CALVERT™ HOMESCHOOL

CURRICULUM CATALOG

Advanced Algebra

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Advanced Algebra Course Overview

Advanced Algebra is a full year high school mathematics course intended for the student who has successfully completed Analytic Geometry. This course is designed to prepare students for college-level and real-world mathematical reasoning. The concepts covered in this course integrate the topics of Statistics, Algebra II, and Trigonometry. Throughout the course, students will perform operations with rational, radical, and exponential expressions, explore higher order strategies necessary for analyzing multi-level logarithmic, exponential, linear, quadratic and polynomial functions and equations. Students are exposed to several branches of mathematics and will explore ways in which each one can be used as a mathematical model in understanding the world.

- **Inferences and Conclusions from Data:** Student will understand random and non-random sampling and the biases they may cause and determine normal distributions and calculate variance and standard deviations from a data set.
- **Polynomial Functions:** Student will simplify algebraic expressions using several properties and operations, understand the graphic solutions to linear systems, and begin to understand complex numbers.
- **Rational and Radical Relationships:** Student will solve multi-step equations, write equations of a line given various information, use conjugates to rationalize the denominator of an algebraic expression, and solve different types of problems using rational equations.
- **Exponents and Logarithms:** Student will understand common and natural logarithms, exponential equations, and graphs of logarithms, square and cube roots, and exponential functions.
- **Trigonometric Functions:** Student will evaluate trigonometric and reciprocal trigonometric functions in degrees and radians and identify their graphs and specific parts of their graphs, and solve trigonometric equations using Pythagorean identities and substitution.
- **Mathematical Modeling:** Student will calculate the common difference of an arithmetic sequence, the common ratio of a geometric sequence, and extend them to the nth term, graph quadratics and analyze them as they are changed using different methods and use ratios or proportions to be able to calculate unit scales and solve problems.

Advanced Algebra	Unit 1: Inferences and Conclusions from Data	
	Assignments	
	1. Course Overview	9. Observational Studies
	2. Measures of Central Tendency	10. Interpreting Data
	3. Dispersion	11. Probability and Decisions
	4. Sample Surveys	12. Quiz 2: Inferences and Conclusions from Data
	5. Normal Distributions	13. Performance Task
	6. Simulations	14. Review
	7. Experiments	15. Test
	8. Quiz 1: Inferences and Conclusions from Data	16. Alternate Test

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Unit 2: Polynomial Functions

Assignments

1. Variables and Expressions
2. Exponents and Order of Operations
3. Evaluating Expressions
4. Quiz 1: Polynomial Functions
5. Commutative and Associative Properties
6. Distributive Property
7. Simplifying Expressions
8. Quiz 2: Polynomial Functions
9. Solution of a System
10. Graphing Systems of Equations
11. Systems of Equations
12. Comparing Functions
13. Quiz 3: Polynomial Functions
14. Multiplying Polynomials by Polynomials
15. Addition and Subtraction Operations
16. Division with Polynomials
17. The Remainder Theorem
18. Numerical Relationships from Identities
19. Binomial Coefficients
20. Quiz 4: Polynomial Functions
21. The Discriminant
22. The Fundamental Theorem of Algebra
23. Imaginary Numbers
24. Quiz 5: Polynomial Functions
25. Test
26. Alternate Test

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Unit 3: Rational and Radical Relationships

Assignments

1. Two-Step Equations
2. Variables on Both Sides
3. Combining Like Terms
4. The Distributive Property
5. Quiz 1: Rational and Radical Relationships
6. Writing Equations from Word Problems
7. Two Unknowns
8. More Than Two Unknowns
9. Quiz 2: Rational and Radical Relationships
10. Writing Linear Equations 1
11. Writing Linear Equations 2
12. Writing Linear Equations 3
13. Inequalities
14. Applications of Rational Equations
15. Quiz 3: Rational and Radical Relationships
16. Multiplying and Dividing with Fractions
17. Reducing Rational Expressions
18. Multiplying Algebraic Fractions
19. Dividing Algebraic Fractions
20. Quiz 4: Rational and Radical Relationships
21. Adding and Subtracting Rational Expressions
22. Adding and Subtracting
23. Mixed Expressions and Complex Fractions
24. Equations with Fractions
25. Quiz 5: Rational and Radical Relationships
26. Real Numbers
27. Law of Radicals
28. Conjugates
29. Radical Equations
30. Quiz 6: Rational and Radical Relationships
31. Test
32. Alternate Test*

Unit 4: Semester Review and Exam

Assignments

1. Exam
2. Alternate Exam*

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Unit 5: Exponents and Logarithms

Assignments

1. Fractional Exponents
2. Exponential Equations
3. Solving Logarithmic Equations
4. Evaluating Exponential Functions, Common and Natural Logarithms
5. Quiz 1: Exponents and Logarithms
6. Radical Functions
7. Exponential Functions
8. Logarithmic Functions
9. Line Graphs
10. Graphing Polynomials
11. Graphing Exponential Functions
12. Graphs of Logarithmic Functions
13. Quiz 2: Exponents and Logarithms
14. Test
15. Alternate Test*

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Unit 6: Trigonometric Functions

Assignments

1. The Unit Circle I
2. Angles in the Coordinate Plane
3. The Unit Circle II
4. Quiz 1: Trigonometric Functions
5. Radian Measure I
6. Radian Measure II
7. Reciprocal Functions
8. Trigonometric Functions on the Unit Circle
9. Quiz 2: Trigonometric Functions
10. Graphs and Amplitude
11. Graphing and Amplitude
12. Vertical and Horizontal Translations
13. Period and Frequency
14. Quiz 3: Trigonometric Functions
15. Pythagorean Identity
16. Pythagorean Identities
17. The Fundamental Trigonometric Identities
18. Proving Identities
19. Quiz 4: Trigonometric Functions
20. Test
21. Alternate Test*

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Unit 7: Mathematical Modeling

Assignments

1. Solutions for Systems of Equations
2. Application of Systems of Equations
3. Solving Inequalities
4. Solving Two-order Inequalities
5. Quiz 1: Mathematical Modeling
6. Writing a Function Rule
7. Arithmetic Sequences
8. Geometric Sequences
9. Quiz 2: Mathematical Modeling
10. Function Transformations I
11. Function Transformations II
12. Rate of Change
13. Function Composition
14. Quiz 3: Mathematical Modeling
15. Inverse Functions I
16. Relations and Functions: Inverses
17. Inverse Functions II
18. Reading Inverses from a Graph or Table
19. Quiz 4: Mathematical Modeling
20. Two- and Three-Dimensional Shapes
21. Modeling with Geometric Figures
22. Density
23. Geometry in Design
24. Quiz 5: Mathematical Modeling
25. Literal Expressions
26. Test
27. Alternate Test*

Unit 8: Semester Review and Exam

Assignments

1. Exam
2. Alternate Exam*

Unit 9: CCSS End-Of-Course Exam

Assignments

1. Exam*
2. Alternate Exam – Form A*
3. Alternate Exam – Form B*

(*) Indicates alternative assignment