



Alignment Document

State of Texas (TAKS) And Aventa Learning Algebra II

Algebra II 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
1	The student will describe functional relationships in a variety of ways.		
1.A.1	The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways.		
1.A.1.A	describe independent and dependent quantities in functional relationships;	Composition of Functions	Function Notation
		Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions
		Composition of Functions	Horizontal Line Test
1.A.1.B	[gather and record data and] use data sets to determine functional relationships between quantities;	Composition of Functions	Horizontal Line Test
		Composition of Functions	Function Notation
		Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions
1.A.1.C	describe functional relationships for given problem situations and write equations or inequalities to answer questions arising from the situations;	Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions

		Composition of Functions	Horizontal Line Test
		Composition of Functions	Function Notation
1.A.1.D	represent relationships among quantities using [concrete] models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and	Composition of Functions	Inverse functions
		Composition of Functions	Function Notation
1.A.1.E	interpret and make decisions, predictions, and critical judgments from functional relationships.	Composition of Functions	Horizontal Line Test
		Composition of Functions	Function Notation
		Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions
2	The student will demonstrate an understanding of the properties and attributes of functions.		
2.A.2	The student uses the properties and attributes of functions.		
2.A.2.A	identify [and sketch] the general forms of linear ($y = x$) and quadratic ($y = x^2$) parent functions;	Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions
		Composition of Functions	Horizontal Line Test
		Composition of Functions	Function Notation
		Quadratics	Introduction
		Quadratics	Quadratic functions in the real world
		Quadratics	From the zeros to the equation of quadratic functions
		Quadratics	Quadratic functions and their graphs
		Quadratics	Factored form of quadratics
		Quadratics	Zeros of the quadratic function



2.A.2.B	identify mathematical domains and ranges and determine reasonable domain and range values for given situations, both continuous and discrete;	Composition of Functions	Review of Functions
2.A.2.C	interpret situations in terms of given graphs [or create situations that fit given graphs]; and	Composition of Functions	Horizontal Line Test
2.A.2.D	[collect and] organize data, [make and] interpret scatterplots (including recognizing positive, negative, or no correlation for data approximating linear situations), and model, predict, and make decisions and critical judgments in problem situations.	Systems of Linear Equations	Systems of Linear Inequalities
		Exponential and Logarithmic Functions	Graphs of exponential functions
		Composition of Functions	Exponential Functions: an intuitive approach
2.A.3	The student understands how algebra can be used to express generalizations and recognizes and uses the power of symbols to represent situations.		
2.A.3.A	use symbols to represent unknowns and variables; and	Polynomials	Introduction
2.A.3.B	look for patterns and represent generalizations algebraically.	Composition of Functions	Exponential Functions: an intuitive approach
		Sequences and Series	Implicitly defined sequences
2.A.4	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.		
2.A.4.A	find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations;	Composition of Functions	Definition of Functions
		Composition of Functions	Review of Functions
		Composition of Functions	Horizontal Line Test
		Composition of Functions	Function Notation
		Polynomials	The Factor Theorem
		Polynomials	Working with Cubes
		Polynomials	Factoring Polynomials



2.A.4.B	use the commutative, associative, and distributive properties to simplify algebraic expressions; and	Absolute Value	Absolute Value Equations
2.A.4.C	connect equation notation with function notation, such as $y = x + 1$ and $f(x) = x + 1$.	Composition of Functions	Function Notation
		Composition of Functions	Checking that two functions really are inverse functions of each other
3	The student will demonstrate an understanding of linear functions.		
3.A.5	The student understands that linear functions can be represented in different ways and translates among their various representations.		
3.A.5.A	determine whether or not given situations can be represented by linear functions; and	Composition of Functions	Inverse functions
		Composition of Functions	Function Notation
3.A.5.C	use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions.	Composition of Functions	Function Notation
		Composition of Functions	Inverse functions
3.A.6	The student understands the meaning of the slope and intercepts of the graphs of linear functions and zeros of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations.		
3.A.6.A	develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations;		
3.A.6.B	interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs;		
3.A.6.C	investigate, describe, and predict the effects of changes in m and b on the graph of $y = mx + b$;		
3.A.6.D	graph and write equations of lines given characteristics such as two points, a point and a slope, or a slope and y -intercept;		
3.A.6.E	determine the intercepts of the graphs of linear functions and zeros of linear functions from graphs, tables, and algebraic representations;		
3.A.6.F	interpret and predict the effects of changing slope and y -intercept in applied situations; and		



3.A.6.G	relate direct variation to linear functions and solve problems involving proportional change.		
4	The student will formulate and use linear equations and inequalities.		
4.A.7	The student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.		
4.A.7.A	analyze situations involving linear functions and formulate linear equations or inequalities to solve problems;	Systems of Linear Equations	Systems of Linear Inequalities
4.A.7.B	investigate methods for solving linear equations and inequalities using [concrete] models, graphs, and the properties of equality, select a method, and solve the equations and inequalities; and	Absolute Value	Absolute Value and Inequalities
		Absolute Value	Absolute Value and Inequalities Shortcuts Summary
		Systems of Linear Equations	Systems of Linear Inequalities
4.A.7.C	interpret and determine the reasonableness of solutions to linear equations and inequalities.	Systems of Linear Equations	Systems of Linear Inequalities
4.A.8	The student formulates systems of linear equations from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.		
4.A.8.A	analyze situations and formulate systems of linear equations in two unknowns to solve problems;	Systems of Linear Equations	Using your calculator to solve systems of linear equations
		Systems of Linear Equations	Systems of two linear equations with two variables
		Systems of Linear Equations	Gauss-Jordan Elimination for systems with three equations and three variables
		Systems of Linear Equations	Underdetermined Systems of Equations
		Systems of Linear Equations	Gauss - Jordan Elimination Method
		Systems of Linear Equations	Substitution Method to solve a system
		Systems of Linear Equations	Systems having three linear equations



		Systems of Linear Equations	Inconsistent Systems of Equations
		Systems of Linear Equations	Introduction
		Systems of Linear Equations	Addition Method of Solving Systems of Equations
4.A.8.B	solve systems of linear equations using [concrete] models, graphs, tables, and algebraic methods; and	Systems of Linear Equations	Using your calculator to solve systems of linear equations
		Systems of Linear Equations	Systems of two linear equations with two variables
		Systems of Linear Equations	Gauss-Jordan Elimination for systems with three equations and three variables
		Systems of Linear Equations	Underdetermined Systems of Equations
		Systems of Linear Equations	Gauss-Jordan Elimination Method
		Systems of Linear Equations	Substitution Method to solve a system
		Systems of Linear Equations	Systems having three linear equations
		Systems of Linear Equations	Addition Method of Solving Systems of Equations
4.A.8.C	interpret and determine the reasonableness of solutions to systems of linear equations.	Systems of Linear Equations	Gauss-Jordan Elimination for systems with three equations and three variables
		Systems of Linear Equations	Underdetermined Systems of Equations
		Systems of Linear Equations	Using your calculator to solve systems of linear equations
		Systems of Linear Equations	Substitution Method to solve a system
		Systems of Linear Equations	Gauss - Jordan Elimination Method
		Systems of Linear Equations	Inconsistent Systems of Equations
		Systems of Linear Equations	Systems of two linear equations with two variables
		Systems of Linear Equations	Systems having three linear equations
		Systems of Linear Equations	Addition Method of Solving Systems of Equations
		Systems of Linear Equations	Introduction



5	The student will demonstrate an understanding of quadratic and other nonlinear functions.		
5.A.9	The student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions.		
5.A.9.B	investigate, describe, and predict the effects of changes in a on the graph of $y = ax^2 + c$;	Quadratics	Graphing Parabolas
5.A.9.C	investigate, describe, and predict the effects of changes in c on the graph of $y = ax^2 + c$; and	Quadratics	Graphing Parabolas
5.A.9.D	analyze graphs of quadratic functions and draw conclusions.	Quadratics	Quadratic functions in the real world
		Quadratics	From the zeros to the equation of quadratic functions
		Quadratics	Introduction
		Quadratics	Quadratic functions and their graphs
		Quadratics	Factored form of quadratics
		Quadratics	Zeros of the quadratic function
5.A.10	The student understands there is more than one way to solve a quadratic equation and solves them using appropriate methods.		
5.A.10.A	solve quadratic equations using [concrete] models, tables, graphs, and algebraic methods; and	Quadratics	Introduction
		Quadratics	Quadratic functions and their graphs
		Quadratics	Zeros of the quadratic function
		Quadratics	Factored for of Quadratics
5.A.10.B	make connections among the solutions (roots) of quadratic equations, the zeros of their related functions, and the horizontal intercepts (x-intercepts) of the graph of the function.	Quadratics	Introduction
		Quadratics	Quadratic functions and their graphs
		Quadratics	Graphing Parabolas
		Quadratics	Zeros of the quadratic function
		Quadratics	Factored for of Quadratics



		Quadratics	From the zeros to the equation of quadratic functions
5.A.11	The student understands there are situations modeled by functions that are neither linear nor quadratic and models the situations.		
5.A.11.A	use [patterns to generate] the laws of exponents and apply them in problem-solving situations.	Exponential and Logarithmic Functions	Exponential Functions: an intuitive approach
		Exponential and Logarithmic Functions	The formal approach
		Exponential and Logarithmic Functions	Graphs of exponential functions
6	The student will demonstrate an understanding of geometric relationships and spatial reasoning.		
6.G.4	The student uses a variety of representations to describe geometric relationships and solve problems.		
6.G.4.A	select an appropriate representation ([concrete,] pictorial, graphical, verbal, or symbolic) in order to solve problems.		
6.G.5	The student uses a variety of representations to describe geometric relationships and solve problems.		
6.G.5.A	use numeric and geometric patterns to develop algebraic expressions representing geometric properties;		
6.G.5.B	use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles;		
6.G.5.C	use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations; and		
6.G.5.D	identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples.		
6.G.10	The student applies the concept of congruence to justify properties of figures and solve problems.		



6.G.10.A	use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane.		
7	The student will demonstrate an understanding of two- and three-dimensional representations of geometric relationships and shapes.		
7.G.6	The student analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representations to solve problems.		
7.G.6.B	use nets to represent [and construct] three-dimensional geometric figures; and		
7.G.6.C	use orthographic and isometric views of three-dimensional geometric figures to represent [and construct] three-dimensional geometric figures and solve problems.		
7.G.7	The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly.		
7.G.7.A	use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures;		
7.G.7.B	use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and [special segments of] triangles and other polygons; and		
7.G.7.C	derive and use formulas involving length, slope, and midpoint.	Conic Sections	The Distance Formula
7.G.9	The student analyzes properties and describes relationships in geometric figures.		
7.G.9.D	analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on explorations and [concrete] models.		
8	The student will demonstrate an understanding of the concepts and uses of measurement and similarity.		
8.G.8	The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations.		



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8.G.8.A	find areas of regular polygons, circles, and composite figures;		
8.G.8.B	find areas of sectors and arc lengths of circles using proportional reasoning;		
8.G.8.C	[derive,] extend, and use the Pythagorean Theorem; and		
8.G.8.D	find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations.		
8.G.11	The student applies the concepts of similarity to justify properties of figures and solve problems.		
8.G.11.A	use and extend similarity properties and transformations to explore and justify conjectures about geometric figures;		
8.G.11.B	use ratios to solve problems involving similar figures;		
8.G.11.C	[develop,] apply, and justify triangle similarity relationships, such as right triangle ratios, [trigonometric ratios,] and Pythagorean triples using a variety of methods; and		
8.G.11.D	describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems.		
9	The student will demonstrate an understanding of percents, proportional relationships, probability, and statistics in application problems.		
9.8.3	The student identifies proportional or non-proportional linear relationships in problem situations and solves problems.		
9.8.3.B	estimate and find solutions to application problems involving percents and other proportional relationships, such as similarity and rates.		
9.8.11	The student applies concepts of theoretical and experimental probability to make predictions.		
9.8.11.A	find the probabilities of dependent and independent events; and	Counting	Frequency Expectation Interpretation of probability
9.8.11.B	use theoretical probabilities and experimental results to make predictions and decisions.	Counting	Probability: An introduction
9.8.12	The student uses statistical procedures to describe data.		



9.8.12.A	select the appropriate measure of central tendency or range to describe a set of data and justify the choice for a particular situation; and		
9.8.12.C	select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, [stem and leaf plots,] circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology.		
9.8.13	The student evaluates predictions and conclusions based on statistical data.		
9.8.13.B	recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.		
10	The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.		
10.8.14	The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.		
10.8.14.A	identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;	Systems of Linear Equations	Substitution Method to solve a system
		Systems of Linear Equations	Systems of Linear Inequalities
		Quadratics	Quadratic functions in the real world
		Exponential and Logarithmic Functions	Graphs of exponential functions
10.8.14.B	use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness; and	Quadratics	Quadratic functions in the real world
		Quadratics	The Discriminant of a Quadratic



10.8.14.C	select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.	Systems of Linear Equations	Substitution Method to solve a system
		Systems of Linear Equations	Systems of Linear Inequalities
		Quadratics	Quadratic functions in the real world
		Exponential and Logarithmic Functions	Graphs of exponential functions
10.8.15	The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.		
10.8.15.A	communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.	Quadratics	Quadratic functions in the real world
		Counting	Frequency Expectation interpretation of probability
		Mathematical Induction	Some final comments
10.8.16	The student uses logical reasoning to make conjectures and verify conclusions.		
10.8.16.A	make conjectures from patterns or sets of examples and nonexamples; and	Exponential and Logarithmic Functions	The Natural Base e
		Composition of Functions	Horizontal Line Test
10.8.16.B	validate his/her conclusions using mathematical properties and relationships.	Conic Sections	What kind of conic is it?