

**Indiana State Core Curriculum**  
**Standards updated 2009**  
**Algebra II**

Strand	Description	Boardworks High School Algebra presentations
<b>Relations and Functions</b>	A2.1 Students graph relations and functions and find zeros. They use function notation and combine functions by composition. They interpret functions in given situations.	
	A2.1.1 Recognize and graph various types of functions, including polynomial, rational, and algebraic functions.	Graphs of important non-linear functions Plotting and sketching graphs
	A2.1.2 Use function notation. Add, subtract, multiply, and divide pairs of functions.	Non-linear functions Function notation Operations with polynomials
	A2.1.3 Understand composition of functions and combine functions by composition.	Domain, range and composite functions
	A2.1.4 Graph relations and functions with and without graphing technology.	Graphs of important non-linear functions Plotting and sketching graphs Graphs of quadratic functions
	A2.1.5 Find the zeros of a function.	Plotting and sketching graphs
	A2.1.6 Solve an inequality by examining the graph.	Inequalities and regions Inequalities in two variables
	A2.1.7 Graph functions defined piece-wise.	Absolute value functions
	A2.1.8 Interpret given situations as functions in graphs, formulas, and words.	Functions and relations
<b>Linear and Absolute Value</b>	A2.2 Students solve systems of linear equations and inequalities and use them to solve word problems. They model data with linear equations.	
	A2.2.1 Graph absolute value equations and inequalities.	Absolute value functions
	A2.2.2 Use substitution, elimination, and matrices to solve systems of two or three linear equations in two or three variables.	Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations

<b>Linear and Absolute Value Equations and Inequalities</b>	A2.2.3 Use systems of linear equations and inequalities to solve word problems.	Problems leading to systems of equations Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables
	A2.2.4 Find a linear equation that models a data set using the median fit method and use the model to make predictions.	Scatter plots Lines of best fit
<b>Quadratic Equations and Functions</b>	A2.3 Students solve quadratic equations, including the use of complex numbers. They interpret maximum and minimum values of quadratic functions. They solve equations that contain square roots.	
	A2.3.1 Define complex numbers and perform basic operations with them.	–
	A2.3.2 Understand how real and complex numbers are related, including plotting complex numbers as points in the plane.	Set notation
	A2.3.3 Solve quadratic equations in the complex number system.	–
	A2.3.4 Graph quadratic functions. Apply transformations to quadratic functions. Find and interpret the zeros and maximum or minimum value of quadratic functions.	Graphs of quadratic functions Transforming functions part 1 Transforming functions part 2
	A2.3.5 Solve word problems using quadratic equations.	Factoring quadratic expressions Quadratic equations and factoring Quadratics and completing the square Completing the square The quadratic formula Problems leading to quadratic equations
	A2.3.6 Solve equations that contain radical expressions.	Manipulating formulas Manipulating radicals
	A2.3.7 Solve pairs of equations, one quadratic and one linear, or both quadratic.	Systems of linear and quadratic equations One linear and one quadratic equation
<b>Conic Sections</b>	A2.4 Students write equations of conic sections and draw their graphs.	
	A2.4.1 Write the equations of conic sections (circle, ellipse, parabola, and hyperbola).	–

	A2.4.2 Graph conic sections	–
<b>Polynomials</b>	A2.5 Students use the binomial theorem, divide and factor polynomials, and solve polynomial equations.	
	A2.5.1 Understand the binomial theorem and use it to expand binomial expressions raised to positive integer powers.	Binomial coefficients
	A2.5.2 Divide polynomials by others of lower degree.	Dividing polynomials The factor theorem
	A2.5.3 Factor polynomials completely and solve polynomial equations by factoring.	Factoring Quadratic equations and factoring Factoring quadratic expressions Solving quadratic equations Operations with polynomials The factor theorem
	A2.5.4 Use graphing technology to find approximate solutions for polynomial equations.	Graphs of quadratic functions Plotting and sketching graphs
	A2.5.5 Use polynomial equations to solve word problems.	Problems leading to quadratic equations
	A2.5.6 Write a polynomial equation given its solutions.	–
	A2.5.7 Understand and describe the relationships among the solutions of an equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial expression.	Plotting and sketching graphs Graphs of quadratic functions The factor theorem
<b>Algebraic Fractions</b>	A2.6 Students use negative and fractional exponents. They simplify algebraic fractions and solve equations involving algebraic fractions. They solve problems of direct, inverse, and joint variation.	
	A2.6.1 Understand and use negative and fractional exponents.	Zero, negative and fractional exponents
	A2.6.2 Add, subtract, multiply, divide, and simplify algebraic fractions.	Algebraic fractions
	A2.6.3 Simplify complex fractions.	Simplifying rational functions
	A2.6.4 Solve equations involving algebraic fractions.	Simplifying rational functions Operations with algebraic fractions Improper fractions

	A2.6.5 Solve word problems involving fractional equations.	Simplifying rational functions Operations with algebraic fractions Improper fractions
	A2.6.6 Solve problems of direct, inverse, and joint variation.	Direct proportion Inverse proportion
<b>Logarithmic and Exponential Functions</b>	A2.7 Students graph exponential functions and relate them to logarithms. They solve logarithmic and exponential equations and inequalities. They solve word problems using exponential functions.	
	A2.7.1 Graph exponential functions.	The laws of logarithms
	A2.7.2 Prove simple laws of logarithms.	The laws of logarithms
	A2.7.3 Understand and use the inverse relationship between exponents and logarithms.	Exponentials and logarithms
	A2.7.4 Solve logarithmic and exponential equations and inequalities.	Solving equations involving logarithms Exponentials and logarithms Exponential growth and decay
	A2.7.5 Use the definition of logarithms to convert logarithms from one base to another.	The laws of logarithms Solving equations involving logarithms
	A2.7.6 Use the properties of logarithms to simplify logarithmic expressions and to find their approximate values.	The laws of logarithms Solving equations involving logarithms
	A2.7.7 Use calculators to find decimal approximations of natural and common logarithmic numeric expressions.	Solving equations involving logarithms
	A2.7.8 Solve word problems involving applications of exponential functions to growth and decay.	Exponential growth and decay
<b>Sequences and Series</b>	A2.8 Students define and use arithmetic and geometric sequences and series.	
	A2.8.1 Define arithmetic and geometric sequences and series.	Sequences and rules Arithmetic sequences Geometric sequences
	A2.8.2 Find specified terms of arithmetic and geometric sequences.	Arithmetic sequences Geometric sequences
	A2.8.3 Find partial sums of arithmetic and geometric series.	Sequences and series The sum of an arithmetic series The sum of a geometric series

	A2.8.4 Solve word problems involving applications of sequences and series.	The sum of an arithmetic series The sum of a geometric series
<b>Counting Principles and Probability</b>	A2.9 Students use fundamental counting principles to compute combinations, permutations, and probabilities.	
	A2.9.1 Understand and apply counting principles to compute combinations and permutations.	Permutations Combinations
	A2.9.2 Use the basic counting principles, combinations, and permutations to compute probabilities.	Permutations Combinations
<b>Mathematical Reasoning and Problem Solving</b>	A2.10 Students use a variety of strategies to solve problems. Students develop and evaluate mathematical arguments and proofs.	
	A2.10.1 Use a variety of problem-solving strategies, such as drawing a diagram, guess-and-check, solving a simpler problem, writing an equation, and working backwards.	–
	A2.10.2 Decide whether a solution is reasonable in the context of the original situation.	–
	A2.10.3 Decide if a given algebraic statement is true always, sometimes, or never (statements involving rational or radical expressions, logarithmic or exponential functions).	–
	A2.10.4 Use the properties of number systems and the order of operations to justify the steps of simplifying functions and solving equations.	Calculating with integers Factoring Multiplying parentheses The distributive property
	A2.10.5 Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation, and that the steps taken when solving equations create new equations that have, in most cases, the same solution set as the original. Understand that similar logic applies to solving systems of equations simultaneously.	Equations, formulas and identities Solving linear equations The elimination method for systems of equations The substitution method for systems of equations
	A2.10.6 Use counterexamples to show that statements are false.	–