

## Algebra 2

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
1	Students will use the language and operations of algebra to evaluate, analyze and solve problems.		
1.1	Evaluate, analyze, and solve mathematical situations using algebraic properties and symbols.		
1.1.a	Solve and graph first-degree absolute value equations of a single variable.	Linear and Quadratic Functions	Solving Linear Equations and Inequalities
1.1.b	Solve radical equations of a single variable, including those with extraneous roots.	Radical Functions	Solving Radical Equations and Inequalities
1.1.c	Solve absolute value and compound inequalities of a single variable.	Linear and Quadratic Functions	Solving Linear Equations and Inequalities
1.1.d	Add, subtract, multiply, and divide rational expressions and solve rational equations.	Rational Functions	Solving Rational Equations and Inequalities
1.1.e	Simplify algebraic expressions involving negative and rational exponents.	Radical Functions	Roots and Properties of Exponents
1.2	Solve systems of equations and inequalities.		
1.2.a	Solve systems of linear, absolute value, and quadratic equations algebraically and graphically.		
1.2.b	Graph the solutions of systems of linear, absolute value, and quadratic inequalities on the coordinate plane.		

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1.2.c	Solve application problems involving systems of equations and inequalities.	Systems of Equations and Inequalities	Systems of Equations
1.3	Represent and compute fluently with complex numbers.		
1.3.a	Simplify numerical expressions, including those with rational exponents.	Radical Functions	Roots and Properties of Exponents
1.3.b	Simplify expressions involving complex numbers and express them in standard form, $a + bi$ .		
1.4	Model and solve quadratic equations and inequalities.		
1.4.a	Model real-world situations using quadratic equations.	Linear and Quadratic Functions	Solving Quadratic Functions
1.4.b	Approximate the real solutions of quadratic equations graphically.	Linear and Quadratic Functions	Graphing Zeros and Min/Max Values

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1.4.c	Solve quadratic equations of a single variable over the set of complex numbers by factoring, completing the square, and using the quadratic formula.	Linear and Quadratic Functions	Solving Quadratic Functions
1.4.d	Solve quadratic inequalities of a single variable.		
1.4.e	Write a quadratic equation when given the solutions of the equation.	Linear and Quadratic Functions	Determining a Quadratic Functions
2	Students will understand and represent functions and analyze function behavior.		
2.1	Represent mathematical situations using relations.		
2.1.a	Model real-world relationships with functions.	Linear and Quadratic Functions	Determining a Quadratic Functions
2.1.b	Describe a pattern using function notation.	Linear and Quadratic Functions	Functions and Relations
2.1.c	Determine when a relation is a function.	Linear and Quadratic Functions	Functions and Relations

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2.1.d	Determine the domain and range of relations.	Linear and Quadratic Functions	Functions and Relations
2.2	Evaluate and analyze functions.		
2.2.a	Find the value of a function at a given point.	Linear and Quadratic Functions	Functions and Relations
2.2.b	Compose functions when possible.	Linear and Quadratic Functions	Functions and Relations
2.2.c	Add, subtract, multiply, and divide functions.	Linear and Quadratic Functions	Functions and Relations
2.2.d	Determine whether or not a function has an inverse, and find the inverse when it exists.	Linear and Quadratic Functions	Functions and Relations
2.2.e	Identify the domain and range of a function resulting from the combination or composition of functions.		
2.3	Define and graph exponential functions and use them to model problems in mathematical and real-world contexts.		

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2.3.a	Define exponential functions as functions of the form $y = ab$ to the $x$ power, $b > 0$ , $b$ "not equal to" 1.	Exponential and Logarithmic Functions	Comparing Logarithmic and Exponential Functions
2.3.b	Model problems of growth and decay using exponential functions.	Exponential and Logarithmic Functions	Exponential Growth and Decay
2.3.c	Graph exponential functions.	Exponential and Logarithmic Functions	Graphing Exponential Functions and Domain and Range
2.4	Define and graph logarithmic functions and use them to solve problems in mathematics and real-world contexts.		
2.4.a	Relate logarithmic and exponential functions.	Exponential and Logarithmic Functions	Comparing Logarithmic and Exponential Functions
2.4.b	Simplify logarithmic expressions.	Exponential and Logarithmic Functions	Comparing Logarithmic and Exponential Functions
2.4.c	Convert logarithms between bases.	Exponential and Logarithmic Functions	Comparing Logarithmic and Exponential Functions
2.4.d	Solve exponential and logarithmic equations.	Exponential and Logarithmic Functions	Solving Exponential and Logarithmic Equations

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2.4.e	Graph logarithmic functions.	Exponential and Logarithmic Functions	Graphing Logarithmic Functions and Domain and Range
2.4.f	Solve problems involving growth and decay.	Exponential and Logarithmic Functions	Exponential Growth and Decay
3	Students will use algebraic, spatial, and logical reasoning to solve geometry and measurement problems.		
3.1	Examine the behavior of functions using coordinate geometry.		
3.1.a	Identify the domain and range of the absolute value, quadratic, radical, sine, and cosine functions.	Linear and Quadratic Functions  Radical Functions  Trigonometric Functions	Solving Linear Equations and Inequalities  Graphing Zeros and Min/Max Values  Graphing Radical Functions and Domain and Range  Graphing Trigonometric Functions
3.1.b	Graph the absolute value, quadratic, radical, sine, and cosine functions.	Linear and Quadratic Functions  Radical Functions  Trigonometric Functions	Solving Linear Equations and Inequalities  Graphing Zeros and Min/Max Values  Graphing Radical Functions and Domain and Range  Graphing Trigonometric Functions

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3.1.c	Graph functions using transformations of parent functions.	Linear and Quadratic Functions	Graphing Quadratic Functions
3.1.d	Write an equation of a parabola in the form $y = a(x - h)^2 + k$ when given a graph or an equation..	Linear and Quadratic Functions	Determining a Quadratic Functions
3.2	Determine radian and degree measures for angles.		
3.2.a	Convert angle measurements between radians and degrees.	Trigonometric Functions	Basic Angles and Radian Measures
3.2.b	Find angle measures in degrees and radians using inverse trigonometric functions, including exact values for special triangles.	Trigonometric Functions	Inverse Trigonometric Values
3.3	Determine trigonometric measurements using appropriate techniques, tools, and formulas.		
3.3.a	Define the sine, cosine, and tangent functions using the unit circle.	Trigonometric Functions	Trigonometric Values in All Four Quadrants
3.3.b	Determine the exact values of the sine, cosine, and tangent functions for the special angles of the unit circle using reference angles.		

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3.3.c	Find the length of an arc using radian measure.		
3.3.d	Find the area of a sector in a circle using radian measure.		
4	Students will understand concepts from probability and statistics and apply statistical methods to solve problems.		
4.1	Apply basic concepts of probability.		
4.1.a	Distinguish between permutations and combinations and identify situations in which each is appropriate.	Probability and Statistics	Permutations and Combinations
4.1.b	Calculate probabilities using permutations and combinations to count events.	Probability and Statistics	Permutations and Combinations
4.1.c	Compute conditional and unconditional probabilities in various ways, including by definitions, the general multiplication rule, and probability trees.	Probability and Statistics	Introduction to Probability
4.1.d	Define simple discrete random variables.		

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4.2	Use percentiles and measures of variability to analyze data.		
4.2.a	Compute different measures of spread, including the range, standard deviation, and interquartile range.		
4.2.b	Compare the effectiveness of different measures of spread, including the range, standard deviation, and interquartile range in specific situations.		
4.2.c	Use percentiles to summarize the distribution of a numerical variable.		
4.2.d	Use histograms to obtain percentiles.		