

**School District of Loyal**  
**College Algebra**  
**Grade: 11-12**  
**Student Learning Targets**



**Class: College Algebra**

Students who demonstrate understanding can:

WI State Standards	Standard:	Student Learning Targets:
M.F.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	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Graph a relation or function in x and y</li> <li>● Differentiate between symmetry about the x-axis, the y-axis, and the origin</li> <li>● Determine the domain and range of a function or relation</li> <li>● Define a 1-1 function</li> <li>● Apply the horizontal line test for 1-1</li> <li>● Determine the inverse function of a 1-1 function</li> <li>● Specify the relation between the domain and range of a function and its inverse</li> <li>● Apply basic transformations to elementary functions</li> <li>● Differentiate among elementary functions</li> </ul>
M.A.REI.C.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Relate the solution of an equation to the x-intercept of a graph of the function and the root (or zero)</li> <li>● Solve linear equations</li> <li>● Solve linear inequalities</li> <li>● Use appropriate notation when writing solutions of inequalities</li> <li>● Solve quadratic equations using more than one method</li> <li>● Use modeling techniques to solve applied problems</li> <li>● Use appropriate notations when writing solutions of inequalities</li> </ul>
M.A.REI.B.4	Solve quadratic equations by inspection (e.g., for $x^2 = 49$ ), taking square roots, completing the square, the quadratic formula, factoring, and	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Graph quadratic functions</li> <li>● Apply multiple transformations to quadratic functions</li> </ul>

	<p>graphing as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as <math>a \pm bi</math> for real numbers <math>a</math> and <math>b</math>.</p>	<ul style="list-style-type: none"> <li>● Determine the composition of two functions</li> <li>● Create new functions by using function operations</li> <li>● Note when function composition is non-commutative</li> <li>● Apply transformations as compositions of functions</li> <li>● Determine the characteristics of a quadratic function</li> <li>● Find zeros of quadratic functions algebraically and graphically</li> <li>● Convert between standard and vertex form of a quadratic function</li> </ul>
<p>M.A.APR.B.3</p>	<p>Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.</p>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Find zeros of polynomial functions</li> <li>● Determine whether a function is increasing or decreasing on an interval.</li> <li>● Determine the end-behavior of a polynomial function.</li> <li>● Use graphical methods to estimate the roots of a polynomial equation.</li> <li>● Identify local and global extrema</li> <li>● Apply the intermediate value theorem</li> <li>● Determine the number of roots of a polynomial equation using the fundamental theorem of algebra.</li> <li>● Determine the number of roots of a polynomial function using the fundamental theorem of algebra.</li> <li>● Identify the degree of a polynomial function</li> <li>● Determine all solutions to polynomial equations including complex solutions</li> </ul>
<p>M.A.REI.A.2</p>	<p>Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.</p>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Solve radical equations</li> <li>● Graph radical functions</li> <li>● Verify solutions to identify extraneous roots</li> <li>● Determine the domain of radical expression</li> <li>● Simplify complex fractions</li> <li>● Identify removable discontinuities</li> <li>● Graph rational functions</li> <li>● Perform arithmetic operations with rational expressions</li> <li>● Determine the domain of rational functions</li> <li>● Determine all asymptotes</li> </ul>

		<ul style="list-style-type: none"> <li>• Solve rational equations</li> </ul>
M.F.BF.B5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Define the exponential function with an arbitrary base</li> <li>• Graph an exponential function with an arbitrary base</li> <li>• Model exponential functions to real life applications</li> <li>• Solve exponential equations</li> <li>• Define logarithmic functions with an arbitrary base</li> <li>• Identify the inverse relationship between the logarithmic function and the exponential function</li> <li>• Graph a logarithmic function with an arbitrary base</li> <li>• Solve logarithmic equations</li> </ul>
M.A.REI.C.6	Solve systems of linear equations exactly and approximately	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Solve nonlinear systems of equations</li> <li>• Solve systems of linear equations in three or more variables</li> <li>• Use systems of three equations to solve applied problems</li> <li>• Graph systems of linear inequalities</li> <li>• Graph systems of nonlinear equations</li> </ul>
M.G.GPE.A.2 M.G.GPE.A.3	Derive the equation of a parabola given a focus and directrix. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Identify all conic sections based on a graph</li> <li>• Identify all conic sections based on an equation</li> <li>• Analyze the characteristics of all conic sections</li> <li>• Sketch the graph of all conic sections given their equations</li> </ul>