

Algebra 2 CR

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
0	Foundations for functions.		
111.33.2A.1	The student uses properties and attributes of functions and applies functions to problem situations.		
111.33.2A.1.A	identify the mathematical domains and ranges of functions and determine reasonable domain and range values for continuous and discrete situations; and	Linear and Quadratic Functions	Functions and Relations
111.33.2A.1.B	collect and organize data, make and interpret scatterplots, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments.	Probability and Statistics	Scatter Plots and Lines of Best Fit
111.33.2A.2	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.		
111.33.2A.2.A	use tools including factoring and properties of exponents to simplify expressions and to transform and solve equations; and	Linear and Quadratic Functions Radical Functions	Solving Quadratic Functions and Inequalities Roots and Properties of Exponents
111.33.2A.2.B	use complex numbers to describe the solutions of quadratic equations.	Linear and Quadratic Functions	Solving Quadratic Functions and Inequalities
111.33.2A.3	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.		
111.33.2A.3.A	analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns to solve problems;	Systems of Equations and Inequalities	Systems of Equations Systems of Inequalities

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111.33.2A.3.B	use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities; and	Systems of Equations and Inequalities	Systems of Equations Systems of Inequalities
111.33.2A.3.C	interpret and determine the reasonableness of solutions to systems of equations or inequalities for given contexts.	Systems of Equations and Inequalities	Systems of Equations Systems of Inequalities
0	Algebra and geometry.		
111.33.2A.4	The student connects algebraic and geometric representations of functions.		
111.33.2A.4.A	identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a$ to the x power), and logarithmic ($f(x) = \log$ base a of x) functions, absolute value of x ($f(x) = x $), square root of x ($f(x) = \text{square root of } x$), and reciprocal of x ($f(x) = 1/x$);	Linear and Quadratic Functions Radical Functions Rational Functions Exponential and Logarithmic Functions	Writing and Graphing Linear Equations Graphing Quadratic Functions Graphing Radical Functions Graphing Rational Functions Graphing Exponential Functions Graphing Logarithmic Functions
111.33.2A.4.B	extend parent functions with parameters such as a in $f(x) = a/x$ and describe the effects of the parameter changes on the graph of parent functions; and	Linear and Quadratic Functions	Graphing Quadratic Functions

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111.33.2A.4.C	describe and analyze the relationship between a function and its inverse.	Linear and Quadratic Functions	Functions and Relations
111.33.2A.5	The student knows the relationship between the geometric and algebraic descriptions of conic sections.		
111.33.2A.5.A	describe a conic section as the intersection of a plane and a cone;	Conic Sections	Introduction to Conic Sections
111.33.2A.5.B	sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph;		
111.33.2A.5.C	identify symmetries from graphs of conic sections;	Conic Sections	Introduction to Conic Sections
111.33.2A.5.D	identify the conic section from a given equation; and	Conic Sections	Introduction to Conic Sections
111.33.2A.5.E	use the method of completing the square.	Linear and Quadratic Functions	Solving Quadratic Functions
0	Quadratic and square root functions.		

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111.33.2A.6	The student understands that quadratic functions can be represented in different ways and translates among their various representations.		
111.33.2A.6.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;		
111.33.2A.6.B	relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions; and	Linear and Quadratic Functions	Graphing Zeros and Min/Max Values
111.33.2A.6.C	determine a quadratic function from its roots (real and complex) or a graph.	Linear and Quadratic Functions	Determining a Quadratic Functions
111.33.2A.7	The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations.		
111.33.2A.7.A	use characteristics of the quadratic parent function to sketch the related graphs and connect between the $y = ax^2 + bx + c$ and the $y = a(x - h)^2 + k$ symbolic representations of quadratic functions; and	Linear and Quadratic Functions	Graphing Quadratic Functions
111.33.2A.7.B	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 in applied and purely mathematical situations.	Linear and Quadratic Functions	Graphing Quadratic Functions
111.33.2A.8	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.		

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111.33.2A.8.A	analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems;	Linear and Quadratic Functions	Graphing Zeros and Min/Max Values
111.33.2A.8.B	analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula;	Linear and Quadratic Functions	Solving Quadratic Functions
111.33.2A.8.C	compare and translate between algebraic and graphical solutions of quadratic equations; and	Linear and Quadratic Functions	Determining a Quadratic Functions
111.33.2A.8.D	solve quadratic equations and inequalities using graphs, tables, and algebraic methods.	Linear and Quadratic Functions	Solving Quadratic Functions
111.33.2A.9	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.		
111.33.2A.9.A	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 domains and ranges;	Radical Functions	Graphing Radical Functions and Domain and Range
111.33.2A.9.B	relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions;	Radical Functions	Graphing Radical Functions and Domain and Range
111.33.2A.9.C	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;	Radical Functions	Graphing Radical Functions and Domain and Range Solving Radical Functions

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111.33.2A.9.D	determine solutions of square root equations using graphs, tables, and algebraic methods;	Radical Functions	Solving Radical Functions
111.33.2A.9.E	determine solutions of square root inequalities using graphs and tables;		
111.33.2A.9.F	analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems; and		
111.33.2A.9.G	connect inverses of square root functions with quadratic functions.		
0	Rational functions.		
111.33.2A.10	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.		
111.33.2A.10.A	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;	Rational Functions	Graphing Rational Functions and Domain and Range
111.33.2A.10.B	analyze various representations of rational functions with respect to problem situations;		

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111.33.2A.10.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;	Rational Functions	Graphing Rational Functions and Domain and Range Solving Rational Equations
111.33.2A.10.D	determine the solutions of rational equations using graphs, tables, and algebraic methods;	Rational Functions	Solving Rational Equations
111.33.2A.10.E	determine solutions of rational inequalities using graphs and tables;	Rational Functions	Solving Rational Equations
111.33.2A.10.F	analyze a situation modeled by a rational function, formulate an equation or inequality composed of a linear or quadratic function, and solve the problem; and		
111.33.2A.10.G	use functions to model and make predictions in problem situations involving direct and inverse variation.	Rational Functions	Direct and Inverse Variation
0	Exponential and logarithmic functions.		
111.33.2A.11	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.		
111.33.2A.11.A	develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses;	Exponential and Logarithmic Functions	Comparing Exponential and Logarithmic Functions

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111.33.2A.11.B	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, and examine asymptotic behavior;	Exponential and Logarithmic Functions	Graphing Exponential Functions and Domain and Range Graphing Logarithmic Functions and Domain and Range
111.33.2A.11.C	determine the reasonable domain and range values of exponential and logarithmic functions, as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities;	Exponential and Logarithmic Functions	Graphing Exponential Functions and Domain and Range Graphing Logarithmic Functions and Domain and Range Solving Exponential and Logarithmic Equations
111.33.2A.11.D	determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods;	Exponential and Logarithmic Functions	Solving Exponential and Logarithmic Equations
111.33.2A.11.E	determine solutions of exponential and logarithmic inequalities using graphs and tables; and	Exponential and Logarithmic Functions	Solving Exponential and Logarithmic Equations
111.33.2A.11.F	analyze a situation modeled by an exponential function, formulate an equation or inequality, and solve the problem.		