

Possible Lesson Objectives and Demonstrations of Learning  
Algebra II

First Six Weeks Grading Period		
TEKS/SE (Student Expectation)	Possible Lesson Objectives	Possible Demonstrations of Learning
<p><b>2A.1 Foundations for functions. The student uses properties and attributes of functions and applies functions to problem situations. <i>The student is expected to:</i></b> (A) identify the mathematical domains and ranges of functions and determine reasonable domain and range values for continuous and discrete situations. <b>R</b></p>	<p>Students will explore and identify the mathematical domains and ranges of continuous and discrete graphs.</p>	<p>Given five different graphs of discrete and/or continuous data, students will correctly determine the range and domain for four of the graphs.</p>
<p><b>2A.6 Quadratic and square root functions. The student understands that quadratic functions can be represented in different ways and translates among their various representations. <i>The student is expected to:</i></b> (A) determine the reasonable domain and range values of quadratic functions, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities. <b>R</b></p>	<ul style="list-style-type: none"> <li>• Students will analyze real-world quadratic situations to determine the reasonableness of the domain and range values.</li> <li>• Students will analyze the graphs of quadratic equations to determine the reasonableness of the domain values.</li> </ul>	<ul style="list-style-type: none"> <li>• Given four real-world quadratic situations, students will correctly determine the domain and range values of all four situations.</li> <li>• Given four quadratic equations, students will correctly determine the domain and range values of three situations.</li> </ul>
<p><b>2A.8 Quadratic and square root functions. The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (A) analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems. <b>R</b></p>	<p>Students will analyze real-world situations, such as how many handshakes does it take in order for everyone to shake everyone else's hand once for 100 people, to formulate quadratic equations and make predictions.</p>	<p>Given four real-world situations, students will analyze and formulate the quadratic equation for three of the situations.</p>
Second Six Weeks Grading Period		
TEKS/SE (Student Expectation)	Possible Lesson Objectives	Possible Demonstrations of Learning
<p><b>2A.2 Foundations for functions. The student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations. <i>The student is expected to:</i></b> (A) use tools including factoring and properties of exponents to simplify expressions and to transform and solve equations. <b>S</b></p>	<p>Students will use exponent rules to add, subtract, multiply and divide polynomial expressions to solve abstract and real-world situations.</p>	<p>Given five abstract and real-world situations, students will use the properties of exponents to simplify four of the situations correctly.</p>
<p><b>2A.7 Quadratic and square root functions. The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. <i>The student is expected to:</i></b> (A) use characteristics of the quadratic parent function to sketch the related graphs and connect between the <math>y = ax^2 + bx + c</math> and the <math>y = a(x - h)^2 + k</math> symbolic representations of quadratic functions. <b>R</b></p>	<p>Students will make connections between the standard form and vertex form of quadratic equations to analyze the characteristics and sketch the related graphs.</p>	<p>Given four quadratic equations in standard form, students will convert the equation into vertex form and use the characteristics of the equation to correctly graph all four equations.</p>
<p><b>2A.7 Quadratic and square root functions. The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. <i>The student is expected to:</i></b> (B) use the parent function to investigate, describe, and predict the effects of changes in <math>a</math>, <math>h</math>, and <math>k</math> on the graphs of <math>y = a(x - h)^2 + k</math> form of a function in applied and purely mathematical situations. <b>S</b></p>	<p>Students will analyze the parent quadratic function in vertex form to predict the effects of changing <math>a</math>, <math>h</math>, and <math>k</math> has on the graph of the parent function, such as how changing <math>a</math> affects the direction of the opening and the shape of the parabola.</p>	<p>Given a combination of three equations and two real-world problems involving changing <math>a</math>, <math>h</math>, or <math>k</math> of the vertex form, students will correctly predict the effects to two of the equations and one of the real-world problems.</p>

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Third Six Weeks Grading Period		
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<p><b>2A.9 Quadratic and square root functions. The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (D) determine solutions of square root equations using graphs, tables, and algebraic methods. <b>S</b></p>	<ul style="list-style-type: none"> <li>• Students will determine solutions of square root equations using tables and graphs.</li> <li>• Students will determine solutions of square root equations using algebraic methods and validate the solutions as reasonable.</li> </ul>	<ul style="list-style-type: none"> <li>• Given four square root relationships represented in tables and graphs, students will correctly determine the solution of all four representations.</li> <li>• Given four square root equations, students will correctly solve three of four equations algebraically.</li> </ul>
<p><b>2A.9 Quadratic and square root functions. The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (F) analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems. <b>R</b></p>	<p>Students will analyze situations modeled by square root functions, create tables and graphs to formulate equations and solve real-world situations.</p>	<p>Given three real-world problems modeled by square root functions, students will create tables and graphs to correctly solve two of the three problems.</p>
<p><b>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (C) 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. <b>S</b></p>	<p>Students will analyze the domain and range of rational functions which have breaks in continuity to determine the reasonableness of solutions involving the domain and range of the rational functions.</p>	<p>Given four rational functions, students will correctly determine the reasonableness of solutions to rational equations and determine the domain and range values for three of four functions.</p>
Fourth Six Weeks Grading Period		
TEKS/SE (Student Expectation)	Possible Lesson Objectives	Possible Demonstrations of Learning
<p><b>2A.4 Algebra and geometry. The student connects algebraic and geometric representations of functions. <i>The student is expected to:</i></b> (C) describe and analyze the relationship between a function and its inverse. <b>S</b></p>	<p>Students will describe and analyze quadratic functions whose range is restricted to nonnegative numbers and compare the quadratic functions to their inverses, square root functions.</p>	<p>Given three quadratic function problems whose range is restricted to nonnegative numbers, students will analyze the relationship between the quadratic functions and their inverses, square root functions, to solve two of three problems correctly.</p>
<p><b>2A.11 Exponential and logarithmic functions. The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (D) determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods. <b>S</b></p>	<ul style="list-style-type: none"> <li>• Students will use graphs to determine the solutions of logarithmic equations.</li> <li>• Students will use properties of logarithms to determine the solutions of logarithmic equations.</li> </ul>	<ul style="list-style-type: none"> <li>• Given four graphs of logarithmic equations, students will correctly determine the solutions to three of four logarithmic equations.</li> <li>• Given four logarithmic equations, students will use properties of logarithms to correctly determine the solutions to three of four logarithmic equations.</li> </ul>
<p><b>2A.11 Exponential and logarithmic functions. The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. <i>The student is expected to:</i></b> (F) analyze a situation modeled by an exponential function, formulate an equation or inequality, and solve the problem. <b>R</b></p>	<p>Students will analyze situations modeled by exponential functions, create tables and graphs of the functions to formulate equations and solve problems.</p>	<p>Given three situations modeled by exponential functions, students will create a table and graph for each and correctly solve two of three problems.</p>

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Fifth Six Weeks Grading Period		
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<p><b>2A.3 Foundations for functions. The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations.</b> <i>The student is expected to:</i> (A) analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns to solve problems. <i>R</i></p>	<ul style="list-style-type: none"> <li>Students will analyze problem situations and formulate systems of equations.</li> <li>Students will analyze problem situations and formulate systems of inequalities.</li> </ul>	<ul style="list-style-type: none"> <li>Given four contextual problems involving systems of equations, students will analyze and formulate a system of equations for all four problems.</li> <li>Given four contextual problems involving systems of inequalities, students will analyze and formulate a system of inequalities for three of the four problems correctly.</li> </ul>
<p><b>2A.3 Foundations for functions. The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations.</b> <i>The student is expected to:</i> (B) use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities. <i>R</i></p>	<ul style="list-style-type: none"> <li>Students will use tables and graphs to solve systems of equations.</li> <li>Students will use algebraic methods, such as substitution and elimination methods to solve systems of equations.</li> </ul>	<ul style="list-style-type: none"> <li>Given four problem situations, students will correctly solve at least three systems of equations using graphs and tables.</li> <li>Given four problem situations, students will correctly solve at least three systems of equations using substitution or elimination methods.</li> </ul>
<p><b>2A.3 Foundations for functions. The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations.</b> <i>The student is expected to:</i> (C) interpret and determine the reasonableness of solutions to systems of equations or inequalities for given contexts. <i>R</i></p>	<p>Students will determine the reasonableness of solutions to systems of inequalities by graphing, shading the region or regions that are common to all inequalities, and interpreting the solutions for given contexts.</p>	<p>Given three contextual problems involving systems of inequalities, students will correctly determine the reasonableness of the solutions to the systems of inequalities by shading the appropriate region or regions on the coordinate graph for all three problems correctly.</p>
Sixth Six Weeks Grading Period		
TEKS/SE (Student Expectation)	Possible Lesson Objectives	Possible Demonstrations of Learning
<p><b>2A.3 Foundations for functions. The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations.</b> <i>The student is expected to:</i> (B) use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities. <i>R</i></p>	<p>Students will use matrices to solve systems of equations involving two or more unknown variables, for purely mathematical and real-world problems.</p>	<p>Given three systems of equations involving two or more unknown variables, students will use matrices to correctly solve all three problems.</p>
<p><b>2A.5 Algebra and geometry. The student knows the relationship between the geometric and algebraic descriptions of conic sections.</b> <i>The student is expected to:</i> (B) sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph. <i>S</i></p>	<ul style="list-style-type: none"> <li>Students will sketch graphs of parabolas to relate how changing <math>h</math> in the equation will result in shifting the graph to the left or right <math>h</math> units.</li> <li>Students will sketch graphs of ellipses to relate how changing <math>a</math> in the equation will result in changing the length of the major axis to <math>2a</math> units.</li> </ul>	<ul style="list-style-type: none"> <li>Given five problems involving parabolas and changing the <math>a</math> in the equation, students will relate the changes to the graph and correctly solve four of five problems.</li> <li>Given five problems involving ellipses and changing the <math>a</math> in the equation, students will relate the changes to the length of the major axis of the graph and correctly solve four of the five problems.</li> </ul>
<p><b>2A.5 Algebra and geometry. The student knows the relationship between the geometric and algebraic descriptions of conic sections.</b> <i>The student is expected to:</i></p>	<p>Students will identify parabolas, circles, ellipses, and hyperbolas from a given conic equation.</p>	<ul style="list-style-type: none"> <li>Given five conic equations, students will identify whether the equations correspond to parabolas, circles, ellipses, or hyperbolas with 100% accuracy.</li> </ul>

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(D) identify the conic section from a given equation. <b>S</b>		
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EXAMPLES