



monarch

2018 - 2019 Curriculum Catalog

Algebra II

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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.

- **Set, Structure, and Function:** Student will review the properties of sets and functions, determine the domains, ranges and inverses of functions, and simplifying expressions by combining like terms, exponent rules for multiplication and division and exponents.
- **Numbers, Sentences, and Problems:** Student will solve linear equations and inequalities using multiplication, addition, and distributive properties, graph absolute value, and compound equations and inequalities, and problems involving rate, distance, and time.
- **Linear Equations and Inequalities:** Student will determine the slope of a line and use that information to write an equation, compare lines, and solve a system of equations using the addition property of equality, the substitution property of equality, and graphical methods.
- **Polynomials:** Student will factor trinomials using the difference of two squares, the product of the sum of two perfect cubes, perfect square trinomials, and the difference of two cubes, and solve problems involving direct variation, inverse variation and joint or combination variation.
- **Algebraic Fractions:** Student will reduce fractions, add and subtract fractions, and change mixed numbers and complex fractions to simple algebraic fractions, and solve equations that contain algebraic fractions, variables in the denominator of a fraction, and mixture problems.
- **Real Numbers:** Student will evaluate and simplify radical expressions and fractional exponent expressions, and solve quadratic equations by the factoring method, and by completing the square.
- **Quadratic Relations and Systems:** Student will determine the major components of different conic sections, write their equations, solve and graph them.
- **Exponential Functions:** Student will evaluate and simplify equations in logarithmic form, exponential form, graph them, and use matrices to solve a system of equations.
- **Counting Principles:** Student will differentiate between a finite and an infinite series, and between an arithmetic and a geometric series, calculate the number of permutations or combinations of r elements from a set of n elements, and use the counting principle, conditional probability, and multiplication principle to calculate the probability of complex events.

Unit 1: Set, Structure, and Function	
Assignments	
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

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|---|---|
| 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