Algebra II Potential Gaps in Student Pre-Requisite Knowledge

This document indicates pre-requisite knowledge gaps that may exist for Algebra II students based on what the Algebra I common core math standards expect. Column four indicates the Algebra II common core standard which could be affected if the Algebra I gap exists. Bold blue text indicates the Algebra I Assessment Limit and Clarifications for standards shared by Algebra I and Algebra II. Limits and clarifications can be found on pages 56-59 of the PARCC Model Content Frameworks. Other gaps may exist for other reasons; therefore, it important that teachers diagnose their students' needs as part of the planning process.

Domain	Algebra I CCSS	Wording of Algebra I CCSS Expectation	Algebra II CCSS
Algebra (A)	**HSA-SSE.A.2**	Use the structure of **numerical and polynomials expressions** to identify ways to rewrite it. **Examples: Recognize $52^2 - 47^2$ as a difference of squares and see an opportunity to rewrite it in the easier-to-evaluate form (53+47)(53-47). See an opportunity to rewrite $a^2 + 9a + 14$ as (a+7)(a+2).**	**HSA-SSE.A.2**
	HSA-SSE.B.3c	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of **integer** exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	**HSA-SSE.B.3c**
	HSA-APR.A.1	d. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**HSA-APR.C.4**
	HSA-APR.B.3	Identify zeros of **quadratic and cubic polynomials in which linear and quadratic factors are available,** and use the zeros to construct a rough graph of the function defined by the polynomial.	**HSA-APR.B.3**
	HSA-CED.A.1	Create **linear, quadratic, or exponential equations with integer exponents** in one variable and use them to solve problems	**HSA-CED.A.1**
	HSA-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**HSA-REI.C.7**
	HSA-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	**HSA-REI.C.6**
	HSA-REI.A.1	Explain each step in solving a simple **quadratic** equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**HSA-REI.A.1**
	HSA-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**HSA-REI.B.4**

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Algebra (A) (continued)	**HSA-REI.B.4a**	Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form.	**HSA-REI.B.4b**
	HSA-REI.B.4b	Solve quadratic equations in one variable. b. Solve quadratic equations by inspection (e.g., for $x_2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions; **however, students were not required to write solutions for nonzero imaginary parts.**	**HSA-REI.B.4b**
	HSA-REI.C.5	Prove 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.	**HSA-REI.C.6**
	HSA-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**HSA-REI.D.11**
	HSA-REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. **Include cases where f(x) and/or g(x) are linear, polynomial, rational, and absolute value. Finding solutions approximately was limited to tasks in which f(x) and g(x) were polynomial functions.**	**HSA-REI.D.11**
Functions (F)	**HSF-IF.B.4**	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*. **Limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-functions (including step functions and absolute value functions) and exponential functions with domains in the integers.**	**HSF-IF.B.4**
	HSF-IF.C.7a-b	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	**HSF-IF.C.7c** **HSF-IF.C.7e**

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Functions (F) (continued)	**HSF-IF.C.8a**	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	**Pre-requisite for unit on quadratic functions**
	HSF-BF.A.1a	Write a **linear, quadratic, or exponential (domains in the integers) function** that describes a relationship between two quantities. ★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	**HSF-BF.A.1a**
	HSF.BF.B.3	Identify the effect on the **graphs of linear and quadratic functions** of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology **limited to linear functions, quadratic functions, square root functions, cube root functions (including step functions and absolute value functions) and exponential functions with domains in the integers.**	**HSF.BF.B.3**
	HSF-LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	**HSF-LE.A.2**
	HSF-LE.A.2	Construct linear and exponential functions **in simple context (not multi-step),** including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**HSF-LE.A.2**
	HSF-LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	**HSF-LE.B.5**
	HSF-LE.B.5	Interpret the parameters in a linear or exponential **(domains in the integers)** function in terms of a context.	**HSF-LE.B.5**
Statistics and Probability (S)	**HSS-ID.B.5**	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**HSS-CP.A.4**