

a-g Algebra 2 A & B

TRANSCRIPT TITLES/ TRANSCRIPT CODES:

a-g Algebra 2A 5E1002

a-g Algebra 2B 5E1007

COURSE DESCRIPTION

This Algebra 2 course builds on the basic algebraic concepts in relation to factoring polynomials, exponents, solving quadratic equations and inequalities, and graphing. The course will examine scientific notation, roots of quadratic equations, real numbers, logarithms, the graphing solution of simultaneous equations, inequalities, factoring, trigonometric functions, exponential equations, polynomials, and word problems. Students will investigate functions and graphing functions. Students will incorporate many real life applications through arithmetic and geometric sequences. Students will use accurate data gathering techniques.

PREREQUISITES: Algebra 1 with a grade of "C" or better.

REQUIRED TEXTBOOK: HOLT CALIFORNIA ALGEBRA 2; 2008; Holt, Rinehart and Winston

COURSE PURPOSE

In this Algebra 2 course, students will:

- Master the California Mathematics Content Standards for Algebra 2.
- Incorporate many real life applications through arithmetic and geometric sequences
- Use accurate data gathering techniques
- Develop their high-order thinking skills.

COURSE OUTLINE

CHAPTER (California Mathematics Content Standards for Algebra 2)

Sectional content

1. FOUNDATIONS FOR FUNCTIONS (1.0, 2.0, 9.0, 24.0, 25.0)

- Properties and Operations (Sets of numbers, properties of real numbers, square roots, simplifying algebraic expressions, exploring negative exponents, properties of exponents)
- Introduction to Functions (Relations and functions, function notation, Chess translations, exploring transformation, introduction to parent functions)

2. LINEAR FUNCTIONS (1.0, 4.0, 5.0, 6.0, 7.0)

- Linear Equations and Inequalities (Solving linear equations and inequalities, proportional reasoning, graphing linear functions, exploring graphs and windows, writing linear functions, linear inequalities in two variables)
- Applying Linear Functions (Transforming linear functions, curve fitting with linear models, solving absolute value equations and inequalities, solving absolute-value equations, absolute-value functions)

3. LINEAR SYSTEMS (2.0, Review of Geometry 12.0)

- Linear Systems in Two Dimensions (Using graphs and tables to solve linear systems, using algebraic methods to solve linear systems, solving systems of linear inequalities, linear programming)

- Linear Systems in Three Dimensions (Linear equations in three dimensions, solving linear systems in three variables, exploring parameter equations, parametric equations)

4. MATRICES (2.0, Review of 7MG3.2)

- Matrix Operations (Matrices and data, multiplying matrices, using matrices to transform geometric figures)

- Using Matrices to Solve Systems (Determinants and Cramer's Rule, matrix inverses and solving systems, using spreadsheets with matrices, row operations and augmented matrices, networks and matrices)

5. QUADRATIC FUNCTIONS (5.0, 6.0, 8.0, 9.0, 10.0)

- Quadratic Functions and Complex Numbers (Exploring parameter changes, using transformations to graph quadratic functions, properties of quadratic functions in standard form, exploring graphs and factors, solving quadratic equations by graphing and factoring, completing the square, complex numbers and roots, the quadratic formula)

- Applying Quadratic Functions (Solving quadratic inequalities, curve fitting with quadratic models, operations with complex numbers)

6. POLYNOMIAL FUNCTIONS (3.0, 4.0, 10.0, 20.0)

- Operations with Polynomials (Polynomials, multiplying and dividing polynomials, exploring the sum and difference of two cubes, factoring polynomials)

- Applying Polynomial Functions (Finding real roots of polynomial equations, fundamental theorem of algebra, exploring end behavior, investigating graphs of polynomial functions, transforming polynomial functions, curve fitting with polynomial models)

7. EXPONENTIAL AND LOGARITHMIC FUNCTIONS (11.0, 11.1, 11.2, 12.0, 13.0, 14.0)

- Exponential Functions and Logarithms (Exponential functions, growth, and decay; exploring inverses of functions, inverses of relations and functions, logarithmic functions, properties of logarithms)

- Applying Exponential and Logarithmic Functions (Exponential and logarithmic equations and inequalities; Prove Laws of logarithms; the Natural Base, e ; Transforming exponential and logarithmic functions, curve fitting with exponential and logarithmic models)

8. RATIONAL AND RADICAL FUNCTIONS (7.0, 12.0, 15.0, Review of Algebra 1 15.0, Preview of Mathematical Analysis 6.0)

- Rational Functions (Modeling inverse variation, variation functions, multiplying and dividing rational expressions, exploring holes in graphs, rational functions, solving rational equations and inequalities)

- Radical Functions (Radical expressions and rational exponents, radical functions, solving radical equations and inequalities)

9. PROPERTIES AND ATTRIBUTES OF FUNCTIONS (10.0, 12.0, 24.0, 25.0, Extension of 7MG2.1)

- Function and their Graphs (Multiple representations of functions, piecewise functions, graph piecewise functions, transforming functions)

- Functional Relationships (Operations with functions, functions and their inverses, exploring differences and ratios, modeling real-world data)

10. CONIC SECTIONS (Extension of 2.0, 16.0, 17.0, Review of 7MG2.1)

- Exploring Conic Sections (Introduction to conic sections, circles, ellipses, locating the foci of an ellipse, hyperbolas, parabolas)

- Applying Conic Sections (Identifying conic sections, conic section art, solving nonlinear systems)

11. PROBABILITY AND STATISTICS (18.0, 19.0, 20.0, Extension of 6SDAP)

- Probability (Permutations and combinations, theoretical and experimental probability, exploring

simulations, independent and dependent events, compound events)

- Data Analysis and Statistics (Measures of central tendency and variation, collect experimental data, binomial distributions, normal distributions)

12. SEQUENCES AND SERIES (21.0, 22.0, 23.0)

- Exploring Arithmetic Sequences and Series (Introduction to sequences, series and summation notation, evaluating sequences and series, arithmetic sequences and series)

- Exploring Geometric Sequences and Series (Geometric sequences and series, exploring infinite geometric series, mathematical induction and infinite geometric series, area under a curve)

13. TRIGONOMETRIC FUNCTIONS (Preview of Trigonometry 1.0, 2.0, 9.0, 13.0, 19.0)

- Trigonometry and Angles (Right angle trigonometry, angles of rotation, exploring the unit circle, inverses of trigonometric functions)

- Applying Trigonometric Functions (The Law of Sines, the Law of Cosines)

14. TRIGONOMETRIC GRAPHS AND IDENTITIES (Preview of Trigonometry 3.0, 3.2, 4.0, 5.0, 6.0, 10.0)

- Exploring Trigonometric Graphs (Graphs of Sine and Cosine, graphs of other trigonometric functions)

- Trigonometric Identities (Graph trigonometric identities, fundamental trigonometric identities, sum and difference identities, double-angle and half-angle identities, solving trigonometric equations)

KEY ASSIGNMENTS

Student must complete these specific assignments:

1. The student will read introduction of each new topic. The student will review the examples given with their complete solutions shown and will then complete the practice problems for the new topics.
2. The student will complete daily problem sets and review sets of previous topics.
3. The student will complete the "College Entrance Exam Practice" and "Mastering the Standards" found at the end of each chapter.
4. The student will complete a minimum of three "Challenge and Extend" problems at the end of every chapter.
5. The student will take chapter tests and cumulative tests without outside assistance or use of notes or the text.
6. The student's Education Specialist and Subject Matter Expert (SME) will review work on a regular basis, and the student's written samples will be kept in a portfolio

INSTRUCTIONAL METHODS AND/OR STRATEGIES

Instructional methods and/or strategies may include, but are not limited, to the following techniques:

- Demonstration
- Multi-media presentations
- Textbook exercises
- Guided practice
- Tutorials
- Discussion
- Hands-on mathematical investigation
- Internet research
- Lecture

- Library research
- Regular access to Subject Matter Expert (SME)

ASSESSMENT METHODS AND/OR TOOLS

Methods by which student progress is assessed will be through a variety and/or combination of methods.

The methods available include, but are not limited to:

- Regular review of work by Education Specialist
- Portfolios
- Observation by Parent Facilitator, Education Specialist (credentialed teacher) and Subject Matter Expert (SME)
- Discussion
- Demonstrations
- Student grades
- Student work examples
- Written examination
- Research projects
- Regular review of work by and access to the Subject Matter Expert (SME)