LIVE Online Math Algebra Scope and Sequence

The course is broken down into units. The units, and lessons that make up each unit, are below.
<mark>Note: If there is a specific concept/technique that is not listed, please <u>contact us</u> to see if it is part of the course. Specific content is not always readily identifiable simply from the title of a lesson.</mark>

Unit 1: Foundational Tools of Algebra

In Unit 1, students explore some foundational tools of Algebra. Some of these concepts will be review, but they are vitally important for the work that lies ahead. Students also get practice with "algebraic thinking" as they interpret expressions, equations and inequalities. A virtual manipulative called, Algebra Tiles is introduced in order to model a few concepts in this unit and these tiles will be used in future units as well. This unit concludes by formally introducing several basic properties used throughout Algebra.

Lesson 1: Variables, Expressions and Exponents

Lesson 2: Order of Operations

Lesson 3: Solutions of Equations and Inequalities

Lesson 4: Terms and Like Terms

Lesson 5: Distribution

Lesson 6: Properties, Properties, Properties

Unit 2: Working with Sets of Numbers and Word Problems

Unit 2 focuses on working with and introducing various sets of numbers. Specifically, integers, rational numbers and irrational numbers are introduced and worked with in a variety of contexts. Previously learned skills such as combining like terms and simplifying expressions are also expanded on in this unit. In lesson 4, a few small, but important techniques are introduced that pop up at various times throughout the course. Lesson 6 focuses exclusively on word problems. Word problems are worked with and analyzed from several different angles. This is an important lesson and students are encouraged to make up their own word problems in the end to provide yet another way to understand word problems.

Lesson 1: Integers and Graphing on a Number Line

Lesson 2: Adding / Subtracting Integers and Absolute Value

Lesson 3: Introduction to Rational Numbers

Lesson 4: Multiplying, Dividing and Simplifying with Rational Numbers

Lesson 5: Square Roots and Irrational Numbers

Lesson 6: Writing Equations / Inequalities and Word Problems

Unit 3: Solving Equations and Ratios, Proportions & Percents

The primary focus of unit 3 is on solving equations. This is arguably the most important skill in Algebra and it is given a thorough treatment in this unit. Lesson 5 introduces students to solving literal equations (equations with several variables). This is a particularly useful skill to have when working with formulas later on in math and science. Lessons 6 and 7 touch on a handful of concepts regarding ratios, proportions and percents. Finally, most lessons have a "Real Life Application" aimed at demonstrating the usefulness of math in a real world context.

Lesson 1: Solving One-Step Equations

Lesson 2: Solving Multi-Step Equations

Lesson 3: Solving Equations With Combining Like Terms

Lesson 4: Solving Complex Equations

Lesson 5: Solving Literal Equations

Lesson 6: Ratios and Proportions

Lesson 7: Percent Problems

Unit 4: Relations and Functions

In unit 4, students are introduced to relations and functions. Functions play a particularly important role in math later on and in science as well. Related concepts such as domain and range are also covered. Lesson 4 introduces students to linear equations, although more detailed work with linear equations comes in unit 5. Lesson 6 shows students how to work with functional notation in the context of evaluating/simplifying functions.

Lesson 1: The Coordinate Plane and Plotting Points

Lesson 2: Relations

Lesson 3: Equations in Two Variables

Lesson 4: Introduction to Linear Equations

Lesson 5: Functions (Part 1)

Lesson 6: Functions (Part 2)

Unit 5: Linear Equations

Unit 5 is all about linear equations. Lesson 1 starts out by introducing the concept of slope (a critical part of working with linear equations). Lessons 2 and 3 allow students to work with a couple of different forms of linear equations. Additionally, lesson 6 covers how to deal with the special situations of parallel, perpendicular, vertical and horizontal lines. Finally, there are connections to real life throughout the unit (particularly in lesson 1 (snow skiing) and lesson 6 (wheel alignment on cars)).

Lesson 1: Slope

Lesson 2: Slope-Intercept Form of a Linear Equation

Lesson 3: Point-Slope Form of a Linear Equation

Lesson 4: Scatter Plots, Correlation and Line of Best Fit

Lesson 5: Graphing Linear Equations

Lesson 6: Parallel, Perpendicular, Vertical and Horizontal Lines

Unit 6: Linear Inequalities

In Unit 6, we extend the concepts learned about linear equations to linear inequalities. Many skills used in solving equations will be used in this unit and a couple new skills will be learned as well. In addition to solving linear inequalities, graphing linear inequalities will also be learned. Set builder notation will be introduced and used frequently to show answers. Solving absolute value equations and inequalities will also be explored.

Lesson 1: Solving and Graphing Inequalities Using Addition and Subtraction

Lesson 2: Solving Inequalities Using Multiplication and Division

Lesson 3: Solving Multi-Step Inequalities

Lesson 4: Compound Inequalities

Lesson 5: Solving Absolute Value Equations and Inequalities

Lesson 6: Graphing Absolute Value Equations on a Coordinate Plane

Lesson 7: Graphing Linear Inequalities

Unit 7: Systems of Linear Equations and Inequalities

Unit 7 primarily deals with solving linear systems. A thorough treatment is given to the topic with traditional techniques such as substitution and elimination being introduced. Special situations such as parallel and coincident lines are addressed as well. Graphing systems of linear inequalities is also explored and the unit concludes with a lesson on common word problems that can be solved using linear systems.

Lesson 1: Systems of Linear Equations

Lesson 2: Solving Linear Systems by Substitution

Lesson 3: Solving Linear Systems by Elimination

Lesson 4: Solving Linear Systems by Elimination (Part 2)

Lesson 5: Systems of Linear Inequalities

Lesson 6: Solving Word Problems with Linear Equations

Unit 8: Exponents and Exponential Functions

In Unit 8 students learn several exponent laws that act as a foundation for higher levels of math. As a lead-in to exponential functions, lesson 4 introduces students to compound interest and how compounding the interest in various ways effects the outcome. Lesson 6 focuses on exponential growth and decay. Students see how applications of exponential growth occurs in the stock market and in population changes around the world.

Lesson 1: Exponent Laws (Part 1)

Lesson 2: Exponent Laws (Part 2)

Lesson 3: Scientific Notation

Lesson 4: Compound Interest

Lesson 5: Exponential Functions

Lesson 6: Exponential Growth and Decay

Unit 9: Polynomials and Factoring

Unit 9 introduces students to polynomials as well as several operations involving polynomials. This segues into learning about various types of factoring. Several techniques are covered including Difference of Two Squares and Perfect Square Trinomials. Algebra Tiles (pictured below) are used frequently throughout this unit to make the concepts more concrete. Additionally, students are led to discover patterns and factoring methods by using previously learned skills. Finally, the "hand graphic" below is used in the second part of the unit to help students remember the many ways of factoring.

Lesson 1: Introduction to Polynomials

Lesson 2: Adding, Subtracting and Multiplying Polynomials

Lesson 3: Multiplying Binomials and Trinomials

Lesson 4: Factoring Using "Un-Distribution"

Lesson 5: Normal Trinomial Factoring

Lesson 6: Difference of Two Squares

Lesson 7: Perfect Square Trinomials

Unit 10: Quadratics

Unit 10 is all about quadratics. Students are initially introduced to the properties of a quadratic equation and standard form. Lesson 2 focuses on graphing parabolas (the shape of the graph of a quadratic equation). The main part of the unit is about working with various ways of solving quadratics. Students also discover the pros and cons of the various solving techniques along the way. Lesson 4 contains a real life application regarding rising and falling objects, and how solving a quadratic equation allows you to determine the height and distance of an object in flight. Finally, lesson 6 shows students how to use the quadratic formula, as well as where it came from.

Lesson 1: Introduction to Quadratics

Lesson 2: Graphing Quadratics

Lesson 3: Solving Quadratics: Graphing

Lesson 4: Solving Quadratics: Factoring

Lesson 5: Solving Quadratics: Completing the Square

Lesson 6: Solving Quadratics: Quadratic Formula

Unit 11: Rational Expressions and Equations

Unit 11 offers a thorough treatment of rational expressions and equations. Students work with rational expressions in the context of all four primary operations (add, subtract, multiply and divide). To make these abstract concepts easier to grasp, connections are made to how fractions were worked with in arithmetic. In lesson 4, students will see how polynomial long division is just like the traditional long division that is applied to any two numbers. Additionally, students will apply their learning through using unit multipliers to convert real life data (lesson 2) and calculate the resistance in a parallel circuit (lesson 7).

Lesson 1: Simplifying Rational Expressions

Lesson 2: Multiplying Rational Expressions

Lesson 3: Dividing Rational Expressions

Lesson 4: Dividing Polynomials

Lesson 5: Adding and Subtracting Rational Expressions

Lesson 6: Solving Rational Equations

Lesson 7: Mixed Expressions and Complex Fractions (optional lesson)

Unit 12: Radicals, The Pythagorean Theorem and Shifting Graphs

The primary focus of Unit 12 is on working with radical expressions and equations. The various rules involved with simplifying radicals are first introduced in lesson 1 and frequently show up throughout the rest of the unit. Lesson 5 introduces the Pythagorean Theorem and the Distance Formula - two important math tools that use radicals. Finally, lesson 6 guides students through understanding how graphs of various functions can be manipulated in similar ways.

Lesson 1: Simplifying Radicals

Lesson 2: Adding and Subtracting Radical Expressions

Lesson 3: Radical Expressions with Variables and FOILing Radical Expressions

Lesson 4: Solving Radical Equations

Lesson 5: The Pythagorean Theorem and The Distance Formula

Lesson 6: Shape Shifters (Function Transformations)