AVENTA LEARNING

Alignment Document
State of South Dakota and Aventa Learning Algebra II

Algebra II

Goals	Indicators	Standards	Unit Name	Course Topic Description
9-12.A Algebra	**9-12.A.1** Use procedures to transform algebraic expressions.	**9-12.A.1.1A** Students are able to write equivalent forms of rational algebraic expressions using properties of real numbers.		
		9-12.A.1.2A Students are able to extend the use of real number properties to expressions involving complex numbers.	Complex Numbers Complex Numbers Complex Numbers Complex Numbers	The complex number i Absolute Value of a Complex Number Introduction Working with complex numbers
	9-12.A.2 Use a variety of algebraic concepts and methods to solve equations and inequalities.	**9-12.A.2.1A** Students are able to determine solutions of quadratic equations.		
		9-12.A.2.1A.a Use the quadratic formula.	Quadratics Quadratics	The Quadratic Formula Developing the Quadratic Formula
		9-12.A.2.1A.b Use the discriminant, $b^2 - 4ac$, to describe the nature of the roots.	Quadratics	The Discriminant of a Quadratic
		9-12.A.2.2A Students are able to determine the solution of systems of equations and systems of inequalities.		
		9-12.A.2.3A Students are able to determine solutions to absolute value	Absolute Value	Absolute Value and Inequalities Shortcuts Summary

		statements.	Absolute Value	Shortcuts
			Absolute Value	Absolute Value and Inequalities Shortcuts
			Absolute Value	More Complicated Absolute Value Equations
			Absolute Value	Introduction
			Absolute Value	Absolute Value and Inequalities
			Absolute Value	Absolute Value Equations
			Absolute Value	Absolute Value equations in other places
	9-12.A.3 Interpret and develop mathematical models.	**9-12.A.3.1A** Students are able to distinguish between linear, quadratic, inverse variation, and exponential models.	Exponential and Logarithm functions	Computations with exponential functions
			Exponential and Logarithm functions	Exponential functions: an example
			Exponential and Logarithm functions	Graphs of exponential functions
			Exponential and Logarithm functions	Introduction
			Exponential and Logarithm functions	Exponential functions: the formal definition
			Exponential and Logarithm functions	Exponential functions: an intuitive approach
			Quadratics	Quadratic functions and their graphs

			Quadratics	Factored form of quadratics
			Quadratics	Zeros of the quadratic function
			Quadratics	From the zeros to the equation of quadratic functions
			Quadratics	Quadratic functions in the real world
			Quadratics	Introduction
		9-12.A.3.2A Students are able to create formulas to model relationships that are algebraic, geometric, trigonometric, and exponential.	Exponential and Logarithm functions	Computations with exponential functions
			Exponential and Logarithm functions	Introduction
			Exponential and Logarithm functions	Graphs of exponential functions
			Exponential and Logarithm functions	Exponential functions: the formal definition
			Exponential and Logarithm functions	Exponential functions: an example
			Exponential and Logarithm functions	Exponential functions: an intuitive approach
		9-12.A.3.3A Students are able to use sequences and series to model relationships.	Sequences and Series	One very special Arithmetic Series
			Sequences and Series	Series
			Sequences and Series	Sequences

			Sequences and Series	Sigma notation and series
			Sequences and Series	Series: An important example
			Sequences and Series	Introduction
			Sequences and Series	Arithmetic sequences
			Sequences and Series	Summation notation (also called Sigma notation)
			Sequences and Series	Explicitly defined sequences
			Sequences and Series	The formula 1+2+3+...+n =
			Sequences and Series	Geometric sequences
			Sequences and Series	Implicitly (or Recursively) defined sequences
	9-12.A.4 Describe and use properties and behaviors of relations, functions, and inverses.	**9-12.A.4.1A** Students are able to determine the domain, range, and intercepts of a function.		
		9-12.A.4.2A Students are able to describe the behavior of a polynomial, given the leading coefficient, roots, and degree.	Polynomials	Introduction
		9-12.A.4.3A Students are able to apply transformations to graphs and describe the results.		

		9-12.A.4.3A.a Change coefficients and/or constants.		
		9-12.A.4.3A.b Graph the inverse of a function.	Composition of Functions	Domain Restrictions
			Composition of Functions	Horizontal Line Test
			Composition of Functions	Checking that two functions really are inverse functions of each other
			Composition of Functions	Finding an Inverse Function
			Composition of Functions	Inverse functions
			Conic Sections	Parabolas in Standard Form
		9-12.A.4.4A Students are able to apply properties and definitions of trigonometric, exponential, and logarithmic expressions.	Exponential and Logarithm functions	Exponential functions: an intuitive approach
			Exponential and Logarithm functions	Graphs of exponential functions
			Exponential and Logarithm functions	Exponential functions: an example
			Exponential and Logarithm functions	Computations with exponential functions
			Exponential and Logarithm functions	Introduction
			Exponential and Logarithm functions	Exponential functions: the formal definition

		9-12.A.4.5A Students are able to describe characteristics of nonlinear functions and relations.		
		9-12.A.4.5A.a Conic sections	Conic Sections Conic Sections Conic Sections	What kind of conic is it? General equation for conic sections. Introduction
		9-12.A.4.5A.b Trigonometric functions		
		9-12.A.4.5A.c Exponential and logarithmic functions	Exponential and Logarithm functions Exponential and Logarithm functions Exponential and Logarithm functions Exponential and Logarithm functions Exponential and Logarithm functions Exponential and Logarithm functions	Exponential functions: an intuitive approach Graphs of exponential functions Exponential functions: an example Computations with exponential functions Introduction Exponential functions: the formal definition
		9-12.A.4.6A Students are able to graph solutions to linear inequalities.	Systems of Linear Equations Absolute Value	Systems of Linear Inequalities Absolute Value and Inequalities
9-12.G Geometry	**9-12.G.1** Use deductive and inductive reasoning to recognize and apply properties of geometric figures.	**9-12.G.1.1A** Students are able to justify properties of geometric figures.		
		9-12.G.1.2A Students are able to determine the values of the sine, cosine, and tangent ratios of right triangles.		

		9-12.G.1.3A Students are able to apply properties associated with circles.		
		9-12.G.1.4A Students are able to use formulas for surface area and volume to solve problems involving three-dimensional figures.		
	9-12.G.2 Use properties of geometric figures to solve problems from a variety of perspectives.	**9-12.G.2.1A** Students are able to use Cartesian coordinates to verify geometric properties.		
9-12.M Measurement	**9-12.M.1** Apply measurement concepts in practical applications.	**9-12.M.1.1A** Students are able to use dimensional analysis to check answers and determine units of a problem solution.		
		9-12.M.1.2A Students are able to use indirect measurement in problem situations that defy direct measurement.		
9-12.N Number Sense	**9-12.N.1** Analyze the structural characteristics of the real number system and its various subsystems. Analyze the concept of value, magnitude, and relative magnitude of real numbers.	**9-12.N.1.1A** Students are able to describe the relationship of the real number system to the complex number system.	Complex Numbers Complex Numbers Complex Numbers Complex Numbers	The complex number i Working with complex numbers Absolute Value of a Complex Number Introduction
		9-12.N.1.2A Students are able to apply properties and axioms of the real number system to various subsets, e.g., axioms of order, closure.		
	9-12.N.2 Apply number operations with real numbers and other number systems.	**9-12.N.2.1A** Students are able to add, subtract, multiply, and divide real numbers including rational exponents.		
		9-12.N.2.1A.a Simplify numeric expressions with radicals.		
	9-12.N.3 Develop conjectures, predictions, or estimations to solve problems and verify or justify the results.	**0** Note: Skills for this indicator have been subsumed within applications to advanced skills by the time students reach advanced high school mathematics.		

9-12.S Statistics and Probability	**9-12.S.1** Use statistical models to gather, analyze, and display data to draw conclusions.	**9-12.S.1.1A** Students are able to analyze and evaluate the design of surveys and experiments.		
		9-12.S.1.2A Students are able to analyze and evaluate graphical displays of data.		
		9-12.S.1.3A Students are able to compare multiple one-variable data sets, using standard deviation and variance.		
		9-12.S.1.3A.b Calculate the standard deviation and variance of a data set.		
		9-12.S.1.4A Students are able to describe the normal curve and use it to make predictions.		
		9-12.S.1.5A Students are able to use scatterplots, best-fit lines, and correlation coefficients to model data and support conclusions.		
	9-12.S.2 Apply the concepts of probability to predict events/outcomes and solve problems.	**9-12.S.2.1A** Students are able to use probabilities to solve problems.		
		9-12.S.2.1A.a Compute combinations, permutations.	Counting Counting Counting Counting	Combinations Counting: An introduction to choosing subsets Permutations Counting Subsets Formula
		9-12.S.2.1A.b Interpret tables.		
		9-12.S.2.1A.c Create and use tree diagrams.		
		9-12.S.2.2A Students are able to determine probability of compound, complementary, independent, and mutually exclusive events.		
		9-12.S.2.3A Students are able to generate data and use the data to	Counting	Probability: An introduction

		determine empirical (experimental) probabilities.		