Algebra 1, Part 1
Course Outline & Objectives

Course Description:

In Algebra 1 Part 1, students will study the foundations of algebra, including the understanding of variables, expressions, and working with real numbers to simplify expressions. They will also learn to solve equations, from one-step to complex equations, including proportions and absolute value equations. Students will learn to solve and graph inequalities, will be introduced to linear functions, and will solve systems of equations and inequalities.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits) | Prerequisites: None

Course Outline

Unit 1: Foundations of Algebra

1.1 Variables & Expressions
1.2 Adding and Subtracting Real Numbers
1.3 Multiplying and Dividing Real Numbers
1.4 Powers and Exponents
1.5 Roots and Irrational Numbers
1.6 Properties of Real Numbers
1.7 Simplifying Expressions

Unit 2: Equations

2.1 Solving One-Step Equations
2.2 Solving Two-Step Equations
2.3 Solving Multi-Step Equations
2.4 Solving Equations with Variables on Both Sides
2.5 Solving Proportions
2.6 Solving Literal Equations for a Variable
2.7 Solving Absolute-Value Equations

Unit 3: Inequalities

3.1 Graphing and Writing Inequalities
3.2 Solving Inequalities by Adding or Subtracting
3.3 Solving Inequalities by Multiplying or Dividing
3.4 Solving Two-Step and Multi-Step Inequalities
3.5 Solving Inequalities with Variables on Both Sides
3.6 Solving Compound Inequalities
3.7 Solving Absolute-Values Inequalities

Common Core Standards

In Unit 1 students will learn:
How to solve simple equations, and will work with more complex variables and expressions.
How to write and simplify Algebraic expressions involving basic functions with Real Numbers.
How to analyze and combine like terms, and a mastery of powers and exponents, as well as roots and irrational numbers.
[N-RN, N-Q]

In Unit 2 students will learn:
To move on from solving one step to two step equations, including equations in which the variable is on both sides.
How to identify real life scenarios and express them as proportions, and from there, how to solve those proportions for the given variable using cross multiplication.
How to use algebraic techniques to solve literal equations for a particular variable.
How to solve and comprehend absolute value equations, showing that two solutions are likely in those scenarios.
[N-Q, A-CED, A-REI]

In Unit 3 students will learn:
How to take what was learned from solving and graphing linear equations and progress to graphing and writing inequalities.
How to solve complex inequalities and to gain the understanding that there is no single solution, but rather a range of possible answers with inequalities.
How to compare and contrast what is known about absolute value equations with absolute value inequalities, and how to graph the outcomes.
[N-Q, A-SSE, A-CED, A-REI, S-ID]

Course Outline

Unit 4: Functions

4.1 Relations and Functions
4.2 Modeling with Functions
4.3 Writing Functions
4.4 Arithmetic Sequence
4.5 Graphing Functions
4.6 PieceWise Functions

Common Core Standards

In Unit 4 students will learn
How to spot and analyze relations and functions, understanding that not all relations are functions.
How to write functions from real life scenarios and how to develop a deep understanding of graphing a "best line of fit" for scatter plots.
How to calculate trend lines and to understand that they are an estimation in most cases.
To take this understanding of functions and learn arithmetic sequences and their patterns.
[N-Q, A-CED, A-REI, F-IF, F-BF, F-LE, S-ID]

Unit 5: Linear Functions

5.1 Linear Equations and Functions
5.2 Graphing Linear Functions Using Intercepts
5.3 Slope
5.4 Direct Variation
5.5 Slope-Intercept Form
5.6 Point-Slope Form
5.7 Slopes of Parallel and Perpendicular Lines
5.8 Linear Word Problems

In Unit 5 students will learn:
How to identify and manipulate linear equations and functions, as well as match graphs to equations using key characteristics like intercepts, the slope, and positive or negative correlation.
To be able to switch between the intercept form and the point-slope form of algebraic equations and will understand when one form is more convenient than another, with regards to graphing.
How to understand and be able to identify when two lines are parallel, perpendicular, or of no particular relationship, using the slopes of the two lines.
[N-Q, A-SSE, A-CED, F-IF, S-ID]

Unit 6: Systems of Equations and Inequalities

6.1 Solving Systems by Graphing
6.2 Solving Systems by Substitution
6.3 Solving Systems by Elimination
6.4 Solving Special Systems
6.5 Applying Systems
6.6 Solving and Graphing Linear Inequalities
6.7 Solving Systems of Linear Inequalities

In Unit 6 students will learn:
How to develop an understanding that two lines cross at a single point and how to incorporate prior knowledge of linear equations and inequalities to solve systems.
How to solve systems of equations and inequalities using the graphing, substitution, and elimination methods, and how to identify which technique is more suitable for which scenario.
How to solve special systems, including both consistent and inconsistent systems, and how to apply systems to real life scenarios.
How to solve systems of inequalities and how to identify ranges of solutions that satisfy both linear inequalities in a system, and how to do the same for more than two inequalities at a time.
[N-Q, A-SSE, A-CED, A-REI]