Algebra II

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.

Objectives

- Understand set notation and the structure of mathematical systems.
- Calculate and perform operations with real and imaginary numbers.
- 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.
- Explore trigonometric identities and functions using the Unit Circle, graphs and modeling.
- Calculate permutations, combinations, and complex probabilities.
- Interpret sample surveys, normal distributions and observational studies.

Algebra II

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: Domain and Range
10. Relations and Functions: Function Transformations
11. Relations and Functions: Function Notation
12. Relations and Functions: Operations
13. Relations and Functions: Inverses
14. Quiz 2: Relations and Functions
15. Algebraic Expressions: Exponents Part 1
16. Algebraic Expressions: Exponents Part 2
17. Algebraic Expressions: Multiplication and Division Part 1
18. Algebraic Expressions: Multiplication and Division Part 2
19. Exponents of Exponential Expressions
20. Algebraic Expressions: Combining Terms
21. Quiz 3: Algebraic Expressions
22. Special Project*
23. Test
24. Alternate Test*
25. Glossary and Credits

Algebra II

Unit 2: Numbers, Sentences, and Problems

Assignments

1. Number Order and Absolute Value
2. Sums and Products
3. Quiz 1: Numbers, Sentences, and Problems
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. Performance Task
18. Alternate Performance Task*
19. Special Project*
20. Test
21. Alternate Test*
22. Glossary and Credits

Algebra II

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
5. Equations: Point Slope Part 1
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. Performance Task
20. Alternate Performance Task*
21. Special Project*
22. Test
23. Alternate Test*
24. Glossary and Credits

Algebra II

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
5. Factoring Trinomials
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. The Remainder Theorem
13. Graphing Polynomials
14. Quiz 2: Polynomials
15. Numerical Relationships from Identities
16. Direct Variation
17. Inverse Variation
18. Joint and Combined Variation
19. Quiz 3: Working with Variations
20. Project: Creating an Algorithm
21. Performance Task
22. Alternate Performance Task*
23. Special Project*
24. Test
25. Alternate Test*
26. Glossary and Credits

Algebra II

Unit 5: Algebraic Fractions

Assignments

1. Multiplying and Dividing with Fractions
2. Reducing Rational Expressions
3. Multiplying Algebraic Fractions
4. Dividing Algebraic Fractions
5. Quiz 1: Algebraic Fractions
6. Adding and Subtracting Rational Expressions
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. Graphs of Rational Functions
15. Graphs of Rational Functions (2)
16. Applications of Fractions
17. Mixture Problems
18. Work Problems
19. Quiz 4: Problems with Fractions
20. Performance Task
21. Alternate Performance Task*
22. Special Project*
23. Test
24. Alternate Test*
25. Glossary and Credits

Algebra II

Unit 6: Semester Review and Exam

Assignments

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

Algebra II

Unit 7: Real Numbers

Assignments

1. Real Numbers
2. Law of Radicals
3. Conjugates
4. Radical Equations
5. Quiz 1: Real Numbers
6. Standard Form of a Quadratic Function
7. Quadratic Equations
8. Factoring Quadratic Equations
9. Completing the Square
10. Quiz 2: Quadratic Solutions
11. Quadratic Formula
12. Graphs of Quadratic Functions
13. Word Problems Involving Quadratic Equations
14. Sum and Product of Roots
15. The Discriminant
16. The Fundamental Theorem of Algebra
17. Imaginary Numbers
18. Complex Solutions
19. Quiz 3: Quadratic Formula
20. Performance Task
21. Alternate Performance Task*
22. Special Project*
23. Test
24. Alternate Test*
25. Glossary and Credits

Algebra II

Unit 8: Quadratic Relations and Systems

Assignments

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

Algebra II

Unit 9: Functions

Assignments

1. Absolute Value Functions
2. Exponential Functions
3. Fractional Exponents
4. Radical Functions
5. Graphs of Piece-Wise Defined Functions
6. Exponential Equations
7. Graphing Exponential Functions
8. Exponential Applications
9. Solving Equations by Graphing Functions
10. Quiz 1: Exponential Functions
11. Logarithmic Functions
12. Evaluation of Logarithms
13. Evaluating Exponential Functions, Common and Natural Logarithms
14. General Properties of Logarithms
15. Scientific Notation
16. Calculation of Common Logarithms
17. Graphs of Logarithmic Functions
18. Solving Logarithmic Equations
19. Graphs of Natural Logarithms
20. Logarithmic Applications
21. Quiz 2: Logarithmic Functions
22. Comparing Functions
23. Inverse Functions
24. Matrices
25. System Solutions with Matrices
26. Addition and Multiplication of Matrices
27. Quiz 3: Matrices
28. Performance Task
29. Alternate Performance Task*
30. Special Project*
31. Test
32. Alternate Test*
33. Glossary and Credits

Algebra II

Unit 10: Counting Principles

Assignments

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

Algebra II

Unit 11: Trigonometry

Assignments

1. Trigonometry Basics
2. The Unit Circle
3. Reciprocal Functions
4. Radian Measure
5. Quiz 1: Unit Circle
6. Trigonometric Functions on the Unit Circle
7. Pythagorean Identity
8. Quiz 2: Trigonometric Functions
9. Graphs and Amplitude
10. Graphs and Modeling
11. Quiz 3: Graphs
12. Project: Regression Curve
13. Performance Task
14. Alternate Performance Task*
15. Special Project*
16. Review
17. Test
18. Alternate Test*
19. Glossary and Credits

Algebra II

Unit 12: Statistics

Assignments

1. Sample Surveys
2. Normal Distributions
3. Simulations
4. Experiments
5. Quiz 1: Statistics
6. Observational Studies
7. Probability and Decisions
8. Quiz 2: Statistical Probability
9. Performance Task
10. Alternate Performance Task*
11. Appropriate Models
12. Modeling Functions
13. Regression Models
14. Quiz 3: Math Models
15. Special Project*
16. Review
17. Test
18. Alternate Test*
19. Glossary and Credits

Algebra II

Unit 13: Review

Assignments

1. Integers
2. Integers Continued
3. Open Sentences
4. Open Sentences Continued
5. Graphs
6. Graphs Continued
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

Algebra II

Unit 14: Semester Review and Exam

Assignments

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

Algebra II

Unit 15: Final Exam

Assignments

1. Exam
2. Alternate Exam – Form A*
3. Alternate Exam – Form B*
4. Performance Task 1*
5. Performance Task 2*

Algebra II

Unit 16: End of Course Exam

Assignments

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