

# **CURRICULUM** OVERVIEW

# Algebra II Fundamentals



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### Algebra II Fundamentals Course Overview

Algebra II Fundamentals 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	Unit 1: Set, Structure, and Function							
	Assig	Assignments							
	1.	Course Overview	13.	Algebraic Expressions: Exponents Part 2					
entals	2.	Properties of Sets	14.	Algebraic Expressions: Multiplication and Division					
	3.	Operations of Sets		Part 1					
lam	4.	Quiz 1: Set Theory	15.	Algebraic Expressions: Multiplication and Division					
nnc	5.	Structure: Axioms		Part 2					
=	6.	Structure: Applications	16.	Exponents of Exponential Expressions					
bra	7.	Relations and Functions: Definitions	17.	Algebraic Expressions: Combining Terms					
٨lge	8.	Relations and Functions: Graphs	18.	Quiz 3: Algebraic Expressions					
4	9.	Relations and Functions: Function Notation	19.	Special Project*					
	10.	Relations and Functions: Inverses	20.	Test					
	11.	Quiz 2: Relations and Functions	21.	Alternate Test*					
	12.	Algebraic Expressions: Exponents Part 1	22.	Glossary and Credits					

	Assig	nments		
als	1.	Number Order and Absolute Value	11.	Compound Sentences
ient	2.	Sums and Products	12.	Quiz 2: Equalities and Inequalities
lam	3.	Quiz 1: Numbers	13.	Number Problems
nnc	4.	Solving Equations	14.	Motion Problems
=	5.	Multiplication Property	15.	Miscellaneous Problems
bra	6.	Multi-step Equations	16.	Quiz 3: Problems
Alge	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

	Assig	Assignments						
s	1.	Line Graphs	12.	Solutions by Addition				
ntal	2.	Line Graphs by Two Points	13.	Solutions by Substitution				
mei	3.	Slope of Lines Part 1	14.	Application of Systems of Equations				
nda	4.	Slope of Lines Part 2	15.	Quiz 2: Solutions for Systems				
Fui	5.	Equations: Point Slope Part 1	16.	Solving Inequalities				
ra II	6.	Equations: Point Slope Part 2	17.	Solving Two-order Inequalities				
seb	7.	Equations: Point Slope Part 3	18.	Quiz 3: Solving Inequalities				
Alg	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 2: Numbers, Sentences, and Problems

Unit 3: Linear Equations and Inequalities

Assignments								
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							

#### Assignments

s	1.	Multiplying and Dividing with Fractions	12.	Proportions
ntal	2.	Reducing Rational Expressions	13.	Quiz 3: Fractional Equations
mei	3.	Multiplying Algebraic Fractions	14.	Applications of Fractions
nda	4.	Dividing Algebraic Fractions	15.	Mixture Problems
Fui	5.	Quiz 1: Algebraic Fractions	16.	Work Problems
ra II	6.	Adding and Subtracting Algebraic Fractions	17.	Quiz 4: Problems with Fractions
seb	7.	Addition and Subtraction	18.	Special Project*
Alg	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
- 1. Review
- 2. Exam

- 3. Alternate Exam Form A\*
- 4. Alternate Exam Form B\*

### Unit 7: Real Numbers

	Assig	nments		
als	1.	Real Numbers	11.	Word Problems Involving Quadratic Equations
ent	2.	Law of Radicals	12.	Sum and Product of Roots
lam	3.	Conjugates	13.	The Discriminant
nnc	4.	Radical Equations	14.	Imaginary Numbers
=	5.	Quiz 1: Real Numbers	15.	Quiz 3: Quadratic Formula
bra	6.	Quadratic Equations	16.	Special Project*
Alge	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	Unit 8: Quadratic Relations and Systems							
	Assig	Assignment Titles							
	1.	Distance Formula	12.	Systems of Equations					
Ital	2.	Circle	13.	Solutions of Inequalities					
nen	3.	Ellipse	14.	Applications of Conic Sections: Part 1					
Fundar	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					
a II	6.	Conic Sections: Parabola	17.	Constant of Proportionality					
Algebra	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					

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Assignment Titles							
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	21.	Special Project*				
	Logarithms, and Natural Logarithms	22.	Test				
10.	General Properties of Logarithms	23.	Alternate Test*				
11.	Scientific Notation	24.	Glossary and Credits				
12.	Calculation of Common Logarithms						
111	1. 2. 3. 4. 5. 6. 7. 8. 9. .0. .1. .2.	<ol> <li>Exponential Functions</li> <li>Fractional Exponents</li> <li>Exponential Equations</li> <li>Graphing Exponential Functions</li> <li>Exponential Applications</li> <li>Quiz 1: Exponential Functions</li> <li>Logarithmic Functions</li> <li>Evaluation of Logarithms</li> <li>Evaluating Exponential Functions, Common Logarithms, and Natural Logarithms</li> <li>General Properties of Logarithms</li> <li>Scientific Notation</li> <li>Calculation of Common Logarithms</li> </ol>	1.Exponential Functions13.2.Fractional Exponents14.3.Exponential Equations15.4.Graphing Exponential Functions16.5.Exponential Applications17.6.Quiz 1: Exponential Functions18.7.Logarithmic Functions19.8.Evaluation of Logarithms20.9.Evaluating Exponential Functions, Common21.Logarithms, and Natural Logarithms22.1.Scientific Notation24.12.Calculation of Common Logarithms24.				

Assig	nment Titles		
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	Unit 11: Review							
	Assig	signment Titles							
	1.	Integers	14.	Real Numbers Continued					
(0)	2.	Integers Continued	15.	Quiz 2: Review					
Itals	3.	Open Sentences	16.	Quadratic Relations and Systems					
nen	4.	Open Sentences Continued	17.	Quadratics Continued					
ıdar	5.	Graphs	18.	Exponential Functions					
Fun	6.	Graphs Continued	19.	Exponential Functions Continued					
a II	7.	Quiz 1: Review	20.	Counting Principles					
ebr	8.	Polynomials	21.	Counting Principles Continued					
Alg	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	Unit 12: Semester Review and Exam				
Assig	nments				
1.	Review	3.	Alternate Exam - Form A*		
2.	Exam	4.	Alternate Exam - Form B*		

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

(\*) Indicates alternative assignment