

# Syllabus

## Algebra 1B

### Course Overview

Algebra is a branch of mathematics that uses symbols in place of numbers to describe and generalize relationships. In Algebra 1A you worked with expressions containing monomials and binomials. In Algebra 1B you'll extend these ideas to factor and perform operations on polynomial expressions containing more than two terms. Many of the equations that you solved in Algebra 1A were linear, or proportional. In Algebra 1B you'll solve quadratic equations. In quadratic equations, the highest power on a variable is 2. You'll study the parabola, a conic section defined by a quadratic equation. You'll build your graphing skills by analyzing and plotting different types of functions: absolute value functions, piecewise functions, exponential functions, and logarithmic functions. Finally, you'll study statistics as you interpret the shapes of data distributions and delve into correlation and causation.

### Course Goals

By the end of this course, you will:

- Classify polynomials and perform operations with polynomials.
- Factor polynomials, including binomials and trinomials.
- Rewrite formulas to solve word problems.
- Solve quadratic equations by completing squares, factoring, or using the quadratic formula.
- Solve quadratic inequalities.
- Find the features of a parabola, including its  $x$ - and  $y$ -intercepts and vertex.
- Graph greatest integer functions, piecewise functions, and absolute value functions.
- Identify graphs of different types of functions.
- Use the properties of exponential and logarithmic functions to solve them.
- Identify the domain of a function in a given context.
- Compare growth of different types of functions.
- Use different types of data plots to represent data.
- Understand and compare shape, center, and spread of data sets.
- Use two-way tables to represent data sets and interpret their relative frequencies.
- Interpret the slope and intercept of a linear fit of a data set.
- Represent quantitative data using a scatter plot and fit a function to the data.
- Interpret the correlation coefficient of a data set.
- Distinguish between correlation and causation.

## General Skills

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

- Complete basic operations with word-processing software, such as Microsoft Word and Google Docs.
- Perform online research using various search engines and library databases.
- 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 Plato Student Orientation document, found at the beginning of this course.*

## Credit Value

Algebra 1B is a 0.5-credit course.

## Course Materials

- Notebook
- Computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft Excel or equivalent

## Course Pacing Guide

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

## Unit 1: Polynomials

### Summary

In this unit, you will explore how to classify different types of polynomial expressions and how to perform addition, subtraction, multiplication, and division with polynomial expressions.

Day	Activity / Plato Objective	Type
1 day: 1	<b>Syllabus and Plato Student Orientation</b> <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
1 day: 2	<b>Classifying Polynomials</b> <i>Classify polynomials.</i>	Lesson
1 day: 3	<b>Polynomial Sum</b> <i>Find the sum of two polynomials.</i>	Lesson

1 day: 4	<b>Polynomial Difference</b> <i>Find the difference of two polynomials.</i>	Lesson
1 day: 5	<b>Product of a Monomial and Polynomial</b> <i>Find the product of monomials and polynomials.</i>	Lesson
1 day: 6	<b>Product of Polynomials</b> <i>Find the product of polynomials.</i>	Lesson
1 day: 7	<b>Quotient of a Monomial and Polynomial</b> <i>Divide a polynomial by a monomial.</i>	Lesson
1 day: 8	<b>Quotient of a Binomial and Polynomial</b> <i>Divide a polynomial by a binomial.</i>	Lesson
3 days: 9–11	<b>Unit Activity/Threaded Discussion—Unit 1</b>	Unit Activity
1 day: 12	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: Factoring

### Summary

In this unit, you will factor monomials, binomials, and trinomials.

Day	Activity / Plato Objective	Type
1 day: 13	<b>Greatest Common Factors of Monomials</b> <i>Find the greatest common factor of two or more monomials.</i>	Lesson
1 day: 14	<b>Monomial Factors of Polynomials</b> <i>Factor a polynomial that has monomial factors.</i>	Lesson
1 day: 15	<b>Binomial Factors of Polynomials, Part 1</b> <i>Use the distributive property to write an expression as the product of two sums or differences.</i>	Lesson
1 day: 16	<b>Binomial Factors of Polynomials, Part 2</b> <i>Group terms to write an expression as the product of two sums or differences.</i>	Lesson
1 day: 17	<b>Factoring the Difference of Two Squares</b> <i>Factor a difference of squares.</i>	Lesson
1 day: 18	<b>Factoring Perfect Square Trinomials</b> <i>Factor a perfect square trinomial.</i>	Lesson
1 day: 19	<b>Factoring Trinomials, Part 1</b> <i>Factor trinomials of the form <math>x^2 + bx + c</math>.</i>	Lesson
1 day: 20	<b>Factoring Trinomials, Part 2</b> <i>Factor trinomials of the form <math>x^2 + bx + c</math>.</i>	Lesson

3 days: 21–23	<b>Unit Activity/Threaded Discussion—Unit 2</b>	Unit Activity
1 day: 24	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: Single-Variable Quadratic Equations

### Summary

In this unit, you will solve quadratic equations in one variable by using factoring and by using the quadratic formula. You will also use quadratic equations to represent and solve a word problem.

Day	Activity / Plato Objective	Type
1 day: 25	<b>Adapting and Using Formulas</b> <i>Rewrite formulas to solve problems with variables.</i>	Lesson
2 days: 26–27	<b>Special Quadratic Equations, Part 1</b> <i>Solve quadratic equations in which both sides are perfect squares.</i>	Lesson
2 days: 28–29	<b>Special Quadratic Equations, Part 2</b> <i>Solve certain types of quadratic equations by factoring.</i>	Lesson
2 days: 30–31	<b>Using Quadratic Equations to Solve Problems</b> <i>Use quadratic equations in one variable to solve practical problems.</i>	Lesson
2 days: 32–33	<b>Solving Simple Quadratic Equations</b> <i>Find the solution for quadratic equations of the form <math>x^2 + bx + c = 0</math>.</i>	Lesson
1 day: 34	<b>Solving Quadratic Equations by Factoring, Part 1</b> <i>Find the solution set of quadratic equations that factor as the difference of two squares.</i>	Lesson
1 day: 35	<b>Solving Quadratic Equations by Factoring, Part 2</b> <i>Find the solution set of a quadratic equation that is the perfect square of a binomial.</i>	Lesson
1 day: 36	<b>Solving Quadratic Equations by Factoring, Part 3</b> <i>Find the solution set of quadratic equations by factoring.</i>	Lesson
2 days: 37–38	<b>Quadratic Formula</b> <i>Use the quadratic formula to find a solution set for a quadratic equation.</i>	Lesson
2 days: 39–40	<b>Review: Equations and Inequalities</b> <i>Review how to solve equations and inequalities.</i>	Lesson
3 days: 41–43	<b>Unit Activity/Threaded Discussion—Unit 3</b>	Unit Activity

1 day: 44	<b>Posttest—Unit 3</b>	Assessment
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## Unit 4: Graphing Functions

### Summary

In this unit, you will solve systems of linear and quadratic equations, both algebraically and graphically. You will explore various features of the graph of a quadratic equation. You will also graph piecewise and absolute value functions.

Day	Activity / Plato Objective	Type
2 days: 45–46	<b>Solving Linear-Quadratic Systems of Equations</b> <i>Solve linear-quadratic equations algebraically and graphically.</i>	Lesson
1 day: 47	<b>Parabola and Its Intercepts</b> <i>Find the x- and y-intercepts of a parabola.</i>	Lesson
1 day: 48	<b>Parabola and Its Vertex</b> <i>Find the vertex of a parabola.</i>	Lesson
1 day: 49	<b>Parabola and Its Coefficients</b> <i>Learn how changing the coefficients of a parabola affects its position and shape.</i>	Lesson
2 days: 50–51	<b>Graphing Piecewise Functions</b> <i>Graph greatest integer and general piecewise functions.</i>	Lesson
2 days: 52–53	<b>Graphing Absolute Value Functions</b> <i>Graph absolute value functions.</i>	Lesson
3 days: 54–56	<b>Unit Activity/Threaded Discussion—Unit 4</b>	Unit Activity
1 day: 57	<b>Posttest—Unit 4</b>	Assessment

## Unit 5: Properties of Functions

### Summary

In this unit, you will study the properties of different types of functions. You will solve problems using linear and quadratic functions. You will explore the properties of logarithmic and exponential functions. Finally, you will analyze and compare the features of different types of functions.

Day	Activity / Plato Objective	Type
2 days: 58–59	<b>Solving Problems with Linear Functions</b> <i>Describe real-world situations as linear functions.</i>	Lesson

2 days: 60–61	<b>Solving Problems with Quadratic Functions</b> <i>Describe real-world situations as quadratic functions.</i>	Lesson
1 day: 62	<b>Properties of Exponential Functions</b> <i>Study the properties of exponential functions.</i>	Lesson
1 day: 63	<b>Properties of Logarithmic Functions</b> <i>Study the properties of logarithmic functions.</i>	Lesson
1 day: 64	<b>Recognizing Graphs of Types of Functions</b> <i>Identify exponential and logarithmic functions by looking at graphs of these functions.</i>	Lesson
2 days: 65–66	<b>Function Models and Features</b> <i>Relate a domain to a function written in context and compare the growth of different types of functions.</i>	Lesson
3 days: 67–69	<b>Unit Activity/Threaded Discussion—Unit 5</b>	Unit Activity
1 day: 70	<b>Posttest—Unit 5</b>	Assessment

## Unit 6: Inferences and Conclusions from Data

### Summary

In this unit, you will represent and analyze categorical and quantitative data using data plots. You will interpret various features of a data plot, such as its center, spread, slope, intercept, and correlation coefficient.

Day	Activity / Plato Objective	Type
2 days: 71–72	<b>Data Plots</b> <i>Represent data with plots on the real number line using dot plots, histograms, and box plots.</i>	Lesson
2 days: 73–74	<b>Showing Data Center and Spread</b> <i>Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.</i>	Lesson
2 days: 75–76	<b>Interpreting the Shape of Data Distributions</b> <i>Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</i>	Lesson
2 days: 77–78	<b>Relating Categorical Data</b> <i>Summarize data for two categories in two-way frequency tables and interpret their relative frequencies in the context of the data.</i>	Lesson
1 day: 79	<b>Interpreting Data as a Line</b> <i>Interpret the slope and the intercept of a linear model in the context of the data.</i>	Lesson

2 days: 80–81	<b>Relating Quantitative Data</b> <i>Represent data of two quantitative variables using a scatter plot, describe and fit a function to the data, and solve problems in the context of the data.</i>	Lesson
1 day: 82	<b>Making and Interpreting Correlations</b> <i>Use technology to compute and interpret the correlation coefficient of a linear fit.</i>	Lesson
2 days: 83–84	<b>Correlation Versus Causation</b> <i>Distinguish between correlation and causation.</i>	Lesson
3 days: 85–87	<b>Unit Activity/Threaded Discussion—Unit 6</b>	Unit Activity
1 day: 88	<b>Posttest—Unit 6</b>	Assessment
1 day: 89	<b>Semester Review</b>	
1 day: 90	<b>End-of-Semester Test</b>	Assessment