Indiana State Core Curriculum

Standards updated 2009

Algebra I

Strand	Description	Boardworks High School Algebra presentations
Operations With Real Numbers	**A1.1 Students simplify and compare expressions. They use rational exponents and simply square roots.**	
	A1.1.1 Compare real number expressions.	–
	A1.1.2 Simplify square roots using factors.	Manipulating radicals
	A1.1.3 Understand and use the distributive, associative, and commutative properties.	Multiplying parentheses The distributive property
	A1.1.4 Use the laws of exponents for rational exponents.	Exponents Zero, negative and fractional exponents
	A1.1.5 Use dimensional (unit) analysis to organize conversions and computations.	–
Linear Equations and Inequalities	**A1.2 Students solve linear equations and inequalities in one variable. They solve word problems that involve linear equations, inequalities, or formulas.**	
	A1.2.1 Solve linear equations.	Solving linear equations
	A1.2.2 Solve equations and formulas for a specified variable.	Using equations to solve problems Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas
	A1.2.3 Find solution sets of linear inequalities when possible numbers are given for the variable.	Inequalities Solving linear inequalities Inequalities and regions
	A1.2.4 Solve linear inequalities using properties of order.	Inequalities Solving linear inequalities Inequalities and regions
	A1.2.5 Solve combined linear inequalities.	Inequalities in two variables

	A1.2.6 Solve word problems that involve linear equations, formulas, and inequalities.	Using equations to solve problems Substituting into formulas Formula problems Rearranging a formula Manipulating formulas Generating formulas Inequalities Solving linear inequalities Inequalities and regions Inequalities in two variables Solving linear equations
Relations and Functions	**A1.3 Students sketch and interpret graphs representing given situations. They understand the concept of a function and analyze the graphs of functions.**	
	A1.3.1 Sketch a reasonable graph for a given relationship.	Linear graphs Slopes and intercepts Plotting and sketching graphs
	A1.3.2 Interpret a graph representing a given situation.	Real life graphs Graphs of important non-linear functions Graphs of quadratic functions Plotting and sketching graphs
	A1.3.3 Understand the concept of a function, decide if a given relation is a function, and link equations to functions.	Non-linear functions Function notation Functions and relations
	A1.3.4 Find the domain and range of a relation.	Domain, range and composite functions
Graphing Linear Equations	**A1.4 Students graph linear equations and inequalities in two variables. They write equations of lines and find and use the slope and y-intercept of lines. They use linear equations to model real data.**	
	A1.4.1 Graph a linear equation.	Linear graphs Slopes and intercepts Parallel and perpendicular lines
	A1.4.2 Find the slope, x-intercept and y-intercept of a line given its graph, its equation, or two points on the line.	Slopes and intercepts Coordinate geometry The equation of a straight line

and Inequalities	A1.4.3 Write the equation of a line in slope-intercept form. Understand how the slope and y-intercept of the graph are related to the equation.	Slopes and intercepts
	A1.4.4 Write the equation of a line given appropriate information.	The equation of a straight line
	A1.4.5 Write the equation of a line that models a data set and use the equation (or the graph of the equation) to make predictions. Describe the slope of the line in terms of the data, recognizing that the slope is the rate of change.	Real life graphs Scatter plots Lines of best fit
	A1.4.6 Graph a linear inequality in two variables.	Inequalities in two variables
Pairs of Linear Equations and Inequalities	**A1.5 Students solve pairs of linear equations using graphs and using algebra. They solve pairs of linear inequalities using graphs. They solve word problems involving pairs of linear equations.**	
	A1.5.1 Use a graph to estimate the solution of a pair of linear equations in two variables.	Systems of equations and graphs
	A1.5.2 Use a graph to find the solution set of a pair of linear inequalities in two variables.	Inequalities in two variables
	A1.5.3 Understand and use the substitution method to solve a pair of linear equations in two variables.	The substitution method for systems of equations
	A1.5.4 Understand and use the addition or subtraction method to solve a pair of linear equations in two variables.	The elimination method for systems of equations
	A1.5.5 Understand and use multiplication with the addition or subtraction method to solve a pair of linear equations in two variables.	The elimination method for systems of equations
	A1.5.6 Use pairs of linear equations to solve word problems.	Problems leading to systems of equations
	A1.6 Students add, subtract, multiply, and divide polynomials. They factor quadratics.	
	A1.6.1 Add and subtract polynomials.	Operations with polynomials
	A1.6.2 Multiply and divide monomials.	Operations with polynomials Dividing polynomials The factor theorem

Polynomials	A1.6.3 Find powers and roots of monomials (only when the answer has an integer exponent).	Exponents Zero, negative and fractional exponents
	A1.6.4 Multiply polynomials.	Operations with polynomials
	A1.6.5 Divide polynomials by monomials.	Dividing polynomials The factor theorem
	A1.6.6 Find a common monomial factor in a polynomial.	The factor theorem
	A1.6.7 Factor the difference of two squares and other quadratics.	Factoring Factoring quadratic expressions Quadratic equations and factoring The distributive property
	A1.6.8 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.	Graphs of quadratic functions Solving quadratic equations
Algebraic Functions	**A1.7 Students simplify algebraic ratios and solve algebraic proportions.**	
	A1.7.1 Simplify algebraic ratios.	Ratio Dividing in a given ratio
	A1.7.2 Solve algebraic proportions.	Algebraic fractions
Quadratic, Cubic, and Radical Equations	**A1.8 Students graph and solve quadratic and radical equations. They graph cubic equations.**	
	A1.8.1 Graph quadratic, cubic, and radical equations.	Graphs of quadratic functions Plotting and sketching graphs
	A1.8.2 Solve quadratic equations by factoring.	Factoring Factoring quadratic expressions Quadratic equations and factoring Solving quadratic equations
	A1.8.3 Solve quadratic equations in which a perfect square equals a constant.	Quadratics and completing the square
	A1.8.4 Complete the square to solve quadratic equations.	Completing the square
	A1.8.5 Derive the quadratic formula by completing the square.	Solving quadratic equations
	A1.8.6 Solve quadratic equations by using the quadratic formula.	The quadratic formula Solving quadratic equations

	A1.8.7 Use quadratic equations to solve word problems.	Problems leading to quadratic equations
	A1.8.8 Solve equations that contain radical expressions.	Manipulating formulas Manipulating radicals
	A1.8.9 Use graphing technology to find approximate solutions of quadratic and cubic equations.	Graphs of important non-linear functions Graphs of quadratic functions Plotting and sketching graphs
Mathematical Reasoning and Problem Solving	**A1.9 Students use a variety of strategies to solve problems. Students develop and evaluate mathematical arguments and proofs.**	
	A1.9.1 Use a variety of problem solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards.	–
	A1.9.2 Decide whether a solution is reasonable in the context of the original situation.	–
	A1.9.3 Use the properties of the real number system and the order of operations to justify the steps of simplifying functions and solving equations.	Calculating with integers Factoring Multiplying parentheses The distributive property
	A1.9.4 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
	A1.9.5 Decide whether a given algebraic statement is true always, sometimes, or never (statements involving linear or quadratic expressions, equations, or inequalities).	–
	A1.9.6 Distinguish between inductive and deductive reasoning, identifying and providing examples of each.	–
	A1.9.7 Identify the hypothesis and conclusion in a logical deduction.	Specifying the problem and planning

	A1.9.8 Use counterexamples to show that statements are false, recognizing that a single counterexample is sufficient to prove a general statement false.	–