

Algebra 1, Semester A

Course Overview

Algebra 1, Semester A, is a single-semester course designed to build, develop, and periodically assess your subject-matter knowledge while strengthening your mathematical skills. Linear relationships are a main focus of this course. You'll graph, create, and solve linear equations and use function notation to describe linear relationships. You will also study linear transformations and represent linear data using scatter plots and mathematical models. You will write and solve systems of linear equations and inequalities. At the end of this course, you'll represent, compare, and analyze data sets in a variety of contexts.

Course Goals

By the end of this course, you will be able to do the following:

- Solve linear equations and inequalities in one variable.
- Use function notation to describe relationships between quantities, and interpret function notation to solve problems.
- Interpret and create graphs of linear relationships.
- Write one-variable and two-variable linear equations and use them to solve problems.
- Describe transformations defined by changes in the slope or the y -intercept of linear functions.
- Represent data with scatter plots, and use mathematical models to solve problems.
- Write systems of equations, and solve them using algebraic and graphical methods.
- Represent data with dot plots, box plots, and histograms.
- Analyze, interpret, and justify conclusions from a set of data.

Math Skills

Before beginning this course, you should be able to do the following:

- Solve problems involving operations with real numbers.
- Understand linear relationships through past work with ratios, proportions, and rates.
- Collect, analyze, and display data to solve problems.

General Skills

To participate in this course, you should be able to do the following:

- Communicate through email.

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Student Orientation, found at the beginning of this course.

Credit Value

Algebra 1, Semester A, is a 0.5-credit course.

Course Materials

- notebook
- computer with internet connection and speakers or headphones
- graphing calculator

Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: The Real Number System

Summary

This unit is designed to provide you with the skills to use linear expressions and equations to describe and solve problems. You'll practice adding and subtracting polynomials of degree 1 in real-world contexts. Then you'll solve linear equations in one variable, applying the distributive property where necessary. Next you will rewrite and simplify numerical radical expressions involving square roots. You'll also examine the results of adding or multiplying rational and irrational numbers. At the end of the unit, you'll apply what you've learned to explain mathematical ideas using precise language and symbols.

Day	Activity/Objective	Type
1 day: 1	Syllabus and Student Orientation <i>Review the Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation

Day	Activity/Objective	Type
2 days: 2–3	Expressions <i>Use expressions to model and solve problems.</i>	Lesson
2 days: 4–5	Linear Equations <i>Solve one-step and two-step linear equations in one variable.</i>	Lesson
2 days: 6–7	Radical Expressions <i>Rewrite numerical radical expressions involving square roots.</i>	Lesson
2 days: 8–9	Relationships Between Real Numbers <i>Explain the result of adding or multiplying rational and irrational numbers.</i>	Course Activity
3 days: 10–12	Unit Activity and Discussion—Unit 1	Unit Activity/ Discussion
1 day: 13	Posttest—Unit 1	Assessment

Unit 2: Linear Equations

Summary

In this unit, you'll develop the skills necessary to solve linear equations in real-world and mathematical contexts. You'll solve linear equations in one variable using multiple steps and the distributive property. You'll solve linear equations and formulas that model real-world relationships. At the end of the unit, you'll extend your understanding of linear relationships to linear inequalities and graph the solution sets of linear inequalities.

Day	Activity/Objective	Type
2 days: 14–15	Solving Linear Equations <i>Solve multistep linear equations in one variable.</i>	Lesson
2 days: 16–17	Solving Advanced Linear Equations <i>Solve multistep linear equations in one variable by applying the distributive property.</i>	Lesson
2 days: 18–19	Solving Literal Equations <i>Solve literal equations and formulas for a specified variable.</i>	Lesson
3 days: 20–22	Solving Linear Inequalities <i>Solve multistep linear inequalities in one variable and graph the solution set.</i>	Lesson

Day	Activity/Objective	Type
1 day: 23	Unit Discussion—Unit 2	Discussion
1 day: 24	Posttest—Unit 2	Assessment

Unit 3: Functions

Summary

In this unit, you'll become familiar with how functions can describe relationships. You'll identify variables in real-world situations and use graphs to model the relationships. You will decide whether relationships represented verbally, tabularly, graphically, or symbolically define a function. You'll also use function notation to describe relationships between quantities and evaluate functions expressed in function notation when given one or more elements in their domains. You will write an expression for the inverse of an equation and solve an equation for a simple function that has an inverse. Finally, you'll apply what you've learned to describe relationships between quantities with function notation and interpret function notation accurately to solve problems.

Day	Activity/Objective	Type
2 days: 25–26	Graphing Relations <i>Identify variables in real-world situations and model the relationships graphically.</i>	Lesson
2 days: 27–28	Functions <i>Identify functions in multiple representations and relate the domains and ranges.</i>	Lesson
2 days: 29–30	Function Notation <i>Use function notation to describe relationships between quantities and interpret function notation accurately to solve problems.</i>	Lesson
3 days: 31–33	Inverse Functions <i>Determine inverses of functions.</i>	Lesson
3 days: 34–36	Unit Activity and Discussion—Unit 3	Unit Activity/ Discussion
1 day: 37	Posttest—Unit 3	Assessment

Unit 4: Linear Relationships

Summary

In this unit, you'll examine how linear functions, equations, and graphs describe the characteristics of linear relationships. You will determine the slope of a line and describe the slope of a linear equation graphically. You'll write linear functions and equations from different representations and identify key features of linear functions and equations. You will also describe the effects on the graph of the function $f(x) = x$ when $f(x)$ undergoes a variety of transformations. In the activity that ends this unit, you'll write linear equations in two variables to represent real-world problems and compare their key features.

Day	Activity/Objective	Type
2 days: 38–39	Slope and Graphing <i>Determine the slope of a line and graph a linear equation in two variables.</i>	Lesson
3 days: 40–42	Writing Linear Functions and Equations <i>Write linear functions and equations in two variables and graph them to display the relationship.</i>	Lesson
3 days: 43–45	Linear Function Transformations <i>Determine the effects of transforming the linear parent function and identify key features of linear functions.</i>	Lesson
3 days: 46–48	Unit Activity and Discussion—Unit 4	Unit Activity/ Discussion
1 day: 49	Posttest—Unit 4	Assessment

Unit 5: Special Linear Relationships

Summary

In this unit, you will extend your knowledge of linear relationships to special mathematical cases, real-world situations, data analyses, and linear inequalities. You'll begin by writing linear equations given specific information about a line, such as a point along the line and the equation of a line that runs perpendicular to it. You will create different representations of direct variation situations. Then you'll represent real-world data using scatter plots and the equation of the line of best fit. You will compare and contrast correlation and causation in real-world problems. You'll also evaluate the reasonableness of mathematical models and use them to make predictions in real-world contexts. You'll write and graph linear inequalities given different representations. At the end of the unit, you'll draw a scatter plot and the line of best fit to analyze a situation.

Day	Activity/Objective	Type
2 days: 50–51	Special Lines <i>Write equations of parallel, perpendicular, vertical, and horizontal lines.</i>	Lesson
2 days: 52–53	Direct Variation <i>Represent direct variation situations with graphs and equations.</i>	Lesson
2 days: 54–55	Representing Data <i>Represent data using scatter plots and the equation of the line of best fit.</i>	Lesson
2 days: 56–57	Using Models from Data <i>Evaluate the reasonableness of mathematical models and use them to make predictions.</i>	Lesson
2 days: 58–59	Linear Inequalities <i>Write and graph linear inequalities in two variables.</i>	Lesson
3 days: 60–62	Unit Activity and Discussion—Unit 5	Unit Activity/ Discussion
1 day: 63	Posttest—Unit 5	Assessment

Unit 6: Systems of Linear Equations and Inequalities

Summary

In this unit, you'll learn that many situations can be described through systems of linear equations and inequalities. You'll write and graph systems of two linear equations given a verbal description. You'll also solve systems of linear equations algebraically using substitution and elimination. You'll apply what you've learned to linear inequalities by graphing the solution set of systems of two linear inequalities in two variables on the coordinate plane. Finally, you'll write and solve a system of linear equations that represents real-world data.

Day	Activity/Objective	Type
2 days: 64–65	Systems of Linear Equations <i>Write and graph systems of linear equations to determine the solutions.</i>	Lesson

Day	Activity/Objective	Type
2 days: 66–67	Writing and Solving Systems Using Substitution <i>Write and solve systems of linear equations algebraically using substitution.</i>	Lesson
2 days: 68–69	Writing and Solving Systems Using Elimination <i>Write and solve systems of linear equations algebraically using elimination.</i>	Lesson
2 days: 70–71	Systems of Inequalities <i>Represent the solution of a system of two linear inequalities graphically and determine solutions.</i>	Lesson
3 days: 72–74	Unit Activity and Discussion—Unit 6	Unit Activity/ Discussion
1 day: 75	Posttest—Unit 6	Assessment

Unit 7: Descriptive Statistics

Summary

This unit introduces you to different ways of representing, analyzing, and comparing data sets. You'll learn how to represent data with dot plots, box plots, and histograms. You'll examine how shape, center, and spread describe a data set and allow you to compare multiple data sets. You will also summarize categorical data for two categories in two-way frequency tables and interpret relative frequencies in the context of the data. Finally, you'll analyze, interpret, and justify conclusions from a set of data.

Day	Activity/Objective	Type
4 days: 76–79	Visual Representations of Data <i>Represent data with dot plots, box plots, and histograms.</i>	Lesson
3 days: 80–82	Comparing Data Sets <i>Compare multiple data sets using statistics and interpret differences in shape, center, and spread.</i>	Lesson
2 days: 83–84	Two-Way Frequency Tables <i>Construct two-way frequency tables for categorical data and interpret measures and associations within the data, including relative frequencies.</i>	Lesson
3 days: 85–87	Unit Activity and Discussion—Unit 7	Unit Activity/ Discussion

Day	Activity/Objective	Type
1 day: 88	Posttest—Unit 7	Assessment
1 day: 89	End-of-Semester Review	
1 day: 90	End-of-Semester Test	Assessment