Algebra II

This document provides correlations between the 2023 Indiana Academic Standards and the 2020 Indiana Academic Standards for easy reference.

The 2023 Indiana Academic Standards resulted from the standards streamlining process required by Indiana Code 20-31-3-1(c-d) and were adopted by the Indiana State Board of Education in June 2023. Standards designated as essential (E) are shaded in gray and all standards were renumbered to avoid gaps in sequencing.

Algebra II standards were revised with a heightened emphasis on data and modeling to align with recommendations from the Indiana Modernization of Mathematics Task Force. These revisions resulted in new standard wording, numbering, and six new domains including: Arithmetic and Structure of Expressions, Equations, and Functions, Function Families, Modeling with Functions and Data, Modeling with Advanced Algebra, Modeling with Data and Statistics, and Modeling with Quantities.

2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Arithmetic and Structure of Expressions, Equations, and Functions			
Number	**Text**	**Number**	**Text**
AII.ASE.1	Explain how extending the properties of integer exponents to rational numbers allows for a notation for radicals in terms of rational exponents (e.g., $5^{1/3}$) and explain how this is defined.	**AII.ASE.1**	Explain how extending the properties of integer exponents to rational numbers allows for a notation for radicals in terms of rational exponents (e.g. $5^{1/3}$) is defined to be the cube root of 5 because we want $(5^{1/3})^3 = 5(^{1/3})^3$ to hold, so $(5^{1/3})^3$ must equal 5.)
AII.ASE.2	Rewrite algebraic rational expressions in equivalent forms (e.g., using properties of exponents and factoring techniques) and describe how rewriting those expressions reveals mathematical structure.	**AII.ASE.3**	Rewrite algebraic rational expressions in equivalent forms (e.g., using properties of exponents and factoring techniques). Add, subtract, multiply, and divide algebraic rational expressions.

	Add, subtract, multiply, and divide algebraic rational expressions. (E)		
AII.ASE.3	Solve systems of equations consisting of linear and nonlinear equations or functions in two variables algebraically and graphically.	**AII.SEI.1**	Solve a system of equations consisting of a linear equation and a quadratic equation in two variables algebraically and graphically with and without technology.
AII.ASE.4	Solve exponential and logarithmic equations in one variable.	**AII.EL.5**	Solve exponential and logarithmic equations in one variable.
2023 Indiana Academic Standard **Domain: Function Families**		**2020 Indiana Academic Standard**	
Number	**Text**	**Number**	**Text**
AII.FF.1	Using technology, identify, create, and connect algebraic and graphical representations of each of the function families listed: a. Quadratic b. Polynomial c. Square root d. Rational e. Exponential f. Logarithmic g. Piecewise-defined and absolute value functions (E)	**AII.PR.1**	Solve real-world and other mathematical problems involving polynomial equations with and without technology. Interpret the solutions and determine whether the solutions are reasonable.
AII.FF.2	Graph each of the families of function with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes, symmetry, and end behavior. Create	**AII.PR.2**	Graph mathematical functions including: a. polynomial functions; b. rational functions; c. square root functions;

	inverse functions algebraically and/or graphically based on a given function. Model real-world situations with each function family. (E)		d. absolute value functions; and, e. piecewise-defined functions with technology. Identify and describe features, such as intercepts, domain and range, end behavior, and lines of symmetry.
AII.FF.3	Use graphical and algebraic structures and techniques to transform functions into equivalent forms to expose different information and identify key features. Connect the meaning of the key features to contextual situations. (E)	**AII.EL.1**	Graph exponential and logarithmic functions with and without technology. Identify and describe key features, such as intercepts, domain and range, asymptotes and end behavior. Know that the inverse of an exponential function is a logarithmic function.
AII.FF.4	Solve real-world problems with each function family, including situations in the context of science and economic phenomena. (E)	**AII.EL.6**	Represent real-world problems using exponential and logarithmic functions and solve such problems with technology. Interpret the solutions and determine whether they are reasonable.
2023 Indiana Academic Standard **Domain: Modeling with Functions and Data**		**2020 Indiana Academic Standard**	
Number	**Text**	**Number**	**Text**
AII.MFD.1	Define functions and their inverses and illustrate examples algebraically and graphically. Identify real-world situations that can be modeled using functions. (E)	**AII.F.2**	Define and find the inverse of a function. Verify functions are inverses algebraically and graphically.
AII.MFD.2	Represent real-world problems that can be modeled by linear, quadratic, exponential, and rational functions using tables, graphs, and equations. Use technology to represent the functional relationships and translate and interpret different forms (e.g.,	**AII.Q.1**	Represent real-world problems that can be modeled with quadratic functions using tables, graphs, and equations; translate fluently among these representations. Solve such problems with and without technology. Interpret the solutions and

	vertex form of a quadratic, intercepts, end behavior) with respect to the context. (E)		determine whether they are reasonable.
		AII.EL.6	Represent real-world problems using exponential and logarithmic functions and solve such problems with technology. Interpret the solutions and determine whether they are reasonable.
AII.MFD.3	Use technology to find a linear, quadratic, or exponential function that models a relationship for a bivariate data set to make predictions; interpret the correlation coefficient for linear models. Compare and evaluate model fit using different function families. (E)	**AII.DSP.3**	Use technology to find a linear, quadratic, or exponential function that models a relationship for a bivariate data set to make predictions; Interpret the correlation coefficient for linear models.
AII.MFD.4	Explore the effects of function transformations using graphing technology. Explain the effects of transformations of functions such as *f(x) + k, kf(x)*, *f(kx)*, or *f(x + k)* for different functions and values of *k*. (E)	**AII.F.4**	Explore and describe the effect on the graph of *f(x)* by replacing *f(x)* with *f(x) + k, kf(x)*, *f(kx)*, and *f(x + k)* for specific values of *k* (both positive and negative) with and without technology. Find the value of *k* given the graph of *f(x)* and the graph of *f(x) + k*, *k f(x), f(kx)*, or *f(x + k)*.
2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Modeling with Advanced Algebra			
Number	**Text**	**Number**	**Text**
AII.MAA.1	Use algebraic and graphical strategies to make use of structure with quadratic, polynomial, and rational functions to solve real-world problems, including but not limited to: a. Completing the square to rewrite contextual quadratic functions in vertex form and	**AII.Q.2**	Use completing the square to rewrite quadratic functions in vertex form and graph these functions with and without technology.
		AII.Q.4	Use the discriminant to determine the number and type of solutions of a quadratic equation. Find all solutions and write complex solutions in the form of

	interpret the outcome; b. Determining the number of solutions to a function using graphical and algebraic forms (including the discriminant and complex numbers as appropriate); c. Factoring, grouping, and rewriting functions using properties of exponents; and d. Identifying and explaining extraneous roots.		a ± bi for real numbers a and b.
AII.MAA.2	Represent and solve real-world systems of linear equations and inequalities in two or three variables algebraically and using technology. Interpret the solution, and determine whether it is reasonable. (E)	**AII.SEI.2**	Represent and solve real-world systems of linear equations and inequalities in two or three variables algebraically and using technology. Interpret the solution set and determine whether it is reasonable.
		AII.SEI.3	Represent real-world problems using a system of linear equations in three variables. Understand that the algebraic steps to solve a two variable system can be extended to systems of equations in three variables.
AII.MAA.3	Model real-world phenomena using linear programming and matrices.		
2023 Indiana Academic Standard **Domain: Modeling with Data and Statistics**		**2020 Indiana Academic Standard**	
Number	**Text**	**Number**	**Text**
AII.MDS.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	**AII.DSP.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.		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.
AII.MDS.2	Using the results of a simulation, decide if a specified model is consistent with the results. Construct a theoretical model, and apply the law of large numbers to show the relationship between the two models. (E)	**AII.DSP.4**	Using the results of a simulation, decide if a specified model is consistent to those results. Construct a theoretical model and apply the law of large numbers to show the relationship between the two models.
AII.MDS.3	Use data science techniques such as predictive modeling, linear algebra, and conditional probability to analyze data sets and make and evaluate claims.		
2023 Indiana Academic Standard		**2020 Indiana Academic Standard**	
Domain: Modeling with Quantities			
Number	**Text**	**Number**	**Text**
AII.MQ.1	Model real-world probability situations using permutations, combinations, and the Fundamental Counting Principle. (E)	**AII.DSP.6**	Understand the Fundamental Counting Principle, permutations, and combinations; apply these concepts to calculate probabilities.

Removed 2020 Indiana Academic Standards: These standards were removed from the 2023 Indiana Academic Standards through the legislatively-required streamlining process.	
AII.DSP.2	Interpret and compare univariate data using measures of center (mean and median) and spread (range, inter-quartile range, standard deviation, and variance). Understand the effects of outliers on the statistical summary of the data.
AII.DSP.5	Understand dependent and independent events, and conditional probability; apply these concepts to calculate probabilities.

AII.ASE.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
AII.ASE.4	Rewrite rational expressions in different forms; write *a(x)/b(x)* in the form *q(x) + r(x)/b(x)*, where *a(x)*, *b(x)*, *q(x)*, and *r(x)* are polynomials with the degree of *r(x)* less than the degree of *b(x)*.
AII.PR.3	Solve real-world and other mathematical problems involving radical and rational equations. Give examples showing how extraneous solutions may arise.
AII.PR.4	Solve absolute value linear equations and inequalities in one variable.
AII.F.1	Understand composition of functions and combine functions by composition.
AII.F.3	Understand that if the graph of a function contains a point (*a, b*), then the graph of the inverse relation of the function contains the point (*b, a*); the inverse is a reflection over the line *y = x.*
AII.Q.3	Understand that different forms of a quadratic equation can provide different information. Use and translate quadratic functions between standard, vertex, and intercept form to graph and identify key features, including intercepts, vertex, line of symmetry, end behavior, and domain and range.
AII.EL.2	Identify the percent rate of change in exponential functions. Classify them as representing exponential growth or decay.
AII.EL.3	Use the properties of exponents to rewrite expressions to describe transformations of exponential functions.
AII.EL.4	Use the properties of exponents to derive the properties of logarithms. Evaluate exponential and logarithmic expressions.