

# **E<sup>3</sup> STEM ACADEMY**

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## **Algebra 2- Course Outline**

### **Chapter 1: Equations and Inequalities**

- Apply Properties of Real Numbers
- Evaluate and Simplify Algebraic Expressions
- Solve Linear Equations
- Rewrite Formulas and Equations
- Use Problem Solving Strategies and Models
- Solve Linear Inequalities
- Solve Absolute Value Equations and Inequalities

### **Chapter 2: Linear Equations and Functions**

- Relations and Functions
- Find Slope and Rate of Change
- Graph Equations of Lines
- Write Equations of Lines
- Model Direct Variation
- Draw Scatter Plots and Best-Fitting Lines
- Use Absolute Value Functions and Transformations
- 2.8 Graph Linear Inequalities in Two Variables

### **Chapter 3: Linear Systems and Matrices**

- Solve Linear Systems by Graphing
- Solve Linear Systems Algebraically
- Graph Systems of Linear Inequalities
- Solve Systems of Linear Equations in Three Variables
- Perform Basic Matrix Operations
- Multiply Matrices
- Evaluate Determinants and Apply Cramer's Rule
- Use Inverse Matrices to Solve Linear Systems

### **Chapter 4: Quadratic Functions and Factoring**

- Graph Quadratic Functions in Standard Form
- Graph Quadratic Functions in Vertex or Intercept Form
- Solve  $ax^2 + bx + c = 0$  by Factoring
- Solve Quadratic Equations by Finding Square Roots
- Perform Operations with Complex Numbers
- Complete the Square
- Use the Quadratic Formula and the Discriminant
- Graph and Solve Quadratic Inequalities
- Write Quadratic Functions and Models

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## **Chapter 5: Polynomials and Polynomial Functions**

- Use Properties of Exponents
- Evaluate and Graph Polynomial Functions
- Add, Subtract, and Multiply Polynomials
- Factor and Solve Polynomial Equations
- Apply the Remainder and Factor Theorems
- Find Rational Zeros
- Apply the Fundamental Theorem of Algebra
- Analyze Graphs of Polynomial Functions
- Write Polynomial Functions and Models

## **Chapter 6: Rational Exponents and Radical Functions**

- Evaluate nth Roots and Use Rational Exponents
- Apply Properties of Rational Exponents
- Perform Function Operations and Composition
- Use Inverse Functions
- Graph Square Root and Cube Root Functions
- Solve Radical Equations

## **Chapter 7: Exponential and Logarithmic Functions**

- Graph Exponential Growth Functions
- Graph Exponential Decay Functions
- Use Functions Involving  $e$
- Evaluate Logarithms and Graph Logarithmic Functions
- Apply Properties of Logarithms
- Solve Exponential and Logarithmic Equations
- Write and Apply Exponential and Power Functions

## **Chapter 8: Rational Functions**

- Model Inverse and Joint Variation
- Graph Simple Rational Functions
- Graph General Rational Functions
- Multiply and Divide Rational Expressions
- Add and Subtract Rational Expressions
- Solve Rational Equations

## **Chapter 9: Quadratic Relations and Conic Sections**

- Apply the Distance and Midpoint Formulas
- Graph and Write Equations of Parabolas
- Graph and Write Equations of Circles
- Graph and Write Equations of Ellipses

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- Graph and Write Equations of Hyperbolas
- Translate and Classify Conic Sections
- Solve Quadratic Systems

## **Chapter 10: Counting Methods and Probability**

- Apply the Counting Principle and Permutations
- Use Combinations and the Binomial Theorem
- Define and Use Probability
- Find Probabilities of Disjoint and Overlapping Events
- Find Probabilities of Independent and Dependent Events
- Construct and Interpret Binomial Distributions

## **Chapter 11: Data Analysis and Statistics**

- Find Measures of Central Tendency and Dispersion
- Apply Transformations to Data
- Use Normal Distributions
- Select and Draw Conclusions from Samples
- Choose the Best Model for Two-Variable Data

## **Chapter 12: Sequences and Series**

- Define and Use Sequences and Series
- Analyze Arithmetic Sequences and Series
- Analyze Geometric Sequences and Series
- Find Sums of Infinite Geometric Series
- Use Recursive Rules with Sequences and Functions

## **Chapter 13: Trigonometric Ratios and Functions**

- Use Trigonometry with Right Triangles
- Define General Angles and Use Radian Measure
- Evaluate Trigonometric Functions of Any Angle
- Evaluate Inverse Trigonometric Functions
- Apply the Law of Sines
- Apply the Law of Cosines

## **Chapter 14: Trigonometric Graphs, Identities, and Equations**

- Graph Sine, Cosine, and Tangent Functions
- Translate and Reflect Trigonometric Graphs
- Verify Trigonometric Identities
- Solve Trigonometric Equations
- Write Trigonometric Models
- Apply Sum and Difference Formulas
- Apply Double-Angle and Half-Angle Formulas