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# Algebra 1 Course Syllabus

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- 1) Real Number System
  - A. Set Theory
  - B. Classifying Real Numbers
  - C. Properties of Real Numbers
  - D. Counter-examples
  - E. Adding and Subtracting Integers
  - F. Multiplying and Dividing Integers
  - G. Combining Like Terms
  - H. Order of Operations
  - I. Algebraic Substitution
  - J. Calculator Key Sequences
  - K. Distributive Property
  - L. Absolute Value
  - M. Integers Raised to a Power
  - N. Algebraic Substitution with Variables Raised to a Power
  
- 2) Expressions, Equations, and Inequalities
  - A. Mathematical Expressions
  - B. Mathematical Sentences
  - C. Domain
  - D. Translating Variable Expressions and Sentences
  - E. Solve Single Step Equations
  - F. Convert Fractions and Decimals
  - G. Acceptable Answers
  - H. Solve Multiple Step Equations
  - I. Simple Algebraic Word Problems
  - J. Consecutive Integer Word Problems
  - K. Word Problems Involving Geometric Figures
  - L. Word Problems Involving Complementary and Supplementary Angles
  - M. Solve Equations with the Variable on Both Sides
  - N. Solve Equations Involving Fractions and Decimals by Multiplying Through
  - O. Transforming Formulas
  - P. Area Formulas for Common Polygons and Circles
  - Q. Volume Formulas for Prisms, Cylinders, Pyramids, and Cones

## *Algebra 1 Course Syllabus*

- 3) Linear Equations
  - A. Plotting Points in the Coordinate Plane
  - B. Finding the Midpoint of Two Given Points
  - C. Graphing Linear Equations Using a Table of Values (X-Y Chart)
  - D. Writing Linear Equations to Describe Geometric Patterns
  - E. Writing Linear Equations to Describe Other Dependent Relationships
  - F. Represent a Linear Function with an Equation, a Table of Values, and a Graph
  - G. Graph Horizontal and Vertical Lines
  - H. Recognize Slope as a Ratio
  - I. Find the Slope Given a Graph or Given Two Points
  - J. Graph Linear Equations Using Slope-Intercept Form
  - K. Convert Slope-Intercept Form to Standard Form
  - L. Graph Linear Equations in Standard Form
  - M. Write Linear Equations Given a Point and a Slope
  - N. Introduce Point-Slope Form of Linear Equation
  - O. Write Linear Equations Given Two Points
  - P. Write a Linear Equation Whose Slope is Parallel to a Given Line
  - Q. Write a Linear Equation Whose Slope is Perpendicular to a Given Line
  - R. Recognize and Graph a Scatterplot
  - S. Determine the Line of Best Fit for a Given Set of Data
  - T. Write a Linear Equation to Describe the Line of Best Fit
  
- 4) Exponents and Polynomials
  - A. Rule of Common Bases
  - B. Power to Power Rule
  - C. Simplifying Expressions Involving Exponents
  - D. Negative Exponents
  - E. Zero as an Exponent
  - F. Division Property of Exponents
  - G. Rational Exponents
  - H. Scientific Notation
  - I. Adding and Subtracting Polynomials
  - J. Multiplying Polynomials
  - K. Multiplying Binomials Using FOIL
  - L. Polynomial Long Division

## Algebra 1 Course Syllabus

- 5) Factoring
  - A. Factor Towers
  - B. Factor Trees
  - C. Greatest Monomial Factor
  - D. Difference of Squares
  - E. Perfect Square Trinomial
  - F. Complete the Square
  - G. Trinomial Factoring:  $x^2 + bx + c$
  - H. Trinomial Factoring:  $ax^2 + bx + c$
  - I. Solve Polynomial Equations by Factoring
  - J. Simplify Algebraic Fractions Involving Factoring
  - K. Multiply and Divide Algebraic Fractions Involving Factoring
  - L. Add and Subtract Algebraic Fractions With Like Denominators
  - M. Add and Subtract Algebraic Fractions With Unlike Denominators
  
- 6) Roots
  - A. Identify Roots as Rational or Irrational
  - B. Simplify Irrational Roots
  - C. Simplify Roots Involving Variables
  - D. Add and Subtract Like Radicals
  - E. Multiply and Divide Radicals
  - F. Follow the Three Rules for Simplifying Radical Expressions
  - G. Simplify Complicated Expressions Involving Radicals
  - H. Use a Conjugate to Simplify
  - I. Solve Equations Involving Roots by Squaring Both Sides
  - J. Solve Equations Involving Perfect Squares Using The Square Root Method
  - K. Pythagorean Theorem
  - L. Common Pythagorean Triples
  - M. Distance Formula
  
- 7) Quadratics
  - A. Graph Quadratic Equations in the Coordinate Plane
  - B. Find Critical Features of Quadratic Equations Without Graphing
  - C. Quadratic Formula
  - D. Discriminant
  - E. Projectile Problems
  - F. Completing the Square
  - G. Derive the Quadratic Formula by Completing the Square
  - H. Review Various Methods of Solving Quadratics
  - I. Identify Relations and Functions Algebraically and Graphically
  - J. Simplify Expressions Involving Function Notation
  - K. Identify and Graph Other Types of Functions

## *Algebra 1 Course Syllabus*

- 8) Systems of Equations
  - A. Solve Systems of Linear Equations by Graphing
  - B. Systems with No Solution or Infinitely Many Solutions
  - C. Solve Systems of Linear Equations by Substitution
  - D. Solve Systems of Linear Equations by Elimination
  - E. Word Problems Involving Linear Systems
  - F. Wind and Current Problems
  - G. Solve Systems of Linear and Quadratic Equations Graphically and Algebraically
  
- 9) Rates, Proportions, and Probability
  - A. Simplify Ratios
  - B. Make Measurements Using a Ruler
  - C. Solve Word Problems Involving Ratios
  - D. Simplify a Unit Rate
  - E. Using Rate Multiplication
  - F. Use Similarity to Identify Congruent Angles
  - G. Solve an Algebraic Proportion
  - H. Use Proportions to Find Unknown Sides in Similar Figures
  - I. Maps and Scale
  - J. Convert Fractions, Decimals, and Percent
  - K. Percent of a Number Problems
  - L. Unknown Percents
  - M. Percent Change
  - N. Simple Probability
  - O. Probability of Compound Events – Mutually Exclusive
  - P. Probability of Compound Events – Dependent Events
  - Q. Using Trees and Diagrams to Model Outcomes
  - R. Probability Involving Geometric Figures
  
- 10) Direct and Inverse Variation, Data Analysis, and Chart Problems
  - A. Direct and Inverse Variation
  - B. Word Problems Involving Direct and Inverse Variation
  - C. Graphing Direct and Inverse Variation
  - D. Measures of Central Tendency – Mean, Median, and Mode
  - E. Line Plots, Frequency Tables, and Stem-Leaf Plots
  - F. Word Problems Involving a Change in Mean
  - G. Chart Problems Involving Age
  - H. Chart Problems Involving Number, Unit Cost, and Total Cost
  - I. Chart Problems Involving Rate, Time, and Distance
  - J. Chart Problems Involving Mixture
  - K. Chart Problems Involving Investment
  - L. Rational Equations
  - M. Restrictions and Extraneous Solutions
  - N. Work Problems

## *Algebra 1 Course Syllabus*

### 11) Inequalities

- A. Solve Linear Inequalities Involving a Single Variable
- B. Graph an Inequality on a Number Line
- C. Word Problems Involving Inequalities
- D. Intersections of Inequalities
- E. Unions of Inequalities
- F. Simplify Compound Inequalities
- G. Graphs of Compound Inequalities
- H. Equations Involving Absolute Value
- I. Inequalities Involving Absolute Value
- J. Graphing Linear Inequalities in Two Variables
- K. Solving Systems of Linear Inequalities by Graphing
- L. Inductive and Deductive Reasoning
- M. Hypothesis, Conclusions, and Conditionals
- N. Direct and Indirect Proof