topics:

- A. Solve polynomial equations by factoring
- B. Solve polynomial equations in quadratic form
- C. Solve equations involving rational exponents
- D. Solve absolute value equations

**Suggested Homework Exercises: 1 – 19 odd, 29 – 41 odd**

### **Section 2.6 – Other Types of Equations – Part 2**

Topics:

- E. Solve rational equations resulting in a quadratic
- F. Solve radical equations

**Suggested Homework Exercises: 21 – 27 odd**





### **Section 2.7 – Linear Inequalities and Absolute Value Inequalities**

Topics:

- A. Using interval notation and set notation
- B. Solve inequalities in one variable algebraically
- C. Solve compound inequalities
- D. Solve absolute value inequalities

**Suggested Homework Exercises: 1 – 53 odd**

### **SUGGESTED ASSESSMENT: Chapter 2 Practice Test**

\*Note: Practice Test Answer Keys are posted on the video library homepage

## **CHAPTER 3 - FUNCTIONS**

### **Section 3.1 – Functions and Function Notation – Part 1**

Topics:

- A. Determine whether a relation represents a function
- B. Find the value of a function
- C. Read information from the graph of a function

**Suggested Homework Exercises: 1 – 39 odd, 61 – 73 odd, 89, 91**

### **Section 3.1 – Functions and Function Notation – Part 2**

Topics:

- D. Use the vertical line test to identify functions
- E. Use the horizontal line test to identify one-to-one functions
- F. Graph the functions listed in the library of functions

**Suggested Homework Exercises: 41 – 59 odd**

### **Section 3.2 – Domain and Range**

Topics:

- A. Find the domain of a function defined by an equation
- B. Graph piecewise defined functions

**Suggested Homework Exercises: 1 – 53 odd, 61**

