

ALGEBRA II
2012-2013 SCOPE AND SEQUENCE

1st	Six Weeks	28 Days		The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents..
		Aug. 27 – Oct. 5, 2012		
		# of Lessons	Objectives	
Unit 1: Developing a Family of Functions Students apply the relationship of functions to their graphs and transformations.		4 90-min. lessons	<p>Ⓡ ALGII.1A Identify the mathematical domains and ranges of functions, determine reasonable domain and range values for continuous and discrete situations, and describe situations given domain and range values.</p> <p>Ⓢ ALGII.4A Identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$), logarithmic ($f(x) = \log_a x$), absolute value of x ($f(x) = x$), square root ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$) functions.</p> <p>Ⓡ ALGII.4B Extend parent functions with parameters such as a in $f(x) - a/x$ and including a in $g(x) = a[f(x)]$, k in $g(x) = f(x) + k$, and h in $g(x) = f(x - h)$, and describe the effects of the parameter changes on the graph of parent functions.</p> <p>Ⓢ ALGII.4C Describe and analyze the relationship between a function and its inverse using concrete representations, tables of values, graphs, and symbolic representations.</p>	
		or 8 45-min. lessons		
Unit 2: Analyzing Linear Functions and Inequalities Students solve and graph linear equations and inequalities, analyze linear functions, and apply these functions as models of real-world situations.		8 90-min. lessons	<p><u>2 (45-min) Lessons: Solving Equations and Inequalities</u></p> <p>Ⓢ ALGII.2A Use and apply tools including factoring and properties of exponents to simplify expressions and to transform and solve equations and inequalities.</p>	
		or 16 45-min. lessons	<p><u>10 (45-min) Lessons: Linear Functions</u></p> <p>Ⓡ ALGII.1B Collect and organize data in a table or list, make and interpret scatterplots using graphing calculators, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments.</p> <p>Ⓢ ALGII.4A Identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$), logarithmic ($f(x) = \log_a x$), absolute value of x ($f(x) = x$), square root ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$) functions.</p> <p>Ⓡ ALGII.4B Extend parent functions with parameters such as a in $f(x) - a/x$ and including a in $g(x) = a[f(x)]$, k in $g(x) = f(x) + k$, and h in $g(x) = f(x - h)$, and describe the effects of the parameter changes on the graph of parent functions.</p>	
		<p><u>2 (45-min) Lessons: Inverse of a Function</u></p> <p>Ⓡ ALGII.1B Collect and organize data in a table or list, make and interpret scatterplots using graphing calculators, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments.</p> <p>Ⓢ ALGII.4C Describe and analyze the relationship between a function and its inverse using concrete representations, tables of values, and symbolic representations.</p>		

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2nd Six Weeks	25 Days		The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents..
	Oct. 8 – Nov. 9, 2012		
	# of Lessons	Objectives	
Unit 3: Absolute Value Functions Students solve absolute value equations and inequalities and apply attributes of transformations to absolute value functions.	4 90-min. lessons or 8 45-min. lessons	The student will: Ⓜ ALGII.1A Identify the mathematical domains and ranges of functions, determine reasonable domain and range values for continuous and discrete situations, <i>and describe situations given domain and range values.</i> Ⓢ ALGII.2A Apply tools including factoring and properties of exponents to simplify expressions and to transform and solve equations and inequalities. Ⓢ ALGII.4A Identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$), logarithmic ($f(x) = \log_a x$), absolute value of x ($f(x) = x$), square root ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$) functions. Ⓜ ALGII.4B Extend parent functions with parameters such as a in $f(x) = a/x$ and <i>including a in $g(x) = a[f(x)]$, k in $g(x) = f(x) + k$, and h in $g(x) = f(x - h)$, and describe the effects of the parameter changes on the graph of parent functions.</i> Ⓢ ALGII.4C Describe and analyze the relationship between a function and its inverse <i>using concrete representations, tables of values, graphs, and symbolic representations.</i>	
Unit 4: Systems of Equations and Inequalities Students solve and analyze a system of linear equations using graphs, tables, matrices, and algebraic methods.	7 90-min. lessons or 14 45-min. lessons	7 (45-min) Lessons: Representing and Solving Systems of Equations and Inequalities Ⓜ ALGII.3A Analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns, to solve problems. Ⓜ ALGII.3B Use and apply algebraic methods including substitution or linear elimination, graphs, tables, or matrices to solve systems of equations or inequalities. Ⓜ ALGII.3C Interpret and determine <i>appropriate domain and range values</i> , and the reasonableness of solutions to systems of equations or inequalities, for given contexts. <hr style="border-top: 1px dashed black;"/> 7 (45-min) Lessons: Using Matrices to Solve Systems of Equations Ⓢ ALGII.2A Use and apply tools including factoring and properties of exponents to simplify expressions and to transform and solve equations and inequalities. Ⓜ ALGII.3A Analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns, to solve problems. Ⓜ ALGII.3B Use and apply algebraic methods <i>including substitution or linear elimination, graphs, tables, or matrices, to solve systems of equations or inequalities.</i> Ⓜ ALGII.3C Interpret and determine <i>appropriate domain and range values</i> , and the reasonableness of solutions to systems of equations or inequalities, for given contexts.	



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3rd Six Weeks	27 Days		The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents.
	Nov. 12 – Dec. 21, 2012		
	# of Lessons	Objectives	
Unit 5: Quadratic Functions Students demonstrate the transformation of a quadratic function and analyze quadratic functions inequalities for various solutions through multiple representations.	10 90-min. lessons	4 (45-min) Lessons: Transformations of Quadratic Functions Ⓡ ALGII.6A Determine the reasonable domain and range values of a quadratic function represented by a table of values, graph, function rule, or a contextual situation, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities. Ⓡ ALGII.6B Relate representations of quadratic functions in algebraic, tabular, graphical, and verbal forms. Ⓡ ALGII.7A Use characteristics of the quadratic parent function to sketch the related graphs and connect between the $f(x) = ax^2 + bx + c$ and the $f(x) = a(x - h)^2 + k$ symbolic representations of quadratic functions, and write the quadratic function in $f(x) = ax^2 + bx + c$ or $f(x) = a(x - h)^2 + k$ given the graph of the function. Ⓢ ALGII.7B Use the parent function to investigate, describe, and predict the effects of changes in a, h, and k on the graphs of $y = a(x - h)^2 + k$ form of a function and what those changes in symbolic representation may mean in a real world applications.	
	or 20 45-min. lessons	16 (45-min) Lessons: Solving and Analyzing Quadratic Equations Ⓢ ALGII.2A Apply tools including factoring and properties of exponents to simplify expressions and to transform and solve equations and inequalities. Ⓢ ALGII.2B Use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world applications. Ⓢ ALGII.5E Use the method of completing the square to solve quadratic equations and to transform general forms of conic sections in order to graph. Ⓡ ALGII.6A Determine the reasonable domain and range values of a quadratic function represented by a table of values, graph, function rule, or a contextual situation, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities. Ⓡ ALGII.6B Relate representations of quadratic functions in algebraic, tabular, graphical, and verbal forms. Ⓢ ALGII.6C Determine a quadratic function from its roots (real and complex) or a graph. Ⓡ ALGII.8A Analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems. Ⓢ ALGII.8B Analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula. Ⓢ ALGII.8C Compare and translate between algebraic solutions and graphical solutions of quadratic equations, and describe the relationship between the roots of a quadratic equation and the zeros of the corresponding quadratic function. Ⓡ ALGII.8D Solve quadratic equations and inequalities using graphs, tables, and algebraic methods.	



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4th	Six Weeks	33 Days	The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents..
		Jan. 8 – Feb. 22, 2013	
		# of Lessons	Objectives
		The student will:	
Unit 6: Square Root Functions Students explore square root equations and functions, and then connect the function's attributes to graphs and tables.	3 90-min. lessons or 6 45-min. lessons	<p>Ⓢ ALGII.9A Use the parent function to investigate, describe, and predict the effects of parameter changes on the graphs of square root functions and describe limitations on the domain and ranges.</p> <p>Ⓢ ALGII.9B Relate representations, such as algebraic, tabular, graphical, and verbal descriptions of square root functions.</p> <p>Ⓢ ALGII.9C Determine the reasonable domain and range values of square root functions, as well as interpret and determine the reasonableness of solutions to square root equations and inequalities.</p> <p>Ⓢ ALGII.9D Analyze solutions of square root equations using graphs, tables, and algebraic methods and relate to real-world applications.</p> <p>Ⓢ ALGII.9E Analyze solutions of square root inequalities using graphs and tables and relate to real-world applications.</p> <p>Ⓢ ALGII.9F Analyze situations modeled by square root functions, formulate equations or inequalities, select a method including tabular, graphical, or algebraic to solve problems.</p> <p>Ⓢ ALGII.9G Connect and express the inverses of square root functions with quadratic functions <i>from tabular, graphical, and algebraic representations.</i></p>	
Unit 7: Conic Sections Students develop the attributes of families of conic sections and identify and convert equations of conic sections from general form to standard form, and solve systems of equations.	8 90-min. lessons or 16 45-min. lessons	<p><u>8 (45-min) Lessons: Transformation of Conic Sections</u></p> <p>Ⓢ ALGII.5A Describe a conic section (<i>circle, ellipse, parabola, and hyperbola</i>) as the intersection of a plane and a cone <i>by comparing α, the acute angle the plane forms with the axis of the cone and β, the acute angle the face of the cone forms with its axis.</i></p> <p>Ⓢ ALGII.5B Sketch graphs of conic sections to relate simple parameter changes in the equations of <i>circles, $(x - h)^2 + (y - k)^2 = r^2$, parabolas, $y = (x - h)^2 + k$ or $x = (y - k)^2 + h$, ellipses, $(x - h)^2/a^2 + (y - k)^2/b^2 = 1$, and hyperbolas, $(x - h)^2/a^2 - (y - k)^2/b^2 = 1$ or $(y - k)^2/a^2 - (x - h)^2/b^2 = 1$ to corresponding change in the graph.</i></p> <p>Ⓢ ALGII.5C Identify symmetries from graphs of conic sections.</p> <hr style="border-top: 1px dashed black;"/> <p><u>8 (45-min) Lessons: Attributes of Conic Sections in Systems</u></p> <p>Ⓢ ALGII.3A Analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns, to solve problems.</p> <p>Ⓢ ALGII.3B Apply algebraic methods <i>including substitution or linear elimination</i>, graphs, tables, or matrices, to solve systems of equations or inequalities.</p> <p>Ⓢ ALGII.5B Sketch graphs of conic sections to relate simple parameter changes in the equations of <i>circles, $(x - h)^2 + (y - k)^2 = r^2$, parabolas, $y = (x - h)^2 + k$ or $x = (y - k)^2 + h$, ellipses, $(x - h)^2/a^2 + (y - k)^2/b^2 = 1$, and hyperbolas, $(x - h)^2/a^2 - (y - k)^2/b^2 = 1$ or $(y - k)^2/a^2 - (x - h)^2/b^2 = 1$ to corresponding change in the graph.</i></p> <p>Ⓢ ALGII.5C Identify symmetries from graphs of conic sections.</p> <p>Ⓢ ALGII.5D Identify a conic section from the given equation, <i>such as the general equation $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ and make generalizations from patterns in both equation and graphical form.</i></p> <p>Ⓢ ALGII.5E Use the method of completing the square to solve quadratic equations and to <i>transform general forms of conic sections in order to graph.</i></p>	



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		Jan. 8 – Feb. 22, 2013	
		# of Lessons	Objectives
		The student will:	
Unit 8: Transformations of Rational Functions Students study transformations of rational functions and characteristics of those functions through graphs, tables, and algebraic methods.	2 90-min. lessons or 4 45-min. lessons	<p><u>4 (45-min) Lessons: Transformation of Rational Functions</u></p> <p>Ⓢ ALGII.4A Identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$), logarithmic ($f(x) = \log_a x$), absolute value of x ($f(x) = x$), square root ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$) functions.</p> <p>Ⓢ ALGII.4B Extend parent functions with parameters including a in $g(x) = a[f(x)]$, k in $g(x) = f(x) + k$, and h in $g(x) = f(x - h)$, and describe the effects of the parameter changes on the graph of parent functions.</p> <p>Ⓢ ALGII.10A Use quotients of polynomials to describe the graphs of rational functions, predict the effects of parameter changes, describe limitations on the domains and ranges, and examine asymptotic behavior.</p> <p>Ⓢ ALGII.10B Analyze various representations of rational functions including tabular, verbal, symbolic, and graphical with respect to problem situations.</p>	



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5th	Six Weeks	29 Days		<i>The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents..</i>
		Feb. 25 – Apr. 12, 2013		
		# of Lessons	Objectives	
		The student will:		
Unit 9: Rational Functions Students study attributes of rational functions, connect rational functions to inverse variations, and solve rational equations.	5 90-min. lessons or 10 45-min. lessons	<u>10 (45-min) Lessons: Evaluating and Solving Rational Equations</u> Ⓒ ALGII.10C Determine the reasonable domain and range values of rational functions, as well as interpret and determine the reasonableness of solutions to rational equations and inequalities. Ⓒ ALGII.10D Determine <i>and analyze</i> the solutions of rational equations using graphs, tables, and algebraic methods. Ⓒ ALGII.10E Determine <i>and analyze the</i> solutions of rational inequalities using graphs and tables. Ⓒ ALGII.10F Analyze a situation modeled by a rational function, formulate an equation or inequality composed of a linear or quadratic function, and solve the problem. Ⓒ ALGII.10G Use functions to model and make predictions in problem situations involving direct and inverse variation.		
Unit 10: Exponential and Logarithmic Functions Students study transformations of exponential and logarithmic functions, applying laws of exponents and logarithms to real-world applications.	7 90-min. lessons or 14 45-min. lessons	<u>4 (45-min) Lessons: Transformation of Exponential and Logarithmic Functions</u> Ⓒ ALGII.4A Identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$) , logarithmic ($f(x) = \log_a x$) , absolute value of x ($f(x) = x $), square root ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$) functions. Ⓒ ALGII.11A Develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses <i>using concrete functions, tables, and symbolic expressions</i> . Ⓒ ALGII.11B Use the parent functions to investigate, describe, and predict the effects of parameter changes on the graphs of exponential and logarithmic functions, describe limitations on the domains and ranges, <i>and identify and write the equations of asymptotes</i> . <hr style="border-top: 1px dashed black;"/> <u>10 (45-min) Lessons: Solving Exponential and Logarithmic Equations</u> Ⓒ ALGII.11C Determine the reasonable domain and range values of exponential and logarithmic functions <i>including subsets of the domain and range which have meaning in a given situation</i> , as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities. Ⓒ ALGII.11D Determine solutions of exponential and logarithmic equations using the GRAPH, TRACE, and TABLE <i>features on a graphing calculator</i> as well as algebraic methods. Ⓒ ALGII.11E Determine solutions of exponential and logarithmic inequalities using the GRAPH, TRACE, and TABLE <i>features on a graphing calculator</i> as well as algebraic methods.		



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6th Six Weeks	38 Days		The recommended number of lessons is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents..
	April 15 – June 6, 2013		
	# of Lessons	Objectives	
Unit 11: Applications of Exponential Functions Students apply laws of exponents and logarithms to exponential growth and decay models.	3 90-min. lessons or 6 45-min. lessons	The student will: Ⓒ ALGII.11C Determine the reasonable domain and range values of exponential and logarithmic functions <i>including subsets of the domain and range which have meaning in a given situation</i> , as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities. Ⓒ ALGII.11F Analyze a situation modeled by an exponential function, formulate an equation or inequality, solve the problem, <i>and relate the solution to the domain and range that have meaning in the context of the situation.</i>	
Unit 12 TAKS/STAAR Review Students review relevant TAKS/STAAR objectives prior to testing using appropriate problem-solving strategies and skills.	5 90-min. lessons or 10 45-min. lessons (Sequence Units 11 and 12 in accordance to students' grade level.)	Objectives to be covered should be based on individual student needs determined by data analysis.	
Unit 13 Bridge to Polynomial Functions Students analyze the graphs and tables of polynomial functions of third degree and greater within the context of real-world situations.	4 90-min. lessons or 8 45-min. lessons	PC.1A Describe parent functions symbolically and graphically, including $f(x) = x^n$, $f(x) = \ln x$, $f(x) = \log_a x$, $f(x) = 1/x$, $f(x) = e^x$, $f(x) = x $, $f(x) = a^x$, $f(x) = \sin x$, $f(x) = \arcsin x$, etc. PC.1B Determine the domain and range of functions using graphs, tables, and symbols, and relate to real world applications. PC.1D Recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, tabular and the symbolic representation of a function. PC.1E Investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically. PC.3A Investigate properties of trigonometric and polynomial functions as graphs, tables, and symbolic representations. PC.3B Use and analyze functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data.	

