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DEPARTMENT OF EDUCATION

Working Together for Student Success



Indiana Academic Standards Algebra I Crosswalk

2014 Standard Language	2020 Standard Language	Changes
Algebra I		
Real Numbers and Expressions	Number Systems and Expressions	Change in title to include real and imaginary number systems
AI.RNE.1: Understand the hierarchy and relationships of numbers and sets of numbers within the real number system.		Removed standard
AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.		Removed standard
	AI.NE.1: Explain the hierarchy and relationships of numbers and sets of numbers within the complex number system. Know that there is an imaginary number, i , such that $\sqrt{-1} = i$. Understand that the imaginary numbers along with the real numbers form the complex number system.	New standard
AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents		Removed standard

using the properties of exponents.		
AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials.	AI.NE.3: Simplify square roots of monomial algebraic expressions, including non-perfect squares.	Indicator change Language change
AI.RNE.5: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms.	AI.NE.2: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms.	Indicator change No language change
AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions.	AI.NE.4: Factor quadratic expressions (including the difference of two squares, perfect square trinomials and other quadratic expressions).	Indicator change Language change Removed “factoring common terms from polynomials and factor polynomials completely”
AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers; add, subtract, and multiply polynomials and divide polynomials by monomials.	AI.NE.5: Add, subtract, and multiply polynomials. Divide polynomials by monomials.	Indicator change Language change Removed “Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers”
Functions		
AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of	AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of	Language change Added “with points of the form $(x, f(x))$ ”

<p>its domain, then $f(x)$ denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation $y = f(x)$.</p>	<p>its domain, then $f(x)$ denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation $y = f(x)$ with points of the form $(x, f(x))$.</p>	
<p>AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship.</p>	<p>AI.F.4: Describe, qualitatively, the functional relationship between two quantities by analyzing key features of a graph. Sketch a graph that exhibits given key features of a function that has been verbally described, including intercepts, where the function is increasing or decreasing, where the function is positive or negative, and any relative maximum or minimum values, Identify the independent and dependent variables.</p>	<p>Indicator change</p> <p>Language change</p> <p>Added “key features of”</p> <p>Added “where the function is positive or negative” and “relative” and “intercepts”</p> <p>Removed “linear or nonlinear”</p> <p>Removed “and make predictions about the relationship”</p>
<p>AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations.</p>	<p>AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations.</p>	<p>No change</p>
<p>AI.F.4: Understand and interpret statements that use function notation in terms of a context; relate the domain of the function to its graph and to the quantitative relationship it describes.</p>	<p>AI.F.2: Evaluate functions for given elements of its domain, and interpret statements in function notation in terms of a context.</p>	<p>Indicator change</p> <p>Language change</p> <p>Added “evaluate functions for given elements of its domain”</p> <p>Removed “understand” at beginning of standard</p> <p>Removed “relate the domain of the function to its graph and to the quantitative relationship it describes”</p>

Linear Equations, Inequalities, and Functions

<p>AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method.</p>	<p>AI.L.1: Represent real-world problems using linear equations and inequalities in one variable, including those with rational number coefficients and variables on both sides of the equal sign. Solve them fluently, explaining the process used and justifying the choice of a solution method.</p>	<p>Language change</p> <p>Changed “with integers, fractions, and decimals as coefficients” to “rational number coefficients”</p> <p>Added “ variables on both sides of the equal sign”</p> <p>Removed “Understand that the steps taken when solving linear equations create new equations that have the same solution as the original”</p>
<p>AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable.</p>		<p>Removed standard</p>
<p>AI.L.3: Represent real-world and other mathematical problems using an algebraic proportion that leads to a linear equation and solve such problems.</p>		<p>Removed standard</p>
<p>AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line).</p>	<p>AI.L.3: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line). Find the equation of a</p>	<p>Indicator change</p> <p>Language change</p> <p>Added “Find the equation of a line, passing through a given point, that is parallel or perpendicular to a given line”</p>

	line, passing through a given point, that is parallel or perpendicular to a given line.	
AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts.	AI.L.4: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts.	Indicator change No language change
AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation.	AI.L.5: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation.	Indicator change No language change
AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing.	AI.L.6: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Graph the solutions to a linear inequality in two variables as a half-plane.	Indicator change Language change Changed “Solve other linear inequalities in two variables by graphing” to “Graph the solutions to a linear inequality in two variables as a half-plane”
AI.L.8: Solve compound linear inequalities in one variable, and represent and interpret the solution on a number line. Write a compound linear inequality given its number line representation.	AI.L.2: Solve compound linear inequalities in one variable, and represent and interpret the solution on a number line. Write a compound linear inequality given its number line representation.	Indicator change No language change
AI.L.9: Solve absolute value linear equations in one variable.		Removed standard Moved to 2020 All.PR.4

<p>AI.L.10: Graph absolute value linear equations in two variables.</p>		<p>Removed standard</p>
<p>AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.</p>	<p>AI.L.7: Solve linear and quadratic equations and formulas for a specified variable to highlight a quantity of interest, using the same reasoning as in solving equations.</p>	<p>Indicator change</p> <p>Language change</p> <p>Added “to highlight a quantity of interest, using the same reasoning as in solving equations”</p> <p>Added “and quadratic”</p> <p>Removed “ including equations with coefficients represented by variables”</p>
<p>Systems of Linear Equations and Inequalities</p>		
<p>AI.SEI.1: Understand the relationship between a solution of a pair of linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers.</p>	<p>AI.SEI.1: Understand the relationship between a solution of a system of two linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers.</p>	<p>Language change</p> <p>Changed “of a pair” to “of a system”</p>
<p>AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables</p>	<p>AI.SEI.2: Verify that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions, including cases with no solution and infinitely many solutions. Solve</p>	<p>Language change</p> <p>Changed “Understand that” to “Verify that”</p> <p>Added “ including cases with no solution and infinitely many solutions”</p>

using substitution and elimination.	systems of two linear equations algebraically using elimination and substitution methods.	Changed “pairs of linear equations in two variables” to “systems of two linear equations algebraically”
AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable.	AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable.	No change
AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other pairs of linear inequalities by graphing with and without technology.	AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes with and without technology. Interpret the solution set and determine whether it is reasonable.	Language change Removed “ and solve such problems” in first sentence Added “Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes “
Quadratic and Exponential Equations and Functions		
AI.QE.1: Distinguish between situations that can be modeled with linear functions and with exponential functions. Understand that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Compare linear functions and exponential functions that model real-world situations	AI.QE.1: Distinguish between situations that can be modeled with linear functions and with exponential functions. Understand that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Compare linear functions and exponential functions that model real-world situations	No change

using tables, graphs, and equations.	using tables, graphs, and equations.	
AI.QE.2: Represent real-world and other mathematical problems that can be modeled with exponential functions using tables, graphs, and equations of the form $y = ab^x$ (for integer values of $x > 1$, rational values of $b > 0$ and $b \neq 1$); translate fluently among these representations and interpret the values of a and b .	AI.QE.2: Represent real-world and other mathematical problems that can be modeled with simple exponential functions using tables, graphs, and equations of the form $y = ab^x$ (for integer values of $x > 1$, rational values of $b > 0$ and $b \neq 1$) with and without technology; interpret the values of a and b .	Language change Added “simple” Added “with and without technology” Removed “translate fluently among these representations and”
	AI.QE.3 Use area models to develop the concept of completing the square to solve quadratic equations. Explore the relationship between completing the square and the quadratic formula.	New standard
A1.QE.3: Graph exponential and quadratic equations in two variables with and without technology.	A1.QE.6: Graph exponential and quadratic functions with and without technology. Identify and describe key features, such as zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions with and without technology; interpret the results in the real-world contexts.	Indicator change Language change Changed “equations” to “functions” to correct Removed “in two variables” Added “ Identify and describe key features, such as zeros, lines of symmetry, and extreme values in real-world and other mathematical problems

		involving quadratic functions with and without technology; interpret the results in the real-world contexts“
AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for $x^2 = 49$), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation.	AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for $x^2 = 49$), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation.	No change
AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.	AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with technology. Interpret the solution(s) and determine whether they are reasonable.	Language change Removed “and without”
AI.QE.6: Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts.		Removed standard
AI.QE.7: Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression.	AI.QE.7: Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression. Explain that every quadratic has two complex solutions, which may or may not be real solutions.	Added “Explain that every quadratic has two complex solutions, which may or may not be real solutions”

Data Analysis and Statistics

<p>AI.DS.1: Distinguish between random and non-random sampling methods, identify possible sources of bias in sampling, describe how such bias can be controlled and reduced, evaluate the characteristics of a good survey and well-designed experiment, design simple experiments or investigations to collect data to answer questions of interest, and make inferences from sample results.</p>		<p>Removed standard</p> <p>Moved to 2020 All.DSP.1</p> <p>No language change</p>
	<p>AI.DS.1: Understand statistics as a process for making inferences about a population based on a random sample from that population. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p>	<p>New standard</p> <p>Moved from 2014 All.DSP.1</p> <p>Language change</p> <p>Changed “Make inferences and justify conclusions from sample surveys, experiments, and observational studies” to “Understand statistics as a process for making inferences about a population based on a random sample from that population”</p>
<p>AI.DS.2: Graph bivariate data on a scatter plot and describe the relationship between the variables.</p>		<p>Removed standard</p>
<p>AI.DS.3: Use technology to find a linear function that models a relationship for a bivariate data set to make predictions; interpret the slope and y-intercept, and compute (using technology) and interpret the</p>	<p>AI.DS.3: Use technology to find a linear function that models a relationship between two quantitative variables to make predictions, and interpret the slope and y-intercept. Using technology, compute and</p>	<p>Language change</p> <p>Changed “for a bivariate data set” to “between two quantitative variables”</p> <p>Changed “and compute (using</p>

correlation coefficient.	interpret the correlation coefficient.	technology) and interpret the correlation coefficient.” to “Using technology, compute and interpret the correlation coefficient“
AI.DS.4: Distinguish between correlation and causation.	AI.DS.4: Distinguish between correlation and causation.	No change
AI.DS.5: Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns (including joint, marginal, and conditional relative frequencies) to describe possible associations and trends in the data.	AI.DS.5: Summarize bivariate categorical data in two-way frequency tables. Interpret relative frequencies in the contexts of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in data.	Language change Removed “Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table”
AI.DS.6: Understand that statistics and data are non-neutral and designed to serve a particular interest. Analyze the possibilities for whose interest might be served and how the representations might be misleading.	AI.DS.2: Understand that statistics and data are non-neutral and designed to serve a particular interest. Analyze the possibilities for whose interest might be served and how the representations might be misleading.	Indicator change No language change