

Algebra 1 CR, Geometry CR, Algebra 2 CR

State Standard Number	State Standard Area/Description	Course Name	Unit Name	Course Topic Description
2	Algebra and Functions			
A1	Students recognize, construct, interpret, and evaluate expressions. They fluently transform symbolic expressions into equivalent forms. They determine appropriate techniques for solving each type of equation, inequality, or system of equations, apply the techniques correctly to solve, justify the steps in the solutions, and draw conclusions from the solutions. They know and apply common formulas.			
A1.1	Construction, Interpretation, and Manipulation of Expressions			
A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.	Alg 1 CR	Variables and Expressions	Section 1
A1.1.2	Know the definitions and properties of exponents and roots transition fluently between them, and apply them in algebraic expressions.	Alg 1 CR	Variables and Expressions Polynomials Quadratics and Radicals	Section 4 Section 1 Sections 3, 4
		Alg 2 CR	Radical Functions	Section A
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities.	Alg 1 CR	Polynomials	Sections 4, 5, 6
A1.1.4	Add, subtract, multiply, and simplify polynomials and rational expressions.	Alg 1 CR	Polynomials Quadratic and Radicals Rational Expressions	Sections 2, 3 Section 4 Sections 2, 3
A1.1.5	Divide a polynomial by a monomial.	Alg 1 CR	Rational Expressions	Section 2
A1.1.6	Transform exponential and logarithmic expressions into equivalent forms using the properties of exponents and logarithms, including the inverse relationship between exponents and logarithms.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Section 2 Sections A, B, D, E

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A1.1.7	Transform trigonometric expressions into equivalent forms using basic identities such as $\sin^2 \theta + \cos^2 \theta = 1$ and $\tan^2 \theta + 1 = \sec^2 \theta$	Geom CR	Right Triangles and Trigonometry	Section 1
A1.2	Solutions of Equations and Inequalities			
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	Alg 1 CR	Equations Inequalities	Sections 1, 2 Sections 1, 2, 4
		Alg 2 CR	Linear and Quadratic Functions	Section B
A1.2.2	Associate a given equation with a function whose zeros are the solutions of the equation.	Alg 1 CR	Polynomials Quadratics and Radicals	Section 4 Sections 1, 2
A1.2.3	Solve linear and quadratic equations and inequalities including systems of up to three linear equations with three unknowns. Justify steps in the solution, and apply the quadratic formula appropriately.	Alg 1 CR	Equations Inequalities Solving Systems Polynomials Quadratics and Radicals	Sections 1, 2 Sections 1, 2, 4 Sections 1, 2, 3, 4 Sections 5, 6 Section 1, 2
		Alg 2 CR	Linear and Quadratic Functions Systems of Equations and Inequalities	Sections B, C, E Sections B, C, D
A1.2.4	Solve absolute value equations and inequalities, and justify steps in the solution.	Alg 1 CR	Equations Inequalities	Section 4 Section 3
		Alg 2 CR	Linear and Quadratic Functions	Section B
A1.2.5	Solve polynomial equations and equations involving rational expressions, and justify steps in the solution.	Alg 1 CR	Polynomials Rational Expressions	Sections 4, 5, 6 Section 4
		Alg 2 CR	Rational Functions	Sections B, C
A1.2.6	Solve power equations and equations including radical expressions, justify steps in the solution, and explain how extraneous solutions may arise.	Alg 1 CR	Quadratics and Radicals	Section 5
		Alg 2 CR	Radical Functions	Section B
A1.2.7	Solve exponential and logarithmic equations, and justify steps in the solution.	Alg 2 CR	Exponential and Logarithmic Functions	Section E

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A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	Alg 1 CR	Equations	Section 4
A1.2.9	Know common formulas and apply appropriately in contextual situations.	Alg 1 CR	Variables and Expressions Polynomials	Section 4 Section 3
A1.2.10	Use special values of the inverse trigonometric functions to solve trigonometric equations over specific intervals.	Alg 2 CR	Trigonometric Functions	Section D
A2	Students understand functions, their representations, and their attributes. They perform transformations, combine and compose functions, and find inverses. Students classify functions and know the characteristics of each family. They work with functions with real coefficients fluently. Students construct or select a function to model a real-world situation in order to solve applied problems. They draw on their knowledge of families of functions to do so.			
A2.1	Definitions, Representations, and Attributes of Functions			
A2.1.1	Determine whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range.	Alg 1 CR Alg 2 CR	Functions and Linear Equations Linear and Quadratic Functions	Sections 1, 4 Section A
A2.1.2	Read, interpret, and use function notation and evaluate a function at a value in its domain.	Alg 1 CR Alg 2 CR	Functions and Linear Equations Linear and Quadratic Functions	Sections 1, 4 Section A
A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.	Alg 1 CR	Functions and Linear Equations	Sections 1, 2, 4
A2.1.4	Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined.			
A2.1.5	Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions.			

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A2.1.6	Identify the zeros of a function, the intervals where the values of a function are positive or negative, and describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations.	Alg 2 CR	Linear and Quadratic Functions	Section F
A2.1.7	Identify and interpret the key features of a function from its graph or its formula(e).	Alg 1 CR	Functions and Linear Equations	Sections 1, 2, 4
		Alg 2 CR	Linear and Quadratic Functions	Section F
A2.2	Operations and Transformations			
A2.2.1	Combine functions by addition, subtraction, multiplication, and division.	Alg 2 CR	Linear and Quadratic Functions	Section A
A2.2.2	Apply given transformations to basic functions and represent symbolically.	Alg 2 CR	Linear and Quadratic Functions	Section D
			Radical Functions	Section B
A2.2.3	Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs.	Alg 1 CR	Functions and Linear Equations	Section 1
		Alg 2 CR	Linear and Quadratic Functions	Section A
A2.2.4	If a function has an inverse, find the expression(s) for the inverse.	Alg 1 CR	Functions and Linear Equations	Section 1
		Alg 2 CR	Linear and Quadratic Functions	Section A
A2.2.5	Write an expression for the composition of one function with another; recognize component functions when a function is a composition of other functions.	Alg 2 CR	Linear and Quadratic Functions	Section A
A2.2.6	Know and interpret the function notation for inverses and verify that two functions are inverses using composition.	Alg 2 CR	Linear and Quadratic Functions	Section A
A2.3	Representations of Functions			
A2.3.1	Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior.			
A2.3.2	Describe the tabular pattern associated with functions having constant rate of change (linear); or variable rates of change.			

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A2.3.3	Write the general symbolic forms that characterize each family of functions.			
A2.4	Models of Real-world Situations Using Families of Functions			
A2.4.1	Identify the family of function best suited for modeling a given real-world situation.			
A2.4.2	Adapt the general symbolic form of a function to one that fits the specification of a given situation by using the information to replace arbitrary constants with numbers.			
A2.4.3	Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.			
A2.4.4	Use methods of linear programming to represent and solve simple real-life problems.			
A3	Students study the symbolic and graphical forms of each function family. By recognizing the unique characteristics of each family, they can use them as tools for solving problems or for modeling real-world situations.			
A3.1	Lines and Linear Functions			
A3.1.1	Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information, and convert between forms.	Alg 1 CR Geom CR Alg 2 CR	Functions and Linear Equations Parallel Lines and Coordinate Plane Linear and Quadratic Functions	Sections 2, 4 Section 3 Section C
A3.1.2	Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.	Alg 1 CR Alg 2 CR	Functions and Linear Equations Linear and Quadratic Functions	Sections 2, 4 Section C
A3.1.3	Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.	Alg 1 CR Alg 2 CR	Functions and Linear Equations Linear and Quadratic Functions	Sections 2, 4 Section C

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A3.1.4	Find an equation of the line parallel or perpendicular to given line, through a given point; understand and use the facts that non-vertical parallel lines have equal slopes, and that non-vertical perpendicular lines have slopes that multiply to give -1.	Alg 1 CR Geom CR	Functions and Linear Equations Parallel Lines and Coordinate Plane	Section 4 Section 3
A3.2	Exponential and Logarithmic Functions			
A3.2.1	Write the symbolic form and sketch the graph of an exponential function given appropriate information.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Section 2 Section B
A3.2.2	Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions; recognize the logarithmic function as the inverse of the exponential function.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Section 2 Sections A, B, D, E
A3.2.3	Apply properties of exponential and logarithmic functions.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Section 1, 2 Sections A, B
A3.2.4	Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and understand how the base affects the rate of growth or decay.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Sections 1, 2 Sections C, D
A.3.2.5	Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.	Alg 1 CR Alg 2 CR	Exponentials Exponential and Logarithmic Functions	Section 2 Sections C, D, E
A3.3	Quadratic Functions			
A3.3.1	Write the symbolic form and sketch the graph of a quadratic function given appropriate information.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 1 Sections D, F, G
A3.3.2	Identify the elements of a parabola (vertex, axis of symmetry, direction of opening) given its symbolic form or its graph, and relate these elements to the coefficient(s) of the symbolic form of the function.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 1 Sections D, F
A3.3.3	Convert quadratic functions from standard to vertex form by completing the square.	Alg 2 CR	Linear and Quadratic Functions	Section E
A3.3.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 2 Sections D, E

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A3.3.5	Express quadratic functions in vertex form to identify their maxima or minima, and in factored form to identify their zeros.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 1 Section F
A3.4	Power Functions			
A3.4.1	Write the symbolic form and sketch the graph of power functions.			
A3.4.2	Express direct and inverse relationships as functions and recognize their characteristics.	Alg 1 CR Alg 2 CR	Functions and Linear Equations Rational Expressions Rational Functions	Section 4 Section 1 Section A
A3.4.3	Analyze the graphs of power functions, noting reflectional or rotational symmetry.			
A3.5	Polynomial Functions			
A3.5.1	Write the symbolic form and sketch the graph of simple polynomial functions.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 1 Section D
A3.5.2	Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Section 1 Section D
A3.5.3	Determine the maximum possible number of zeros of a polynomial function, and understand the relationship between the x-intercepts of the graph and the factored form of the function.	Alg 1 CR Alg 2 CR	Quadratics and Radicals Linear and Quadratic Functions	Sections 1, 2 Section E
A3.6	Rational Functions			
A3.6.1	Write the symbolic form and sketch the graph of simple rational functions.	Alg 2 CR	Rational Functions	Sections B, C
A3.6.2	Analyze graphs of simple rational functions and understand the relationship between the zeros of the numerator and denominator and the function's intercepts, asymptotes, and domain.	Alg 2 CR	Rational Functions	Sections B, C
A3.7	Trigonometric Functions			
A3.7.1	Use the unit circle to define sine and cosine; approximate values of sine and cosine; use sine and cosine to define the remaining trigonometric functions; explain why the trigonometric functions are periodic.	Alg 2 CR	Trigonometric Functions	Section C

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A3.7.2	Use the relationship between degree and radian measures to solve problems.	Alg 2 CR	Trigonometric Functions	Section B
A3.7.3	Use the unit circle to determine the exact values of sine and cosine, for integer multiples of $\pi/6$ and $\pi/4$.	Alg 2 CR	Trigonometric Functions	Section C
A3.7.4	Graph the sine and cosine functions; analyze graphs by noting domain, range, period, amplitude, and location of maxima and minima.	Alg 2 CR	Trigonometric Functions	Section E
A3.7.5	Graph transformations of basic trigonometric functions (involving changes in period, amplitude, and midline) and understand the relationship between constants in the formula and the transformed graph.	Alg 2 CR	Trigonometric Functions	Section E
3	Geometry and Trigonometry			
G1	Students represent basic geometric figures, polygons, and conic sections and apply their definitions and properties in solving problems and justifying arguments, including constructions and representations in the coordinate plane. Students represent three-dimensional figures, understand the concepts of volume and surface area, and use them to solve problems. They know and apply properties of common three-dimensional figures.			
G1.1	Lines and Angles; Basic Euclidean and Coordinate Geometry			
G1.1.1	Solve multi-step problems and construct proofs involving vertical angles, linear pairs of angles supplementary angles, complementary angles, and right angles.	Geom CR	Connections From Algebra	Section 5
G1.1.2	Solve multi-step problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.	Geom CR	Parallel Lines and Coordinate Plane	Section 1
G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.			
G1.1.4	Given a line and a point, construct a line through the point that is parallel to the original line using straightedge and compass. Given a line and a point, construct a line through the point that is			

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	perpendicular to the original line. Justify the steps of the constructions.			
G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.	Geom CR	Connections from Algebra Parallel Lines and Coordinate Plane	Section 2 Section 2
G1.1.6	Recognize Euclidean geometry as an axiom system. Know the key axioms and understand the meaning of and distinguish between undefined terms, axioms, definitions, and theorems.	Geom CR	Connections From Algebra	Section 2
G1.2	Triangles and Their Properties			
G1.2.1	Prove that the angle sum of a triangle is 180° and that an exterior angle of a triangle is the sum of the two remote interior angles.	Geom CR	Triangles	Section 1
G1.2.2	Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.	Geom CR Alg 2 CR	Triangles Special Triangles Perimeters and Areas Geometry	Section 1 Sections 1, 2 Section 1 Section B
G1.2.3	Know a proof of the Pythagorean Theorem, and use the Pythagorean Theorem and its converse to solve multistep problems.	Alg 1 CR Geom CR	Quadratics and Radicals Special Triangles	Section 5 Section 3
G1.2.4	Prove and use the relationships among the side lengths and the angles of 30° - 60° - 90° triangles and 45° - 45° - 90° triangles.	Geom CR Alg 2 CR	Special Triangles Trigonometric Functions	Section 3 Section C
G1.2.5	Solve multistep problems and construct proofs about the properties of medians, altitudes, perpendicular bisectors to the sides of a triangle, and the angle bisectors of a triangle. Using a straightedge and compass, construct these lines.	Geom CR	Triangles Special Triangles	Section 3 Section 1
G1.3	Triangles and Trigonometry			
G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.	Geom CR Alg 2 CR	Right Triangles and Trigonometry Trigonometric Functions	Section 1 Sections A ,D

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G1.3.2	Know and use the Law of Sines and the Law of Cosines and use them to solve problems. Find the area of a triangle with sides a and b and included angle theta using the formula $Area = (1/2) ab \sin \theta$.	Geom CR	Right Triangles and Trigonometry	Section 2
G1.3.3	Determine the exact values of sine, cosine, and tangent for 0° , 30° , 45° , 60° , and their integer multiples and apply in various contexts.	Geom CR	Right Triangles and Trigonometry	Section 1
G1.4	Quadrilaterals and Their Properties			
G1.4.1	Solve multistep problems and construct proofs involving angle measure, side length, diagonal length, perimeter, and area of squares, rectangles, parallelograms, kites, and trapezoids.	Geom CR	Quadrilaterals and Polygons Perimeters and Areas	Sections 1, 2, 3 Section 2
G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals using Euclidean methods or coordinate geometry.	Geom CR	Quadrilaterals and Polygons	Sections 1, 2, 3
G1.4.3	Describe and justify hierarchical relationships among quadrilaterals.	Geom CR Alg 2 CR	Quadrilaterals and Polygons Geometry	Sections 1, 2, 3 Section A
G1.4.4	Prove theorems about the interior and exterior angle sums of a quadrilateral.			
G1.4.5	Understand the definition of a cyclic quadrilateral and know and use the basic properties of cyclic quadrilaterals.			
G1.5	Other Polygons and Their Properties			
G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons.			
G1.5.2	Know, justify, and use formulas for the perimeter and area of a regular n-gon and formulas to find interior and exterior angles of a regular n-gon and their sums.	Geom CR	Quadrilaterals and Polygons Perimeters and Areas	Section 4 Section 1
G1.6	Circles and Their Properties			
G1.6.1	Solve multistep problems involving circumference and area of circles.	Geom CR	Perimeters and Areas	Section 3
G1.6.2	Solve problems and justify arguments about chords and lines tangent to circles.	Geom CR Alg 2 CR	Circles Geometry	Section 1 Section C
G1.6.3	Solve problems and justify arguments about central angles, inscribed angles, and triangles in circles.	Geom CR Alg 2 CR	Circles Geometry	Section 2 Section C

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G1.6.4	Know and use properties of arcs and sectors and find lengths of arcs and areas of sectors.	Geom CR Alg 2 CR	Circles Geometry	Section 1 Section C
G1.7	Conic Sections and Their Properties			
G.1.7.1	Find an equation of a circle given its center and radius; given the equation of a circle, find its center and radius.	Geom CR	Circles	Section 3
G1.7.2	Identify and distinguish among geometric representations of parabolas, circles, ellipses, and hyperbolas; describe their symmetries, and explain how they are related to cones.	Alg 2 CR	Conic Sections	Section A
G1.7.3	Graph ellipses and hyperbolas with axes parallel to the x- and y-axes, given equations.	Alg 2 CR	Conic Sections	Sections D, E
G1.7.4	Know and use the relationship between the vertices and foci in an ellipse, the vertices and foci in a hyperbola, and the directrix and focus in a parabola, interpret these relationships in applied contexts.	Alg 2 CR	Conic Sections	Sections B, D, E
G1.8	Three- Dimensional Figures			
G1.8.1	Solve multi-step problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	Geom CR	Perimeters and Areas	Sections 4, 5
G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.			
G2	Students use and justify relationships between lines, angles, area and volume formulas, and 2- and 3-dimensional representations. They solve problems and provide proofs about congruence and similarity.			
G2.1	Relationships Between Area and Volume Formulas			
G2.1.1	Know and demonstrate the relationships between the area formula of a triangle, the area formula of a parallelogram, and the area formula of a trapezoid.			
G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals.			

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G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).			
G2.2	Relationships Between Two-dimensional and Three-dimensional Representations			
G2.2.1	Identify or sketch a possible three-dimensional figure, given two-dimensional views. Create a two-dimensional representation of a three-dimensional figure.			
G2.2.2	Identify or sketch cross sections of three-dimensional figures. Identify or sketch solids formed by revolving two-dimensional figures around lines.			
G2.3	Congruence and Similarity			
G2.3.1	Prove that triangles are congruent using the SSS, SAS, ASA, and AAS criteria, and that right triangles, are congruent using the hypotenuse-leg criterion.	Geom CR	Triangles	Section 2
G2.3.2	Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.	Alg 2 CR	Geometry	Section B
G2.3.3	Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.	Geom CR	Similarity	Section 2
G2.3.4	Use theorems about similar triangles to solve problems with and without use of coordinates.	Geom CR	Similarity	Section 2
G2.3.5	Know and apply the theorem stating that the effect of a scale factor of k relating one two-dimensional figure to another or one three-dimensional figure to another, on the length, area, and volume of the figures is to multiply each by k , k^2 , and k^3 , respectively.			
G3	Students will solve problems about distance-preserving transformations and shape-preserving transformations. The transformations will be described synthetically and, in simple cases, by analytic expressions in coordinates.			
G3.1	Distance-preserving Transformations: Isometries			
G3.1.1	Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.	Geom CR	Perimeters and Areas	Section 6

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G3.1.2	Given two figures that are images of each other under an isometry, find the isometry and describe it completely.			
G3.1.3	Find the image of a figure under the composition of two or more isometries and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.	Geom CR	Perimeters and Areas	Section 6
G3.2	Shape-preserving Transformations: Dilations and Isometries			
G3.2.1	Know the definition of dilation and find the image of a figure under a given dilation.			
G3.2.2	Given two figures that are images of each other under some dilation, identify the center and magnitude of the dilation.			
G3.2.3	Find the image of a figure under the composition of a dilation and an isometry.			