

## Algebra 2, Semester B

### Course Overview

Algebra 2, 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 function transformations on the coordinate plane, the inverse of functions, and the properties of functions. You'll learn to create and graph trigonometric functions and identify their key features. Toward the end of this course, you will build your understanding of the key concepts of probability and statistics.

### Course Goals

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

- Transform the graphs of functions in the coordinate plane.
- Find the inverses of simple rational, radical, and exponential functions.
- Compare and translate among representations of nonlinear functions.
- Connect the ideas of radian measure and arc length to the trigonometric origins of the unit circle while also proving and applying the Pythagorean identity
- Graph and identify the key features of trigonometric functions and their transformations.
- Interpret the key features of trigonometric functions and use those features to model periodic, real-world phenomena.
- Compare statistical models with experimental and observational data.
- Construct and analyze fair decisions and strategies based on probability concepts and methods.
- Fit data to a normal distribution and estimate population percentages and area using the normal distribution curve.
- Evaluate reports based on real-world data for accuracy, bias, and validity.

## Math Skills

Algebra 2, Semester A, is a prerequisite for Algebra 2, Semester B. Before beginning this course, you should be able to do the following:

- Solve problems involving arithmetic operations with real numbers.
- Know the properties of expressions and equations, and use those properties to solve problems.
- 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 2, 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: Comparing and Building Functions

### Summary

In this unit, you will learn to transform the graphs of functions in the coordinate plane. You will study how to find the inverses of simple rational, radical, and exponential functions. You will explore the various properties of functions. At the end of the unit, you will learn to combine functions to demonstrate the relationship between quantities in context.

Day	Activity/Objective	Type
1 day: 1	<b>Syllabus and Student Orientation</b> <i>Review the Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
4 days: 2–5	<b>Function Transformations</b> <i>Transform the graphs of functions in the coordinate plane.</i>	Lesson
4 days: 6–9	<b>Inverse Functions</b> <i>Find inverses of simple rational, radical, and exponential functions.</i>	Lesson
5 days: 10–14	<b>Revealing and Comparing Properties of Functions</b> <i>Compare and translate among representations of nonlinear functions.</i>	Lesson
4 days: 15–18	<b>Combining Functions</b> <i>Build functions to model a relationship between quantities in context.</i>	Lesson
4 days: 19–22	<b>Unit Activity and Discussion—Unit 1</b>	Unit Activity/ Discussion
1 day: 23	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: Trigonometric Functions

### Summary

You will begin this unit by exploring the concept of the unit circle. You will also learn to construct graphs of trigonometric functions and their transformations. You will learn to identify and interpret the key features of trigonometric functions in context. In the course activity, you will learn to model periodic, real-world phenomena with specific trigonometric functions.

Day	Activity/Objective	Type
4 days: 24–27	<b>The Unit Circle</b> <i>Connect the ideas of radian measure and arc length to the trigonometric origins of the unit circle while also proving and applying the Pythagorean identity.</i>	Lesson
4 days: 28–31	<b>Graphing Trigonometric Functions</b> <i>Graph and identify key features of trigonometric functions and their transformations.</i>	Lesson
4 days: 32–35	<b>Interpreting Trigonometric Functions</b> <i>Identify and interpret key features of trigonometric functions in context.</i>	Lesson
5 days: 36–40	<b>Modeling Periodic Phenomena with Trigonometric Functions</b> <i>Model periodic, real-world phenomena with specific trigonometric functions and describe the key features.</i>	Course Activity
4 days: 41–44	<b>Unit Activity and Discussion—Unit 2</b>	Unit Activity/ Discussion
1 day: 45	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: Data and Random Sampling

### Summary

In this unit, you will identify and explain the purpose and structure of statistics and random sampling and make inferences from sample results. You will compare statistical models with experimental and observational data. You will also learn to identify and explain the purposes of randomized sample surveys, experiments, and observational studies.

Day	Activity/Objective	Type
4 days: 46–49	<b>Understanding Statistics</b> <i>Identify and explain the purpose and structure of statistics and random sampling and make inferences from sample results.</i>	Lesson
4 days: 50–53	<b>Statistical Models</b> <i>Compare statistical models with experimental and observational data.</i>	Lesson
4 days: 54–57	<b>Surveys, Experiments, and Studies</b> <i>Identify and explain the purposes of randomized sample surveys, experiments, and observational studies.</i>	Lesson
4 days: 58–61	<b>Unit Activity and Discussion—Unit 3</b>	Unit Activity/ Discussion
1 day: 62	<b>Posttest—Unit 3</b>	Assessment

## Unit 4: Inferences and Decision Making from Data

### Summary

In this unit, you will learn to apply probability concepts and methods. You will learn to fit data to a normal distribution and estimate population percentages and area using the normal distribution curve. You will study how to estimate and compute population means, proportions, and margins of error through random sampling. In the course activity, you will compare treatments in experiments and assess when differences between parameters are significant. You will also evaluate reports based on real-world data for accuracy, bias, and validity.

Day	Activity/Objective	Type
4 days: 63–66	<b>Evaluating Outcomes with Probability</b> <i>Construct and analyze fair decisions and strategies based on probability concepts and methods.</i>	Lesson
4 days: 67–70	<b>Data and the Normal Distribution</b> <i>Fit data to a normal distribution and estimate population percentages and area using the normal distribution curve.</i>	Lesson
5 days: 71–75	<b>Estimations from Sampling</b> <i>Estimate and compute population means, proportions, and margins of error through random sampling.</i>	Lesson

<b>Day</b>	<b>Activity/Objective</b>	<b>Type</b>
4 days: 76–79	<b>Treatments and Significance</b> <i>Compare treatments in experiments and assess when differences between parameters are significant.</i>	Course Activity
4 days: 81–83	<b>Evaluating Reports</b> <i>Evaluate reports based on real-world data for accuracy, bias, and validity.</i>	Lesson
4 days: 84–87	<b>Unit Activity and Discussion—Unit 4</b>	Unit Activity/ Discussion
1 day: 88	<b>Posttest—Unit 4</b>	Assessment
1 day: 89	<b>Semester Review</b>	
1 day: 90	<b>End-of-Semester Exam</b>	Assessment