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## Algebra 2B

### Course Description

Algebra 2B is the second semester of a traditional high school Algebra 2 course. Algebra 2B continues the treatment of algebraic concepts through the study of rational, exponential, and logarithmic functions; sequences and series; conic sections; and data analysis. Emphasis is placed on real-life applications of algebra. A transformational approach to graphing all functions and relations is used with families of related graphs. Graphing calculators are an integral part of this course.

Learning is enhanced by the interactive components within each topic. Students can observe and listen as step-by-step examples of key concepts are presented on a virtual blackboard. Interactive geometry software provides students hands-on practice with these concepts. Additionally, self-check activities are built into each topic; quizzes are provided at the end of each lesson; and comprehensive tests are given at the end of each unit.

Reading and writing skills are incorporated throughout the course as students participate in discussion groups about mathematics and complete algebra application assignments. These activities help students to relate their learning to real-life experiences, require them to communicate their thoughts and findings, and enable them to explore other math-related websites.

This course will provide the skills necessary for the continuation of the study of mathematics and science in courses such as calculus, trigonometry, chemistry, and physics.

### Overview

#### Unit 1 – Rational Functions

- Lesson 1: Variations
- Lesson 2: Rational Expressions and Solving Rational Equations
- Lesson 3: Identifying and Graphing Rational Functions

#### Unit 2 – Exponential Functions and Equations

- Lesson 1: Graphing Exponential Functions
- Lesson 2: Solving Exponential Equations

#### Unit 3 – Sequences and Series

- Lesson 1: Sequences
- Lesson 2: Series

#### Unit 4 – Logarithms

- Lesson 1: Logarithmic Expressions
- Lesson 2: Properties of Logarithms and Logarithmic Equations
- Lesson 3: Graphing Logs

#### Unit 5 – Conics

- Lesson 1: Conic Section Introduction
- Lesson 2: Circles and Ellipses
- Lesson 3: Parabolas and Hyperbolas
- Lesson 4: Identifying Conics and Nonlinear Systems

#### Unit 6 – Data Analysis

- Lesson 1: Data Analysis

## Objectives

Students will develop the following skills:

- Work with direct and inverse variations.
- Perform operations with rational expressions.
- Simplify complex fractions using the least common multiple of the denominators.
- Graph and solve rational and exponential equations.
- Work with arithmetic and geometric sequences and means.
- Solve problems involving arithmetic and geometric series.
- Fund sums written in sigma notation and convert them to expanded form.
- Solve and graph logarithmic functions and equations.
- Visualize three-dimensional objects and spaces from different perspectives, and analyze their cross-sections.
- Explore the geometric construction of circles, ellipses, parabolas and hyperbolas and graph them.
- Identify conic sections and solve nonlinear systems.
- Apply the midpoint and distance formulas.
- Use a graphing calculator to calculate the mean, median, and mode of a set of data, as well as to find an equation of best fit for a data set.
- Create and interpret box plots.
- Use a regression curve to make predictions.
- Communicate mathematically by expressing ideas, analyzing situations, explaining procedures for correct computation, and describing results numerically and graphically.
- Use the Internet to gain useful information.
- Use discussion groups and e-mail to communicate with teacher and classmates and develop a sense of class membership.

## Activities and Assessments

- **Practice Sets and 16 Vocabulary Reviews** – Each lesson has numerous practice sets, along with a review of math vocabulary.
- **6 Online Discussion Group Activities** – At the end of each unit, students participate in a group discussion of a topic relevant to the material covered. The teacher evaluates the students' contributions to the discussion and provides grading and feedback.
- **6 Algebra Application Assignments** – At the end of each unit, students demonstrate their understanding of algebraic concepts by completing a computer-graded algebra application assignment.
- **16 Quizzes, 6 Evaluations, and 1 Final Exam** – Along with numerous self-check activities throughout the course, there is a quiz at the end of each of the 18 lessons in the course. There is also an evaluation at the end of each of the six units. At the conclusion of the course, students are given one opportunity to complete a comprehensive final exam. All of these assessments are computer-graded and provide students with instant feedback on their work.