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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.

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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

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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
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. 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
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. 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*
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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
5. Quiz 1: 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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Unit 7: Real Numbers

Assignments

1. Real Numbers
2. Law of Radicals
3. Conjugates
4. Radical Equations
5. Quiz 1: Real Numbers
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

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Unit 8: Quadratic Relations and Systems

Assignment Titles

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
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

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Unit 9: Exponential Functions

Assignment Titles

1. Exponential Functions
2. Fractional Exponents
3. Exponential Equations
4. Graphing Exponential Functions
5. Exponential Applications
6. Quiz 1: Exponential Functions
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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Unit 10: Counting Principles

Assignment Titles

1. Progressions: Sequences
2. Progressions: Series
3. Quiz 1: Sequences and Series
4. Permutations: Factorials
5. Permutation Formula
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*
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Unit 11: Review

Assignment Titles

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

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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*

(*) Indicates alternative assignment

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