Algebra 2A

Course Overview

Algebra is a branch of mathematics that uses symbols in place of numbers to describe and generalize relationships. You have worked with rational numbers in prior courses. In Algebra 2A, you will perform operations and identify restrictions on rational expressions (expressions that contain rational numbers as coefficients). You will also analyze and graph polynomial functions. Algebra 2A will introduce you to a new concept, complex numbers. Complex numbers rely on an imaginary unit, i, where $i^2 = -1$. You will plot complex numbers in the complex number plane and solve quadratic equations in the complex number system.

Course Goals

By the end of this course, you will:

- Evaluate and simplify expressions, including polynomial and rational expressions.
- Find the least common denominator of rational expressions.
- Rewrite rational expressions.
- Divide polynomials using synthetic division.
- Plot complex numbers in the complex number plane.
- Perform addition, subtraction, multiplication, and division with complex numbers.
- Solve quadratic equations in the complex number system.
- Solve equations involving radicals and power functions.
- Examine polynomial functions and their graphs.
- Derive and use a formula to predict the outcome of a geometric series.

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 2A 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: Polynomial, Rational, and Radical Relationships

Summary

In this unit, you will evaluate and simplify rational and polynomial expressions. You will study polynomial identities and the Binomial Theorem, and you will find the sum, difference, and product of two rational expressions.

Day	Activity / *Plato Objective*	Type
1 day: 1	**Syllabus and Plato Student Orientation** *Review the Plato Student Orientation and Course Syllabus at the beginning of this course.*	Course Orientation
3 days: 2–4	**Evaluating Rational Expressions** *Evaluate a rational expression for a given set of values.*	Lesson
3 days: 5–7	**Restrictions on Rational Expressions** *Identify nonpermissible values for the variables in the rational expression.*	Lesson
3 days: 8–10	**Equivalent Forms of Rational Expressions** *Identify rational expressions that are equivalent.*	Lesson
3 days: 11–13	**Simplifying Rational Expressions** *Simplify rational expressions.*	Lesson
3 days: 14–16	**Simplifying Polynomial Expressions** *Simplify polynomial expressions.*	Lesson

	Polynomial Identities and the Binomial Theorem	Lesson
3 days: 17–19	**Polynomial Identities and the Binomial Theorem** *Prove and use polynomial identities and the Binomial Theorem.*	Lesson
3 days: 20–22	**Sum of Rational Expressions, Part 1** *Find the sum of rational expressions with like denominators.*	Lesson
3 days: 23–25	**Difference of Rational Expressions, Part 1** *Subtract rational expressions with like denominators.*	Lesson
3 days: 26–28	**Product of Rational Expressions** *Find the product of two rational expressions.*	Lesson
3 days: 29–31	**Unit Activity/Threaded Discussion—Unit 1**	Unit Activity
1 day: 32	**Posttest—Unit 1**	Assessment

Unit 2: Advanced Polynomial, Rational, and Radical Relationships

Summary
In this unit, you will study advanced concepts relating to rational and polynomial expressions. You will explore complex examples of operations with rational expressions. You will find the least common denominator of two rational expressions and simplify algebraic expressions by grouping like terms. At the end of the unit, you will factor algebraic expressions and divide polynomials using synthetic division.

Day	Activity / *Plato Objective*	Type
2 days: 33–34	**Quotient of Rational Expressions** *Find the quotient of two rational expressions.*	Lesson
3 days: 35–37	**Common Denominators of Rational Expressions** *Find the least common denominator of two rational expressions.*	Lesson
2 days: 38–39	**Sum of Rational Expressions, Part 2** *Find the sum of two rational expressions with unlike denominators.*	Lesson
2 days: 40–41	**Difference of Rational Expressions, Part 2** *Find the difference of rational expressions with unlike denominators.*	Lesson
3 days: 42–44	**Simplifying Algebraic Expressions** *Simplify algebraic expressions by collecting like terms and following grouping symbols.*	Lesson

2 days: 45–46	**Review: Rational Expressions** *Review solving of rational expressions.*	Lesson
3 days: 47–49	**Rewriting Rational Expressions** *Rewrite rational expressions in different forms using multiple methods.*	Lesson
3 days: 50–52	**Factoring Algebraic Expressions** *Factor common algebraic expressions.*	Lesson
3 days: 53–55	**Dividing Polynomials Using Synthetic Division** *Divide polynomials using synthetic division.*	Lesson
3 days: 56–58	**Unit Activity/Threaded Discussion—Unit 2**	Unit Activity
1 day: 59	**Posttest—Unit 2**	Assessment

Unit 3: Complex Numbers

Summary

In this unit, you will plot complex numbers, perform operations on complex numbers, and solve quadratic equations in the complex number system. You will solve radical and power functions, examine graphs of polynomial functions, and calculate the rate of change of a function. You will also learn about geometric sums and their use in solving word problems.

Day	Activity / *Plato Objective*	Type
2 days: 60–61	**Plotting Complex Numbers in the Plane** *Plot complex numbers in the complex number plane.*	Lesson
3 days: 62–64	**Adding and Subtracting Complex Numbers** *Add and subtract complex numbers.*	Lesson
3 days: 65–67	**Multiplying and Dividing Complex Numbers** *Multiply and divide complex numbers.*	Lesson
3 days: 68–70	**Solving Quadratic Equations in the Complex Number System** *Solve quadratic equations with complex solutions.*	Lesson
3 days: 71–73	**Other Types of Equations** *Solve other types of equations, including those involving radicals and power functions.*	Lesson
3 days: 74–76	**Polynomial Functions** *Examine polynomial functions.*	Lesson
3 days: 77–79	**Graphing Polynomial Functions** *Examine graphs of polynomial functions.*	Lesson

2 days: 80–81	**Average Rate of Change** *Calculate and interpret the rate of change of functions presented in different formats.*	Lesson
3 days: 82–84	**Finite Geometric Sums** *Derive and use the formula for the sum of a finite geometric series.*	Lesson
3 days: 85–87	**Unit Activity/Threaded Discussion —Unit 3**	Unit Activity
1 day: 88	**Posttest—Unit 3**	Assessment
1 day: 89	**Semester Review**	
1 day: 90	**End-of-Semester Test**	Assessment