Algebra 1 Syllabus

This course covers the Common Core math standards for Algebra 1. Students who have completed Math 8 or a Pre-Algebra course are ready for this course.

The course is broken up into 8 units, each with a Quiz and an End Assessment.

Unit 1: Representing Relationships

Unit 2: Linear Equations and Inequalities

Unit 3: Describing Data

Unit 4: Describing Functions

Unit 5: Systems of Linear Equations and Inequalities

Unit 6: Exponential Functions

Unit 7: Quadratic Functions

Unit 8: Quadratic Equations

Unit 1. Representing Relationships

Section 1: Multiple Representations of Relationships *(3 Lessons)*

- Use tables, equations, and graphs to describe relationships and make predictions.

Section 2: Linear and Exponential Relationships *(5 Lessons + Quiz + Assessment)*

- Distinguish between linear and exponential relationships shown in tables, graphs, equations, and situations.
- Write and interpret equations of linear and exponential relationships.

Common Core State Standards

HSA.CED.A.2
HSA.REI.D.10
HSA.SSE.A.1
HSF.BF.A.1
HSF.BF.A.1.A
HSF.IF.B.4
HSF.IF.C.7
HSF.LE.A.1
HSF.LE.A.1.A
HSF.LE.A.1.B
HSF.LE.A.2
HSF.LE.A.3
HSF.LE.B.5
HSN.Q.A.2

Vocabulary

- constant difference
- constant ratio
- exponential relationship
- linear relationship
- model

Unit 2. Linear Equations and Inequalities

Section 1: One-Variable Equations *(3 Lessons)*

- Solve linear equations with one variable, including equations with no solution or many solutions.

Section 2: Multi-Variable Equations *(2 Lessons + Quiz)*

- Solve multi-variable equations for a given variable.
- Write equations to represent linear situations.

Section 3: One-Variable and Two-Variable Inequalities *(5 Lessons + Assessment)*

- Determine solutions to an inequality algebraically and graphically.
- Write inequalities in one and two variables to represent constraints.

Common Core State Standards

HSA.CED.A.1
HSA.CED.A.2
HSA.CED.A.3
HSA.CED.A.4
HSA.REI.A.1
HSA.REI.B.3
HSA.REI.D.10
HSA.REI.D.12
HSN.Q.A.3

Vocabulary

- constraint
- equivalent equations
- solution
- standard form (of a linear equation)

Unit 3. Describing Data

Section 1: Visualizing One-Variable Data *(4 Lessons)*

- Represent data with a dot plot, histogram, or box plot.

Section 2: Summarizing One-Variable Data *(4 Lessons + Quiz)*

- Calculate the mean and standard deviation or median and IQR for a data set.
- Use shape, center, spread, and outliers to compare data sets.

Section 3: Two-Variable Data *(5 Lessons + Assessment)*

- Describe data using correlation coefficients and lines of best fit.
- Use technology to generate lines of best fit and make predictions.

Vocabulary

bell-shaped, bimodal, box plot, categorical data, causation, correlation, correlation coefficient, dot plot, histogram, interquartile range (iqr), line of best fit, linear association, mean, measure of center, measure of spread, median, negative association, outlier, positive association, quantitative data, quartile, residual, residual plot, scatter plot, skewed, slope, standard deviation, statistic, symmetric, uniform

Common Core State Standards

HSS.ID.A.1
HSS.ID.A.2
HSS.ID.A.3
HSS.ID.B.6
HSS.ID.B.6.A
HSS.ID.B.6.B
HSS.ID.B.6.C
HSS.ID.C.7
HSS.ID.C.8
HSS.ID.C.9

Unit 4. Describing Functions

Section 1: Function Notation *(3 Lessons + Quiz)*

- Describe whether or not a relationship is a function.
- Interpret statements in function notation using tables, equations, and graphs.

Section 2: Key Features of Functions *(7 Lessons + Quiz)*

- Describe functions using their key features, including average rate of change.
- Compare graphs of functions using function notation and key features.
- Describe the domain and range of a function using its graph.

Section 3: Piecewise-Defined and Absolute Value Functions *(3 Lessons + Assessment)*

- Interpret, evaluate, graph, and write equations of piecewise-defined and absolute value functions.

Common Core State Standards

HSA.REI.D.11, HSF.BF.A.1, HSF.IF.A.1, HSF.IF.A.2, HSF.IF.B.4, HSF.IF.B.5, HSF.IF.B.6, HSF.IF.C, HSF.IF.C.7, HSF.IF.C.7.B, HSF.IF.C.9

Vocabulary

- absolute value function
- average rate of change
- compound inequality
- decreasing (interval or function)
- domain
- function
- function notation
- increasing (interval or function)
- maximum
- minimum
- negative (interval or function)
- piecewise-defined function
- positive (interval or function)
- range

Unit 5. Systems of Linear Equations and Inequalities

Section 1: Systems of Equations (*5 Lessons + Quiz*)

- Solve systems of linear equations with elimination, substitution, and graphing.
- Write systems of linear equations to represent constraints and interpret their solutions in context.

Section 2: Systems of Inequalities (*2 Lessons + Assessment*)

- Graph the solutions to a system of inequalities.
- Write systems of linear inequalities to represent constraints and interpret their solutions in context.

Common Core State Standards

HSA.CED.A.3
HSA.REI.C.5
HSA.REI.C.6
HSA.REI.D.10
HSA.REI.D.11
HSA.REI.D.12
HSF.IF.C.7
HSF.IF.C.7.A
HSN.Q.A.1
HSN.Q.A.3

Vocabulary

- elimination
- solution region
- solution to a system of equations
- solution to a system of inequalities
- substitution
- system of equations
- system of inequalities
- x-intercept
- y-intercept

Unit 6. Exponential Functions

Section 1: Comparing Linear and Exponential Functions *(4 Lessons)*

- Distinguish between situations modeled by linear and exponential functions.
- Compare representations of linear and exponential functions.

Section 2: Exponential Growth and Decay *(2 Lessons + Quiz)*

- Interpret and write exponential equations to model situations that involve percent increase or decrease.
- Use equations of exponential functions to solve problems in context.

Section 3: Compound Interest and Modeling Data *(3 Lessons + Assessment)*

- Use properties of exponents to make sense of compound interest rates.
- Fit a linear or exponential function to data and informally assess the fit.

Common Core State Standards

HSA.CED.A.2,HSA.REI.D.11, HSA.SSE.A.1, HSA.SSE.A.1.A, HSA.SSE.A.1.B, HSA.SSE.A.2, HSA.SSE.B.3.C, HSF.BF.A, HSF.BF.A.1, HSF.BF.A.1.A, HSF.IF.A.2, HSF.IF.B.4, HSF.IF.B.5, HSF.IF.C.8, HSF.IF.C.8.B, HSF.IF.C.9, HSF.LE.A., HSF.LE.A.1.A, HSF.LE.A.1.B, HSF.LE.A.1.C, HSF.LE.A.2, HSF.LE.A.3, HSF.LE.B.5, HSN.Q.A.1, HSN.Q.A.3, HSS.ID.B.6, HSS.ID.B.6.A

Vocabulary

- constant difference
- constant ratio
- compound interest
- exponential decay/growth
- exponential function
- growth factor
- linear function
- percent decrease/increase
- simple interest

Unit 7. Quadratic Functions

Section 1: Introduction to Quadratic Functions (5 Lessons + Quiz)

- Justify whether a function is linear, quadratic, exponential, or none.
- Identify and interpret key features of quadratics in graphs and tables.

Section 2: Standard Form and Factored Form (4 Lessons + Quiz)

- Graph quadratics in standard form and factored form.
- Write quadratic equations in factored form from a graph or description.

Section 3: Vertex Form (4 Lessons + Assessment)

- Use key features to graph quadratics in vertex form.
- Write quadratic functions in factored form or vertex form.

Common Core State Standards

HSA.SSE.A.1.A, HSA.SSE.A.1.B, HSF.BF.A.1, HSF.BF.A.1.A, HSF.BF.B.3, HSF.IF.A.2, HSF.IF.B.4, HSF.IF.B.5, HSF.IF.C.7, HSF.IF.C.7.A, HSF.IF.C.8, HSF.IF.C.9, HSF.LE.A.1, HSF.LE.A.3

Vocabulary

- concave down
- concave up
- factored form
- line of symmetry
- parabola
- quadratic
- second difference
- standard form
- translation
- vertex
- vertex form
- vertical stretch

Unit 8. Quadratic Equations

Section 1: Multiplying and Factoring *(6 Lessons + Quiz)*

- Convert quadratic expressions between factored and standard form by multiplying and factoring.
- Use factoring and the zero-product property to solve equations and determine the zeros of quadratic functions.

Section 2: Solving Equations and Completing the Square *(4 Lessons)*

- Solve quadratic equations with no solutions, one solution, and two solutions using reasoning, graphs, and completing the square.
- Complete the square in order to reveal the vertex of a quadratic function.

Section 3: The Quadratic Formula and More *(4 Lessons + Assessment)*

- Derive the quadratic formula and use it to solve quadratic equations.
- Explore the sums and products of rational and irrational numbers.
- Solve systems of quadratic and linear equations.

Common Core State Standards

HSA.CED.A.1, HSA.REI.B.4, HSA.REI.B.4.A, HSA.REI.B.4.B, HSA.REI.C.7, HSA.REI.D.10, HSA.SSE.A.2, HSA.SSE.B.3, HSA.SSE.B.3.A, HSA.SSE.B.3.B, HSF.IF.C.8.A, HSN.RN.B.3

Vocabulary

- completing the square
- factored form
- irrational number
- perfect square
- plus/minus symbol
- quadratic formula
- rational number
- square root
- standard form
- zero-product property
- zeros