

**New Jersey State Core Curriculum**  
**Standards adopted 2010**  
**Algebra II**

Strand	Heading	Description	Boardworks High School Algebra presentations	
<b>Operations on Numbers and Expressions</b>	O1. Real numbers	a. Convert between and among radical and exponential forms of numerical expressions.	Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents Radicals Manipulating radicals	
		b. Simplify and perform operations on numerical expressions containing radicals.	Manipulating formulas Radicals Manipulating radicals	
		c. Apply the laws of exponents to numerical expressions with rational and negative exponents to order and rewrite them in alternative forms.	Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents	
	O2. Complex numbers	a. Represent complex numbers in the form $a+bi$ , where $a$ and $b$ are real; simplify powers of pure imaginary numbers.	–	
		b. Perform operations on the set of complex numbers.	–	
			a. Convert between and among radical and exponential forms of algebraic expressions.	Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents Radicals Manipulating radicals
			b. Simplify and perform operations on radical algebraic expressions.	Manipulating formulas Radicals Manipulating radicals

	O3. Algebraic expressions	c. Apply the laws of exponents to algebraic expressions, including those involving rational and negative exponents, to order and rewrite them in alternative forms.	Exponents and roots Exponent laws Negative exponents and reciprocals Rational exponents
		d. Perform operations on polynomial expressions.	Operations with polynomials Dividing polynomials The factor theorem
		e. Perform operations on rational expressions, including complex fractions.	Simplifying rational functions Operations with algebraic fractions Improper fractions
		f. Identify or write equivalent algebraic expressions in one or more variables to extract information.	Using equations to solve problems Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas
		a. Solve equations and inequalities involving the absolute value of a linear expression.	Absolute value functions
		b. Express and solve systems of linear equations in three variables with and without the use of technology.	Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations
		c. Solve systems of linear inequalities in two variables and graph the solution set.	Inequalities in two variables

<b>Equations and Inequalities</b>	E1. Linear equations and inequalities	d. Recognize and solve problems that can be represented by single variable linear equations or inequalities or systems of linear equations or inequalities involving two or more variables. Interpret the solution(s) in terms of the context of the problem.	Solving linear equations Equations with parentheses and fractions Using equations to solve problems Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables Systems of equations and graphs The elimination method for systems of equations The substitution method for systems of equations Problems leading to systems of equations
	E2. Nonlinear equations and inequalities	a. Solve single-variable quadratic, exponential, rational, radical, and factorable higher-order polynomial equations over the set of real numbers, including quadratic equations involving absolute value.	Simplifying rational functions Operations with algebraic fractions Improper fractions Solving quadratic equations The laws of logarithms Solving equations involving logarithms Exponentials and logarithms Exponential growth and decay Absolute value functions
		b. Solve single variable quadratic equations and inequalities over the complex numbers; graph real solution sets on a number line.	Quadratic inequalities Solving quadratic inequalities Solving quadratic equations Graphs of quadratic functions
		c. Use the discriminant, $D = b^2 - 4ac$ , to determine the nature of the solutions of the equation $ax^2 + bx + c = 0$	Solving quadratic equations
		d. Graph the solution set of a two-variable quadratic inequality in the coordinate plane.	Solving quadratic inequalities
		e. Rewrite nonlinear equations and inequalities to express them in multiple forms in order to facilitate finding a solution set or to extract information about the relationships or graphs indicated.	Quadratic inequalities Solving quadratic inequalities Solving quadratic equations Graphs of quadratic functions

<b>Polynomial and Rational Functions</b>	P1. Quadratic functions	a. Determine key characteristics of quadratic functions and their graphs.	Graphs of quadratic functions
		b. Represent quadratic functions using tables, graphs, verbal statements, and equations. Translate among these representations.	Graphs of quadratic functions
		c. Describe and represent the effect that changes in the parameters of a quadratic function have on the shape and position of its graph.	Graphs of quadratic functions
		d. Recognize, express, and solve problems that can be modeled using quadratic functions. Interpret their solutions in terms of the context.	Problems leading to quadratic equations Solving quadratic equations Graphs of quadratic functions
	P2. Higher-order polynomial and rational functions	a. Determine key characteristics of power functions in the form $f(x) = ax^n$ , $a \neq 0$ , for positive integral values of $n$ and their graphs.	Graphs of important non-linear functions Plotting and sketching graphs
		b. Determine key characteristics of polynomial functions and their graphs.	Plotting and sketching graphs
		c. Represent polynomial functions using tables, graphs, verbal statements, and equations. Translate among these representations.	Graphs of quadratic functions Plotting and sketching graphs
		d. Determine key characteristics of simple rational functions and their graphs.	Simplifying rational functions Operations with algebraic fractions Improper fractions
		e. Represent simple rational functions using tables, graphs, verbal statements, and equations. Translate among these representations.	Simplifying rational functions Operations with algebraic fractions Improper fractions
		f. Recognize, express, and solve problems that can be modeled using polynomial and simple rational functions. Interpret their solutions in terms of the context.	Problems leading to quadratic equations
	a. Determine key characteristics of exponential functions and their graphs.	The laws of logarithms Solving equations involving logarithms Exponentials and logarithms Exponential growth and decay	

<b>Exponential Functions</b>	X1. Exponential functions	b. Represent exponential functions using tables, graphs, verbal statements, and equations. Represent exponential equations in multiple forms. Translate among these representations.	The laws of logarithms Solving equations involving logarithms Exponentials and logarithms Exponential growth and decay
		c. Describe and represent the effect that changes in the parameters of an exponential function have on the shape and position of its graph.	Graphs of important non-linear functions Exponentials and logarithms
		d. Recognize, express, and solve problems that can be modeled using exponential functions, including those where logarithms provide an efficient method of solution. Interpret their solutions in terms of the context.	Exponential growth and decay
<b>Function Operations and Inverses</b>	F1. Function operations	a. Combine functions by addition, subtraction, multiplication, and division.	Operations with polynomials Dividing polynomials The factor theorem
		b. Determine the composition of two functions, including any necessary restrictions on the domain.	Domain, range and composite functions
	F2. Inverse functions	a. Describe the conditions under which an inverse relation is a function.	Inverse functions
		b. Determine and graph the inverse relation of a function.	Inverse functions
	F3. Piecewise-defined functions	a. Determine key characteristics of absolute value, step, and other piecewise-defined functions.	Absolute value functions
		b. Represent piecewise-defined functions using tables, graphs, verbal statements, and equations. Translate among these representations.	Absolute value functions
		c. Recognize, express, and solve problems that can be modeled using absolute value, step, and other piecewise-defined functions. Interpret their solutions in terms of the context.	Absolute value functions