Algebra 1 (1 of 2)

Course Description:

Algebra I (1 of 2) explores properties to simplify expressions with exponents and radicals, and relationships between rational and irrational numbers. It also explores how to solve linear equations and inequalities, how to solve and graph systems of linear equations and inequalities, how to apply operations on polynomials, how to factor quadratic expressions, and how to solve quadratic equations with different methods.

Course Objectives:

- Solve systems of equations and inequalities.
- Model equations and inequalities with graphs.
- Identify and interpret scales and units in graphs.
- Add, subtract, and multiply polynomials.
- Simplify and evaluate expressions with rational exponents and radicals.
- Explain and justify the process of solving equations and inequalities.
- Create and solve equations and inequalities.
- Rewrite and interpret expressions and equations in different forms.
- Identify and justify whether the sums and products of rational and irrational numbers are rational or irrational.
- Interpret solutions for equations and inequalities that represent word problems.
- Identify and interpret key features of linear and quadratic equations.

Required Materials:

Recommended:

- bag or other container to hold folded strips of paper
- cardstock in different colors
- cardstock with coordinate planes
- colored paper
- colored pencils
- construction paper
- dice
- dry-erase markers
- envelopes
- glue sticks
- graph paper
- graphing calculator (either online such as GeoGebra or Desmos, or handheld)
- highlighters
- index cards in different colors
- markers
- old magazines
- online quiz game such as Kahoot!, Quizlet, or Quizziz
- painter's tape
- pipe cleaners
- presentation paper or large sheets of construction paper
- presentation software (such as PowerPoint, Prezi, or Google Slides)
- resealable sandwich bags

- rulers
- scissors
- stickers
- sticky grid-style presentation paper
- sticky notes in different colors
- tape
- timer (for teacher use)
- transparencies or page protectors
- video recording equipment (cell phones or video cameras)
- video viewing equipment (individual computers or classroom projector)
- wet erase markers
- whiteboards
- whiteboard erasers

Optional:

- algebra tiles
- butcher paper
- colored paper and tape
- grid paper
- magnetic algebra tiles (for teacher use)
- scrap paper

Course Overview:

Unit 1: The Real Numbers

- ***Lesson 1: Properties of Integer Exponents***
    - Activity 1: Introduction to Algebra I
    - Activity 2: Instruction: Negative Exponents
    - Activity 3: Practice: Negative Exponents
    - Activity 4: Instruction: Properties of Exponents, Part 1
    - Activity 5: Practice: Properties of Exponents, Part 1
    - Activity 6: Instruction: Properties of Exponents, Part 2
    - Activity 7: Practice: Properties of Exponents, Part 2
    - Activity 8: Checkpoint: Properties of Integer Exponents
- ***Lesson 2: Radicals and Rational Exponents***
    - Activity 1: Instruction: When the Numerator Is 1
    - Activity 2: Practice: When The Numerator Is 1
    - Activity 3: Instruction: Numerators Other than 1
    - Activity 4: Practice: Numerators Other than 1
    - Activity 5: Instruction: Simplifying Radicals
    - Activity 6: Practice: Simplifying Radicals
    - Activity 7: Checkpoint: Radicals and Rational Exponents
- ***Lesson 3: Rules for Rational Exponents***
    - Activity 1: Instruction: Rules for Rational Exponents, Part 1

- Activity 2: Practice: Rules for Rational Exponents, Part 1
- Activity 3: Instruction: Rules for Rational Exponents, Part 2
- Activity 4: Practice: Rules for Rational Exponents, Part 2
- Activity 5: Instruction: Combining Properties
- Activity 6: Practice: Combining Properties
- Activity 7: Discussion: Rules for Exponents
- Activity 8: Checkpoint: Rules for Rational Exponents

- ***Lesson 4: Operations with Irrational Numbers***
  - Activity 1: Instruction: Adding Irrational Numbers
  - Activity 2: Practice: Adding Irrational Numbers
  - Activity 3: Instruction: Multiplying Irrational Numbers
  - Activity 4: Practice: Multiplying Irrational Numbers
  - Activity 5: Checkpoint: Operations with Irrational Numbers
- ***Lesson 5: Order of Operations***
  - Activity 1: Instruction: Expressions with Radicals
  - Activity 2: Practice: Expressions with Radicals
  - Activity 3: Instruction: Expressions with Exponents, Part 1
  - Activity 4: Practice: Expressions with Exponents, Part 1
  - Activity 5: Instruction: Expressions with Exponents, Part 2
  - Activity 6: Practice: Expressions with Exponents, Part 2
  - Activity 7: Notes/Work Upload: The Real Numbers
  - Activity 8: Review: The Real Numbers
  - Activity 9: Exam: The Real Numbers

Unit 2: Lines and Their Graphs

- ***Lesson 6: Solve One-Variable Equations***
  - Activity 1: Instruction: Solve Linear Equations
  - Activity 2: Practice: Solve Linear Equations
  - Activity 3: Instruction: Solve Problems with Linear Equations
  - Activity 4: Practice: Solve Problems with Linear Equations
  - Activity 5: Instruction: Absolute Value Equations
  - Activity 6: Practice: Absolute Value Equations
  - Activity 7: Checkpoint: Solve One-Variable Equations
- ***Lesson 7: Forms of Equations of Lines***
  - Activity 1: Instruction: Slope-Intercept Form
  - Activity 2: Practice: Slope-Intercept Form
  - Activity 3: Instruction: Point-Slope Form
  - Activity 4: Practice: Point-Slope Form
  - Activity 5: Instruction: Standard Form
  - Activity 6: Practice: Standard Form
  - Activity 7: Checkpoint: Forms of Equations of Lines
  - Activity 8: Project: Solving Literal Equations – Step 1

- ***Lesson 8: Graphing Lines***
    - Activity 1: Instruction: Graph from Tables
    - Activity 2: Practice: Graph from Tables
    - Activity 3: Instruction: Graph from Equations with Slope
    - Activity 4: Practice: Graph from Equations with Slope
    - Activity 5: Instruction: Graph from Standard Form
    - Activity 6: Practice: Graph from Standard Form
    - Activity 7: Checkpoint: Graphing Lines
- ***Lesson 9: Creating Linear Equations from Graphs***
    - Activity 1: Instruction: Interpreting Graphs of Lines
    - Activity 2: Practice: Interpreting Graphs of Lines
    - Activity 3: Instruction: Determining the Slope-Intercept Form
    - Activity 4: Practice: Determining the Slope-Intercept Form
    - Activity 5: Instruction: Determining the Point-Slope Form
    - Activity 6: Practice: Determining the Point-Slope Form
    - Activity 7: Discussion: Linear Equations
    - Activity 8: Checkpoint: Creating Linear Equations from Graphs
- ***Lesson 10: Solve by Graphing***
    - Activity 1: Instruction: Graph a System of Equations
    - Activity 2: Practice: Graph a System of Equations
    - Activity 3: Instruction: Finding the Solution Graphically
    - Activity 4: Practice: Finding the Solution Graphically
    - Activity 5: Instruction: Number of Solutions
    - Activity 6: Practice: Number of Solutions
    - Activity 7: Notes/Work Upload: Lines and Their Graphs
    - Activity 8: Review: Lines and Their Graphs
    - Activity 9: Exam: Lines and Their Graphs

Unit 3: Linear Systems and Inequalities

- ***Lesson 11: Solve by Substitution***
    - Activity 1: Instruction: Equations in Slope-Intercept Form
    - Activity 2: Practice: Equations in Slope-Intercept Form
    - Activity 3: Instruction: One Variable Isolated
    - Activity 4: Practice: One Variable Isolated
    - Activity 5: Instruction: No Variables Isolated
    - Activity 6: Practice: No Variables Isolated
    - Activity 7: Checkpoint: Solve by Substitution
- ***Lesson 12: Solve by Elimination***
    - Activity 1: Instruction: Add Two Equations
    - Activity 2: Practice: Add Two Equations
    - Activity 3: Instruction: Multiply One Equation by a Constant

- Activity 4: Practice: Multiply One Equation by a Constant
- Activity 5: Instruction: Multiply Two Equations by a Constant
- Activity 6: Practice: Multiply Two Equations by a Constant
- Activity 7: Checkpoint: Solve by Elimination
- Activity 8: Project: Solving Literal Equations – Step 2

- ***Lesson 13: One-Variable Linear Inequalities***

  - Activity 1: Instruction: Solve and Graph Linear Inequalities
  - Activity 2: Practice: Solve and Graph Linear Inequalities
  - Activity 3: Instruction: Two Inequalities Together
  - Activity 4: Practice: Two Inequalities Together
  - Activity 5: Instruction: Linear Inequalities in Context
  - Activity 6: Practice: Linear Inequalities in Context
  - Activity 7: Checkpoint: One-Variable Linear Inequalities

- ***Lesson 14: Linear Inequalities in Two Variables***

  - Activity 1: Instruction: Model with Linear Inequalities
  - Activity 2: Practice: Model with Linear Inequalities
  - Activity 3: Instruction: Graph Linear Inequalities
  - Activity 4: Practice: Graph Linear Inequalities
  - Activity 5: Instruction: Interpreting Solution Sets
  - Activity 6: Practice: Interpreting Solution Sets
  - Activity 7: Discussion: Linear Inequalities
  - Activity 8: Checkpoint: Linear Inequalities in Two Variables

- ***Lesson 15: Systems of Linear Inequalities***

  - Activity 1: Instruction: Systems of Inequalities
  - Activity 2: Practice: Systems of Inequalities
  - Activity 3: Instruction: Solve with Systems of Inequalities
  - Activity 4: Practice: Solve with Systems of Inequalities
  - Activity 5: Instruction: Linear Programming
  - Activity 6: Practice: Linear Programming
  - Activity 7: Notes/Work Upload: Linear Systems and Inequalities
  - Activity 8: Review: Linear Systems and Inequalities
  - Activity 9: Exam: Linear Systems and Inequalities

Unit 4: Polynomials and Factoring

- ***Lesson 16: Adding and Subtracting Polynomials***

  - Activity 1: Instruction: What Is a Polynomial?
  - Activity 2: Practice: What Is a Polynomial?
  - Activity 3: Instruction: Adding Polynomials
  - Activity 4: Practice: Adding Polynomials
  - Activity 5: Instruction: Subtracting Polynomials
  - Activity 6: Practice: Subtracting Polynomials
  - Activity 7: Checkpoint: Adding and Subtracting Polynomials

- ***Lesson 17: Multiplying Polynomials***
    - Activity 1: Instruction: Multiply by a Constant
    - Activity 2: Practice: Multiply by a Constant
    - Activity 3: Instruction: Multiply by a Monomial
    - Activity 4: Practice: Multiply by a Monomial
    - Activity 5: Instruction: Multiply by a Binomial
    - Activity 6: Practice: Multiply by a Binomial
    - Activity 7: Checkpoint: Multiplying Polynomials
    - Activity 8: Project: Solving Literal Equations – Step 3
- ***Lesson 18: Introduction to Quadratic Expressions***
    - Activity 1: Instruction: What Is a Quadratic Expression?
    - Activity 2: Practice: What Is a Quadratic Expression?
    - Activity 3: Instruction: Factoring Perfect Square Trinomials
    - Activity 4: Practice: Factoring Perfect Square Trinomials
    - Activity 5: Instruction: Factoring a Difference of Squares
    - Activity 6: Practice: Factoring a Difference of Squares
    - Activity 7: Discussion: Quadratic Expressions
    - Activity 8: Checkpoint: Introduction to Quadratic Expressions
- ***Lesson 19: Factor by Grouping***
    - Activity 1: Instruction: The Greatest Common Factor
    - Activity 2: Practice: The Greatest Common Factor
    - Activity 3: Instruction: Factoring by Grouping
    - Activity 4: Practice: Factoring by Grouping
    - Activity 5: Checkpoint: Factor by Grouping
- ***Lesson 20: Other Methods for Factoring Quadratics***
    - Activity 1: Instruction: The Decomposition Method
    - Activity 2: Practice: The Decomposition Method
    - Activity 3: Instruction: Shortcut to Decomposition When a=1
    - Activity 4: Practice: Shortcut to Decomposition When a=1
    - Activity 5: Notes/Work Upload: Polynomials and Factoring
    - Activity 6: Review: Polynomials and Factoring
    - Activity 7: Exam: Polynomials and Factoring

Unit 5: Quadratic Equations, Part 1

- ***Lesson 21: Solve by Factoring***
    - Activity 1: Instruction: Solve by Factoring
    - Activity 2: Practice: Solve by Factoring
    - Activity 3: Instruction: Solving by Factoring in Context
    - Activity 4: Practice: Solving by Factoring in Context
    - Activity 5: Checkpoint: Solve by Factoring

- ***Lesson 22: Graphing a Factored Quadratic***
    - Activity 1: Instruction: What Is a Parabola?
    - Activity 2: Practice: What Is a Parabola?
    - Activity 3: Instruction: Symmetry in Parabolas
    - Activity 4: Practice: Symmetry in Parabolas
    - Activity 5: Instruction: Graphing from Factored Form
    - Activity 6: Practice: Graphing from Factored Form
    - Activity 7: Checkpoint: Graphing a Factored Quadratic
    - Activity 8: Project: Solving Literal Equations – Step 4
- ***Lesson 23: Completing the Square***
    - Activity 1: Instruction: What Is "Completing the Square"?
    - Activity 2: Practice: What Is "Completing the Square"?
    - Activity 3: Instruction: Creating a Perfect Square
    - Activity 4: Practice: Creating a Perfect Square
    - Activity 5: Instruction: Completing the Square
    - Activity 6: Practice: Completing the Square
    - Activity 7: Discussion: Completing the Square
    - Activity 8: Checkpoint: Completing the Square
- ***Lesson 24: Solve with Square Roots***
    - Activity 1: Instruction: Solve with Square Roots, Part 1
    - Activity 2: Practice: Solve with Square Roots, Part 1
    - Activity 3: Instruction: Solve with Square Roots, Part 2
    - Activity 4: Practice: Solve with Square Roots, Part 2
    - Activity 5: Instruction: Solving by Completing the Square
    - Activity 6: Practice: Solving by Completing the Square
    - Activity 7: Checkpoint: Solve with Square Roots
- ***Lesson 25: The Vertex Form of a Quadratic Equation***
    - Activity 1: Instruction: What Is the Vertex Form?
    - Activity 2: Practice: What Is the Vertex Form?
    - Activity 3: Instruction: Creating Equations in Vertex Form
    - Activity 4: Practice: Creating Equations in Vertex Form
    - Activity 5: Instruction: Finding the Maximum or Minimum
    - Activity 6: Practice: Finding the Maximum or Minimum
    - Activity 7: Notes/Work Upload: Quadratic Equations, Part 1
    - Activity 8: Review: Quadratic Equations, Part 1
    - Activity 9: Exam: Quadratic Equations, Part 1

Unit 6: Quadratic Equations, Part 2

- ***Lesson 26: Graphing Quadratics in Vertex Form***
    - Activity 1: Instruction: The Line of Symmetry
    - Activity 2: Practice: The Line of Symmetry

- Activity 3: Instruction: Find Zeros and Plot Points
- Activity 4: Practice: Find Zeros and Plot Points
- Activity 5: Instruction: Writing the Vertex Form from a Graph
- Activity 6: Practice: Writing the Vertex Form from a Graph
- Activity 7: Checkpoint: Graphing Quadratics in Vertex Form

- ***Lesson 27: The Quadratic Formula***
  - Activity 1: Instruction: What Is the Quadratic Formula?
  - Activity 2: Practice: What Is the Quadratic Formula?
  - Activity 3: Instruction: Solving with the Quadratic Formula
  - Activity 4: Practice: Solving with the Quadratic Formula
  - Activity 5: Instruction: Solving Contextual Problems
  - Activity 6: Practice: Solving Contextual Problems
  - Activity 7: Checkpoint: The Quadratic Formula
- ***Lesson 28: Solving Quadratics with Technology***
  - Activity 1: Instruction: Matching Graphs to Descriptions
  - Activity 2: Practice: Matching Graphs to Descriptions
  - Activity 3: Instruction: Using the Graphing Tool
  - Activity 4: Practice: Using the Graphing Tool
  - Activity 5: Instruction: Solving with the Graphing Tool
  - Activity 6: Practice: Solving with the Graphing Tool
  - Activity 7: Discussion: Graphs and Key Features of Parabolas
  - Activity 8: Checkpoint: Solving Quadratics with Technology
- ***Lesson 29: Systems Involving Quadratic Equations***
  - Activity 1: Instruction: Solving Systems by Graphing
  - Activity 2: Practice: Solving Systems by Graphing
  - Activity 3: Instruction: Solve Systems Algebraically, Part 1
  - Activity 4: Practice: Solve Systems Algebraically, Part 1
  - Activity 5: Instruction: Solve Systems Algebraically, Part 2
  - Activity 6: Practice: Solve Systems Algebraically, Part 2
  - Activity 7: Notes/Work Upload: Quadratic Equations, Part 2
  - Activity 8: Review: Quadratic Equations, Part 2
  - Activity 9: Exam: Quadratic Equations, Part 2
- ***Lesson 30: Final Exam***
  - Activity 1: Final Exam
  - Activity 2: Course Summary