



monarch

2017 - 2018 Curriculum Catalog

Algebra II

Table of Contents

| | |
|---|----------|
| ALGEBRA II COURSE OVERVIEW | 1 |
| UNIT 1: SET, STRUCTURE, AND FUNCTION | 1 |
| UNIT 2: NUMBERS, SENTENCES, AND PROBLEMS..... | 1 |
| UNIT 3: LINEAR EQUATIONS AND INEQUALITIES | 2 |
| UNIT 4: POLYNOMIALS..... | 2 |
| UNIT 5: ALGEBRAIC FRACTIONS | 2 |
| UNIT 6: SEMESTER REVIEW AND EXAM | 2 |
| UNIT 7: REAL NUMBERS..... | 3 |
| UNIT 8: QUADRATIC RELATIONS AND SYSTEMS..... | 3 |
| UNIT 9: EXPONENTIAL FUNCTIONS | 3 |
| UNIT 10: COUNTING PRINCIPLES..... | 4 |
| UNIT 11: REVIEW | 4 |
| UNIT 12: SEMESTER REVIEW AND EXAM | 4 |
| UNIT 13: FINAL EXAM..... | 4 |

Algebra II Course Overview

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.

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

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

| Unit 3: Linear Equations and Inequalities | | |
|---|--|---|
| Assignments | | |
| Algebra II | 1. Line Graphs | 12. Solutions by Addition |
| | 2. Line Graphs by Two Points | 13. Solutions by Substitution |
| | 3. Slope of Lines Part 1 | 14. Application of Systems of Equations |
| | 4. Slope of Lines Part 2 | 15. Quiz 2: Solutions for Systems |
| | 5. Equations: Point Slope Part 1 | 16. Solving Inequalities |
| | 6. Equations: Point Slope Part 2 | 17. Solving Two-order Inequalities |
| | 7. Equations: Point Slope Part 3 | 18. Quiz 3: Solving Inequalities |
| | 8. Equations: Slope-Intercept | 19. Special Project* |
| | 9. General Equation of a Line | 20. Test |
| | 10. Quiz 1: Lines | 21. Alternate Test* |
| | 11. Solutions for Systems of Equations | 22. Glossary and Credits |

| Unit 4: Polynomials | | |
|---------------------|---|------------------------------------|
| Assignments | | |
| Algebra II | 1. Products and Factoring | 12. Quiz 2: Polynomials |
| | 2. Multiplying Polynomials by Polynomials | 13. Direct Variation |
| | 3. Using Special Products Part 1 | 14. Inverse Variation |
| | 4. Using Special Products Part 2 | 15. Joint and Combined Variation |
| | 5. Factoring Trinomials | 16. Quiz 3: Working Variations |
| | 6. Factoring Special Products Part 1 | 17. Project: Creating an Algorithm |
| | 7. Factoring Special Products Part 2 | 18. Special Project* |
| | 8. Quiz 1: Special Products | 19. Test |
| | 9. Addition and Subtraction Operations | 20. Alternate Test* |
| | 10. Division with Polynomials | 21. Glossary and Credits |
| | 11. Synthetic Division | |

| Unit 5: Algebraic Fractions | | |
|-----------------------------|--|-------------------------------------|
| Assignments | | |
| Algebra II | 1. Multiplying and Dividing with Fractions | 12. Proportions |
| | 2. Reducing Rational Expressions | 13. Quiz 3: Fractional Equations |
| | 3. Multiplying Algebraic Fractions | 14. Applications of Fractions |
| | 4. Dividing Algebraic Fractions | 15. Mixture Problems |
| | 5. Quiz 1: Algebraic Fractions | 16. Work Problems |
| | 6. Adding and Subtracting Algebraic Fractions | 17. Quiz 4: Problems with Fractions |
| | 7. Addition and Subtraction | 18. Special Project* |
| | 8. Mixed Expressions and Complex Fractions | 19. Test |
| | 9. Quiz 2: Addition and Subtraction of Fractions | 20. Alternate Test* |
| | 10. Equations with Fractions | 21. Glossary and Credits |
| | 11. Fractional Equations | |

| Unit 6: Semester Review and Exam | | |
|----------------------------------|-----------|-----------------------------|
| Assignments | | |
| Alg. II | 1. Review | 3. Alternate Exam - Form A* |
| | 2. Exam | 4. Alternate Exam - Form B* |
| | | |
| | | |

| Unit 7: Real Numbers | | |
|----------------------|----------------------------------|---|
| Assignments | | |
| Algebra II | 1. Real Numbers | 11. Word Problems Involving Quadratic Equations |
| | 2. Law of Radicals | 12. Sum and Product of Roots |
| | 3. Conjugates | 13. The Discriminant |
| | 4. Radical Equations | 14. Imaginary Numbers |
| | 5. Quiz 1: Real Numbers | 15. Quiz 3: Quadratic Formula |
| | 6. Quadratic Equations | 16. Special Project* |
| | 7. Factoring Quadratic Equations | 17. Test |
| | 8. Completing the Square | 18. Alternate Test* |
| | 9. Quiz 2: Quadratic Solutions | 19. Glossary and Credits |
| | 10. Quadratic Formula | |

| Unit 8: Quadratic Relations and Systems | | |
|---|--|--|
| Assignment Titles | | |
| Algebra II | 1. Distance Formula | 12. Systems of Equations |
| | 2. Circle | 13. Solutions of Inequalities |
| | 3. Ellipse | 14. Applications of Conic Sections: Part 1 |
| | 4. Ellipse Continued | 15. Applications of Conic Sections: Part 2 |
| | 5. Quiz 1: Conics and the Coordinate Plane | 16. Applications of Conic Sections: Part 3 |
| | 6. Conic Sections: Parabola | 17. Constant of Proportionality |
| | 7. Conic Sections: Parabola Continued | 18. Quiz 3: Applications of Conics |
| | 8. Conic Sections: Hyperbola | 19. Special Project* |
| | 9. Conic Sections: Hyperbola Continued | 20. Test |
| | 10. Identifying Conic Sections | 21. Alternate Test* |
| | 11. Quiz 2: Conics | 22. Glossary and Credits |

| Unit 9: Exponential Functions | | |
|-------------------------------|--|---|
| Assignment Titles | | |
| Algebra II | 1. Exponential Functions | 13. Graphs of Logarithmic Functions |
| | 2. Fractional Exponents | 14. Solving Logarithmic Equations |
| | 3. Exponential Equations | 15. Logarithmic Applications |
| | 4. Graphing Exponential Functions | 16. Quiz 2: Logarithmic Functions |
| | 5. Exponential Applications | 17. Matrices |
| | 6. Quiz 1: Exponential Functions | 18. System Solutions with Matrices |
| | 7. Logarithmic Functions | 19. Addition and Multiplication of Matrices |
| | 8. Evaluation of Logarithms | 20. Quiz 3: Matrices |
| | 9. Evaluating Exponential Functions, Common Logarithms, and Natural Logarithms | 21. Special Project* |
| | 10. General Properties of Logarithms | 22. Test |
| | 11. Scientific Notation | 23. Alternate Test* |
| | 12. Calculation of Common Logarithms | 24. Glossary and Credits |

| Unit 10: Counting Principles | | |
|------------------------------|---|---|
| Assignment Titles | | |
| Algebra II | 1. Progressions: Sequences | 11. Quiz 3: Combinations |
| | 2. Progressions: Series | 12. Probability: Concepts |
| | 3. Quiz 1: Sequences and Series | 13. Probability: Equally Likely Outcomes |
| | 4. Permutations: Factorials | 14. Probability: Multiplication Principle |
| | 5. Permutation Formula | 15. Conditional Probability |
| | 6. Permutations: Applications | 16. Quiz 4: Probability |
| | 7. Quiz 2: Permutations | 17. Special Project* |
| | 8. Combination Formula | 18. Test |
| | 9. Combinations: Applications | 19. Alternate Test* |
| | 10. Combinations: Binomial Coefficients | 20. Glossary and Credits |

| Unit 11: Review | | |
|-------------------|--------------------------------|-------------------------------------|
| Assignment Titles | | |
| Algebra II | 1. Integers | 14. Real Numbers Continued |
| | 2. Integers Continued | 15. Quiz 2: Review |
| | 3. Open Sentences | 16. Quadratic Relations and Systems |
| | 4. Open Sentences Continued | 17. Quadratics Continued |
| | 5. Graphs | 18. Exponential Functions |
| | 6. Graphs Continued | 19. Exponential Functions Continued |
| | 7. Quiz 1: Review | 20. Counting Principles |
| | 8. Polynomials | 21. Counting Principles Continued |
| | 9. Polynomials Continued | 22. Quiz 3: Review |
| | 10. Algebraic Fractions Part 1 | 23. Special Project* |
| | 11. Algebraic Fractions Part 2 | 24. Test |
| | 12. Algebraic Fractions Part 3 | 25. Alternate Test* |
| | 13. Real Numbers | 26. Glossary and Credits |

| Unit 12: Semester Review and Exam | | |
|-----------------------------------|-----------|-----------------------------|
| Assignments | | |
| Alg. II | 1. Review | 3. Alternate Exam - Form A* |
| | 2. Exam | 4. Alternate Exam - Form B* |

| Unit 13: Final Exam | | |
|---------------------|-----------------------------|-----------------------------|
| Assignments | | |
| Alg. II | 1. Exam | 3. Alternate Exam - Form B* |
| | 2. Alternate Exam - Form A* | |

(*) Indicates alternative assignment