

Foundations of Algebra provides a curriculum focused on foundational concepts that prepare students for success in Algebra I. Through a "Discovery-Confirmation-Practice"-based exploration of basic concepts, students are challenged to work toward a mastery of computational skills, to deepen their understanding of key ideas and solution strategies, and to extend their knowledge through a variety of problem-solving applications.

Course topics include integers; the language of algebra; solving equations with addition, subtraction, multiplication, and division; fractions and decimals; measurement; exponents; solving equations with roots and powers; multi-step equations; and linear equations.

Within each Foundations of Algebra lesson, students are supplied with a scaffolded note-taking guide, called a Study Sheet, as well as a post-study Checkup activity that provides them the opportunity to hone their computational skills by working through a low-stakes, 10-question problem set before starting formal assessment. Unit-level Introductory Algebra assessments include a computer-scored test and a scaffolded, teacher-scored test.

The course is built to state standards and informed by the National Council of Teachers of Mathematics (NCTM).

Length: Two semesters

UNIT 1: INTEGERS

- Lesson 1: Whole Numbers
- Lesson 2: Number Lines and Inequalities
- Lesson 3: Rounding Whole Numbers
- Lesson 4: Operations and Numerical Expressions
- Lesson 5: Properties of Operations
- Lesson 6: The Operations on a Number Line
- Lesson 7: Reverse Operations
- Lesson 8: Negative Numbers
- Lesson 9: Absolute Value
- Lesson 10: Adding Integers
- Lesson 11: Subtracting Integers
- Lesson 12: Multiplying Integers
- Lesson 13: Dividing Integers
- Lesson 14: Wrap-Up

UNIT 2: THE LANGUAGE OF ALGEBRA

- Lesson 1: What is a Variable?
- Lesson 2: Finding and Naming Variables
- Lesson 3: Units and Reasonable Values
- Lesson 4: Graphs Tables and Equations
- Lesson 5: Solving Problems with Tables and Graphs
- Lesson 6: Variable Expressions
- Lesson 7: Simplifying and Evaluating Expressions
- Lesson 8: Mathematical Sentences
- Lesson 9: Solving Mathematical Sentences
- Lesson 10: Some Guidelines for Problem Solving
- Lesson 11: Wrap-Up

UNIT 3: SOLVING EQUATIONS WITH ADDITION AND SUBTRACTION

- Lesson 1: Solving Equations Graphically
- Lesson 2: Solving Equations with Larger Numbers
- Lesson 3: Solving $x + a = b$
- Lesson 4: Solving with a Number Line
- Lesson 5: Solving Inequalities
- Lesson 6: Variations of Equations and Inequalities
- Lesson 7: Density
- Lesson 8: The King's Crown Problem
- Lesson 9: Wrap-Up

UNIT 4: FRACTIONS AND DECIMALS

- Lesson 1: Fraction Fundamentals
- Lesson 2: Introduction to Fraction Arithmetic
- Lesson 3: Equivalent Fractions
- Lesson 4: Simplifying Fractions
- Lesson 5: Mixed Numbers
- Lesson 6: Dividing Fractions
- Lesson 7: Adding and Subtracting Fractions
- Lesson 8: Decimals and Percents
- Lesson 9: The Set of Rational Numbers
- Lesson 10: Wrap-Up

UNIT 5: MEASUREMENT

- Lesson 1: Metric and Customary Units
- Lesson 2: Converting Units
- Lesson 3: Estimation and Scale
- Lesson 4: Precision in Measurement
- Lesson 5: Applications of Measurement
- Lesson 6: Wrap-Up

UNIT 6: SEMESTER 1 REVIEW AND EXAM

- Lesson 1: Preparing for the Semester Exam

UNIT 7: SOLVING EQUATIONS WITH MULTIPLICATION AND DIVISION

- Lesson 1: Solving $ax = b$
- Lesson 2: The Lightning Problem
- Lesson 3: Solving $\cancel{x}a = b$
- Lesson 4: Inequalities
- Lesson 5: Wrap-Up

UNIT 8: EXPONENTS

- Lesson 1: Definitions and Examples of Exponents
- Lesson 2: Exponents and the Order of Operations
- Lesson 3: Laws of Exponents
- Lesson 4: Scientific Notation
- Lesson 5: Exponents in Geometry
- Lesson 6: Square Roots
- Lesson 7: Radical Notation
- Lesson 8: Wrap-Up

UNIT 9: SOLVING EQUATIONS WITH ROOTS AND POWERS

- Lesson 1: Solving $|x| = b$
- Lesson 2: Solving $x^2 = b$

- Lesson 3: Solving $\sqrt{x} = b$
- Lesson 4: Inequalities and Absolute Value
- Lesson 5: Inequalities and x^2
- Lesson 6: Inequalities and \sqrt{x}
- Lesson 7: The Pythagorean Theorem
- Lesson 8: Wrap-Up

UNIT 10: MULTI-STEP EQUATIONS

- Lesson 1: Solving $ax + b = c$
- Lesson 2: Collecting Like Terms
- Lesson 3: Using the Distributive Property
- Lesson 4: Variables on Both Sides of the Equation
- Lesson 5: The Profit Problem
- Lesson 6: Wrap-Up

UNIT 11: LINEAR EQUATIONS

- Lesson 1: Cartesian Coordinate Systems
- Lesson 2: Lines in the xy -plane
- Lesson 3: Slope
- Lesson 4: Parallel and Perpendicular Lines
- Lesson 5: Slope and Equations
- Lesson 6: Slope-Intercept Form
- Lesson 7: Point-Slope Form
- Lesson 8: Linear Inequalities
- Lesson 9: Wrap-Up

UNIT 12: SEMESTER 2 REVIEW AND EXAM

- Lesson 1: Preparing for the Semester Exam