Algebra II Fundamentals

Algebra II is a full-year, high school math course intended for the student who has successfully completed the prerequisite course Algebra I. This course focuses on algebraic techniques and methods in order to develop student understanding of advanced number theory, concepts involving linear, quadratic and polynomial functions, and pre-calculus theories. This course also integrates geometric concepts and skills throughout the units, as well as introducing students to basic trigonometric identities and problem solving.

By the end of the course, students will be expected to do the following:

- Understand set notation and the structure of mathematical systems.
- Know how to use functional notation and operations on functions.
- Simplify and solve algebraic fractions.
- Perform operations on polynomials, including factoring, long division, and synthetic division.
- Solve algebraic word problems involving mixtures, money, integers, and work.
- Evaluate and solve radical expressions and equations.
- Solve systems of equations with graphing, substitution, and matrices.
- Graph and solve quadratic equations, including conic sections.
- Graph and solve exponential and logarithmic equations.
- Calculate permutations, combinations, and complex probabilities.

Algebra II Fundamentals

Unit 1: Set, Structure, and Function

Assignments

1. Course Overview
2. Properties of Sets
3. Operations of Sets
4. Quiz 1: Set Theory
5. Structure: Axioms
6. Structure: Applications
7. Relations and Functions: Definitions
8. Relations and Functions: Graphs
9. Relations and Functions: Function Notation
10. Relations and Functions: Inverses
11. Quiz 2: Relations and Functions
12. Algebraic Expressions: Exponents Part 1
13. Algebraic Expressions: Exponents Part 2
14. Algebraic Expressions: Multiplication and Division Part 1
15. Algebraic Expressions: Multiplication and Division Part 2
16. Exponents of Exponential Expressions
17. Algebraic Expressions: Combining Terms
18. Quiz 3: Algebraic Expressions
19. Special Project*
20. Test
21. Alternate Test*
22. Glossary and Credits

Algebra II Fundamentals

Unit 2: Numbers, Sentences, and Problems

Assignments

1. Number Order and Absolute Value
2. Sums and Products
3. Quiz 1: Numbers
4. Solving Equations
5. Multiplication Property
6. Multi-step Equations
7. Equations with Parentheses
8. Literal Expressions
9. Solving Inequalities
10. Graphing Solution Sets for Inequalities
11. Compound Sentences
12. Quiz 2: Equalities and Inequalities
13. Number Problems
14. Motion Problems
15. Miscellaneous Problems
16. Quiz 3: Problems
17. Special Project*
18. Test
19. Alternate Test*
20. Glossary and Credits

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Unit 3: Linear Equations and Inequalities

Assignments

1. Line Graphs
2. Line Graphs by Two Points
3. Slope of Lines Part 1
4. Slope of Lines Part 2
6. Equations: Point Slope Part 2
7. Equations: Point Slope Part 3
8. Equations: Slope-Intercept
9. General Equation of a Line
10. Quiz 1: Lines
11. Solutions for Systems of Equations
12. Solutions by Addition
13. Solutions by Substitution
14. Application of Systems of Equations
15. Quiz 2: Solutions for Systems
16. Solving Inequalities
17. Solving Two-order Inequalities
18. Quiz 3: Solving Inequalities
19. Special Project*
20. Test
21. Alternate Test*
22. Glossary and Credits

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Unit 4: Polynomials

Assignments

1. Products and Factoring
2. Multiplying Polynomials by Polynomials
3. Using Special Products Part 1
4. Using Special Products Part 2
6. Factoring Special Products Part 1
7. Factoring Special Products Part 2
8. Quiz 1: Special Products
9. Addition and Subtraction Operations
10. Division with Polynomials
11. Synthetic Division
12. Quiz 2: Polynomials
13. Direct Variation
14. Inverse Variation
15. Joint and Combined Variation
16. Quiz 3: Working Variations
17. Project: Creating an Algorithm
18. Special Project*
19. Test
20. Alternate Test*
21. Glossary and Credits

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Unit 5: Algebraic Fractions

Assignments

1. Multiplying and Dividing with Fractions
2. Reducing Rational Expressions
3. Multiplying Algebraic Fractions
4. Dividing Algebraic Fractions
6. Adding and Subtracting Algebraic Fractions
7. Addition and Subtraction
8. Mixed Expressions and Complex Fractions
9. Quiz 2: Addition and Subtraction of Fractions
10. Equations with Fractions
11. Fractional Equations
12. Proportions
13. Quiz 3: Fractional Equations
14. Applications of Fractions
15. Mixture Problems
16. Work Problems
17. Quiz 4: Problems with Fractions
18. Special Project*
19. Test
20. Alternate Test*
21. Glossary and Credits

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Unit 6: Semester Review and Exam

Assignments

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

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Algebra

Unit 7: Real Numbers

Assignments

1. Real Numbers
2. Law of Radicals
3. Conjugates
4. Radical Equations
6. Quadratic Equations
7. Factoring Quadratic Equations
8. Completing the Square
9. Quiz 2: Quadratic Solutions
10. Quadratic Formula
11. Word Problems Involving Quadratic Equations
12. Sum and Product of Roots
13. The Discriminant
14. Imaginary Numbers
15. Quiz 3: Quadratic Formula
16. Special Project*
17. Test
18. Alternate Test*
19. Glossary and Credits

II

Unit 8: Quadratic Relations and Systems

Assignment Titles

1. Distance Formula
2. Circle
3. Ellipse
4. Ellipse Continued
6. Conic Sections: Parabola
8. Conic Sections: Hyperbola
7. Conic Sections: Parabola Continued
9. Conic Sections: Hyperbola Continued
10. Identifying Conic Sections
11. Quiz 2: Conics
12. Systems of Equations
13. Solutions of Inequalities
14. Applications of Conic Sections: Part 1
15. Applications of Conic Sections: Part 2
16. Applications of Conic Sections: Part 3
17. Constant of Proportionality
18. Quiz 3: Applications of Conics
19. Special Project*
20. Test
21. Alternate Test*
22. Glossary and Credits

Algebra II

Unit 9: Exponential Functions

Assignment Titles

1. Exponential Functions
2. Fractional Exponents
3. Exponential Equations
4. Graphing Exponential Functions
5. Exponential Applications
7. Logarithmic Functions
8. Evaluation of Logarithms
9. Evaluating Exponential Functions, Common Logarithms, and Natural Logarithms
10. General Properties of Logarithms
11. Scientific Notation
12. Calculation of Common Logarithms
13. Graphs of Logarithmic Functions
14. Solving Logarithmic Equations
15. Logarithmic Applications
16. Quiz 2: Logarithmic Functions
17. Matrices
18. System Solutions with Matrices
19. Addition and Multiplication of Matrices
20. Quiz 3: Matrices
21. Special Project*
22. Test
23. Alternate Test*
24. Glossary and Credits

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Algebra

Unit 10: Counting Principles

Assignment Titles

1. Progressions: Sequences
2. Progressions: Series
3. Quiz 1: Sequences and Series
4. Permutations: Factorials
6. Permutations: Applications
7. Quiz 2: Permutations
8. Combination Formula
9. Combinations: Applications
10. Combinations: Binomial Coefficients
11. Quiz 3: Combinations
12. Probability: Concepts
13. Probability: Equally Likely Outcomes
14. Probability: Multiplication Principle
15. Conditional Probability
16. Quiz 4: Probability
17. Special Project*
18. Test
19. Alternate Test*
20. Glossary and Credits

Algebra II

Unit 11: Review

Assignment Titles

1. Integers
2. Integers Continued
3. Open Sentences
4. Open Sentences Continued
5. Graphs
7. Quiz 1: Review
8. Polynomials
9. Polynomials Continued
10. Algebraic Fractions Part 1
11. Algebraic Fractions Part 2
12. Algebraic Fractions Part 3
13. Real Numbers
14. Real Numbers Continued
15. Quiz 2: Review
16. Quadratic Relations and Systems
17. Quadratics Continued
18. Exponential Functions
19. Exponential Functions Continued
20. Counting Principles
21. Counting Principles Continued
22. Quiz 3: Review
23. Special Project*
24. Test
25. Alternate Test*
26. Glossary and Credits

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Unit 12: Semester Review and Exam

Assignments

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

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Unit 13: Final Exam

Assignments

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

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