

Algebra 1, Semester B

Course Overview

Algebra 1, Semester B, is a single-semester course designed to cultivate and periodically assess your subject-matter knowledge while strengthening your mathematical skills. This course includes lessons that focus on the relationship of linear, exponential, and quadratic functions. You will create, graph, and solve quadratic equations and inequalities in one or two variables. You will also add, subtract, and multiply linear and quadratic polynomials. At the end of this course, you'll interpret, analyze, and build functions.

Course Goals

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

- Compare data sets using statistics, and interpret differences in shape, center, and spread.
- Represent data with scatter plots, fit and analyze functions that model the plots, and use the models to solve problems.
- Add, subtract, and multiply linear and quadratic polynomials.
- Create quadratic equations and inequalities in one and two variables, and use them to solve problems.
- Solve systems of linear and quadratic equations using algebraic and graphical methods.
- Graph quadratic, absolute value, piecewise, and step functions, and illustrate key features of their graphs.
- Compare and translate representations of linear, exponential, and quadratic functions.

Math Skills

Middle school mathematics is a prerequisite for Algebra 1B. 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.
- Know the meaning of a line and make predictions from linear relationships.
- Collect, analyze, and display data to solve problems.

General Skills

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

- Understand the basics of spreadsheet software, such as Microsoft Excel or Google Spreadsheets, but having prior computing experience is not necessary.
- Communicate through email and participate in discussion boards.

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

Credit Value

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

Course Materials

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Excel or equivalent

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: Descriptive Statistics

Summary

In this unit, you will represent data with dot plots, box plots, histograms, and scatter plots, and solve problems. You'll use these representations to depict data sets, derive statistics from the datasets, and interpret those statistics. You'll create functions using scatterplots as a guide. Finally, you'll interpret linear models derived from scatterplots and describe the difference between correlation and causation.

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
3 days: 2–4	Visual Representations of Data <i>Represent data with dot plots, box plots, and histograms.</i>	Lesson
3 days: 5–7	Comparing Data Sets <i>Compare multiple data sets using statistics and interpret differences in shape, center, and spread.</i>	Lesson
3 days: 8–10	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
4 days: 11–14	Representing Data with Scatter Plots and Functions <i>Represent data with scatter plots, fit and analyze functions that model the plots, and use the models to solve problems.</i>	Lesson
3 days: 15–17	Interpreting Linear Models <i>Interpret the characteristics of a linear model in the context of the data and explain the difference between correlation and causation.</i>	Lesson

Day	Activity/Objective	Type
3 days: 18–20	Unit Activity and Discussion—Unit 1	Unit Activity/ Discussion
1 day: 21	Posttest—Unit 1	Assessment

Unit 2: Manipulating and Interpreting Expressions

Summary

In this unit, you will study ways to rewrite quadratic expressions and examine the properties of arithmetic operations on rational and irrational numbers as well as quadratic polynomials. You'll use the structure and various forms of quadratic and exponential expressions to interpret their meaning in context.

Day	Activity/Objective	Type
3 days: 22–24	Rewriting Expressions <i>Use factoring techniques and distribution to rewrite quadratic expressions.</i>	Lesson
3 days: 25–27	Relationships Between Real Numbers <i>Explain the result of adding or multiplying rational and irrational numbers.</i>	Course Activity
3 days: 28–30	Arithmetic with Polynomials <i>Add, subtract, and multiply linear and quadratic polynomials.</i>	Lesson
3 days: 31–33	Interpreting and Using Quadratic Expressions <i>Use the structure and various forms of quadratic expressions to interpret what the expression represents in context.</i>	Lesson
3 days: 34–36	Interpreting and Using Exponential Expressions <i>Use the structure and various forms of exponential expressions to interpret what an expression represents in context.</i>	Lesson

4 days: 37–40	Unit Activity and Discussion—Unit 2	Unit Activity/ Discussion
1 day: 41	Posttest—Unit 2	Assessment

Unit 3: Quadratic Equations and Inequalities

Summary

In this unit, you will create one- and two-variable quadratic equations and inequalities and use them to solve problems. You'll solve quadratic equations by inspection, taking square roots, and factoring, and you'll approximate solutions by graphing. In addition, you will complete the square and use the quadratic formula to solve the equations. At the end of this unit, you'll explore how to solve systems of linear and quadratic equations using algebraic and graphical methods.

Day	Activity/Objective	Type
3 days: 42–44	Creating One-Variable Quadratic Equations and Inequalities <i>Create quadratic equations and inequalities in one variable and use them to solve problems.</i>	Lesson
3 days: 45–47	Creating Two-Variable Quadratic Equations <i>Create quadratic equations in two variables and graph them to display the relationship.</i>	Lesson
4 days: 48–51	Solving Quadratic Equations, Part 1 <i>Solve quadratic equations in one variable by inspection, taking square roots, factoring, and graphing.</i>	Lesson
4 days: 52–55	Solving Quadratic Equations, Part 2 <i>Use completing the square and the quadratic formula to solve quadratic equations and investigate the types of solutions that exist.</i>	Lesson

4 days: 56–59	Solving Systems of Linear and Quadratic Equations <i>Solve systems of linear and quadratic equations using algebraic and graphical methods.</i>	Lesson
4 days: 60–63	Unit Activity and Discussion—Unit 3	Unit Activity/ Discussion
1 day: 64	Posttest—Unit 3	Assessment

Unit 4: Interpreting, Analyzing, and Building Functions

Summary

In unit 4, you'll learn to interpret quadratic functions and graphs. You will then interpret function characteristics and build quadratic functions. Finally, you'll determine inverse of functions and simplify the expressions of linear, exponential, and quadratic functions.

Day	Activity/Objective	Type
3 days: 65–67	Interpreting Quadratic Functions and Graphs <i>Calculate and interpret key features of a quadratic relationship between two quantities and use them to sketch a graph.</i>	Lesson
4 days: 68–71	Graphing Nonlinear Functions and Their Key Features <i>Graph quadratic, absolute value, piecewise, and step functions and illustrate key features of the graphs.</i>	Lesson
4 days: 72–75	Rewriting and Interpreting Functions <i>Use quadratic and exponential functions written in various forms to identify and interpret function characteristics in context.</i>	Lesson
3 days: 76–78	Quadratic Relationships Between Quantities <i>Build quadratic functions to model relationships in context.</i>	Lesson
3 days: 79–81	Inverse Functions and Function Transformations <i>Identify the effects of transformations on graphs of quadratic and absolute value functions and determine inverses of functions.</i>	Lesson

Day	Activity/Objective	Type
3 days: 82–84	Comparing Functions <i>Compare and translate representations of linear, exponential, and quadratic functions.</i>	Lesson
3 days: 85–87	Unit Activity and Discussion—Unit 4	Unit Activity/ Discussion
1 day: 88	Posttest—Unit 4	Assessment
1 day: 89	Semester Review	
1 day: 90	End-of-Semester Exam	Assessment