

Mathematics Standard Articulated by Grade Level
Strand 1: Number and Operations

Concept 1: Number Sense			
Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Recognize and convert between expressions for positive and negative rational numbers, including fractions, decimals, percents, and ratios.		PO 1. Justify with examples the relation between the number system being used (natural numbers, whole numbers, integers, rational numbers and irrational numbers) and the question of whether or not an equation has a solution in that number system.	<i>PO 1. Solve problems and equations that require the number system to be extended from real to complex numbers.</i>
PO 2. Find or use factors, multiples, or prime factorization within a set of numbers.			
PO 3. Compare and order rational numbers using various models and representations.	PO 1. Compare and order real numbers including very large and small integers, and decimals and fractions close to zero.		
	PO 2. Classify real numbers as rational or irrational.	PO 2. Sort sets of numbers as finite or infinite, and justify the sort.	
	PO 3. Model the relationship between the subsets of the real number system.		
PO 4. Model and solve simple problems involving absolute value.	PO 4. Model and solve problems involving absolute value.	PO 3. Express that the distance between two numbers is the absolute value of their difference.	
			<i>PO 2. Convert between radical and exponential forms of numerical expressions.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level

Strand 1: Number and Operations

Concept 2: Numerical Operations			
Understand and apply numerical operations and their relationship to one another.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Add, subtract, multiply, and divide integers.	PO 1. Solve problems with factors, multiples, divisibility or remainders, prime numbers, and composite numbers.	PO 1. Solve word problems involving absolute value, powers, roots, and scientific notation.	
PO 2. Solve problems with rational numbers and appropriate operations using exact answers or estimates.			
	PO 2. Describe the effect of multiplying and dividing a rational number by <ul style="list-style-type: none"> • a number less than zero, • a number between zero and one, • one, and • a number greater than one. 	PO 2. Summarize the properties of and connections between real number operations; justify manipulations of expressions using the properties of real number operations.	
		PO 3. Calculate powers and roots of rational and irrational numbers.	<i>PO 1. Explore different forms of complex numbers; determine if the properties of the real number system extend to complex numbers and matrices.</i>
PO 3. Solve problems involving percentages, ratio and proportion, including tax, discount, tips, and part/whole relationships.	PO 3. Solve problems involving percent increase, percent decrease, and simple interest rates.		
PO 4. Represent and interpret numbers using scientific notation (positive exponents only).	PO 4. Convert standard notation to scientific notation and vice versa (include positive and negative exponents).	PO 4. Compute using scientific notation.	
PO 5. Simplify numerical expressions using the order of operations and appropriate mathematical properties.	PO 5. Simplify numerical expressions using the order of operations that include grouping symbols, square roots, cube roots, absolute values, and positive exponents.		<i>PO 2. Perform computations with complex numbers.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 1: Number and Operations

Concept 2: Numerical Operations			
Understand and apply numerical operations and their relationship to one another.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
			<i>PO 3. Describe the relationship between real and complex numbers including plotting complex numbers as points in a plane.</i>
			PO 4. Define polar coordinates; relate polar coordinates to Cartesian coordinates.
			PO 5. Convert complex numbers to trigonometric form and then multiply the results.
			PO 6. Apply DeMoivre’s Theorem to calculate products, powers, and roots of complex numbers.

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 1: Number and Operations

Concept 3: Estimation			
Use estimation strategies reasonably and fluently while integrating content from each of the other strands.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Estimate and apply benchmarks for rational numbers and common irrational numbers.		PO 1. Determine rational approximations of irrational numbers.	
PO 2. Make estimates appropriate to a given situation.	PO 1. Make estimates appropriate to a given situation.	PO 2. Use estimation to determine the reasonableness of a solution.	<i>PO 1. Recognize the limitations of estimations by assessing the amount of error resulting from estimation and determining whether the error is within acceptable tolerance limits.</i>
		PO 3. Determine when an estimate is more appropriate than an exact answer.	
PO 3. Estimate square roots of numbers less than 1000 by locating them between two consecutive whole numbers.	PO 2. Estimate the location of rational and common irrational numbers on a number line.	PO 4. Estimate the location of the rational or irrational numbers on a number line.	
PO 4. Estimate the measure of an object in one system of units given the measure of that object in another system and the approximate conversion factor.			

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 2: Data Analysis, Probability, and Discrete Mathematics

Concept 1: Data Analysis (Statistics)			
Understand and apply data collection, organization, and representation to analyze and sort data.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Solve problems by selecting, constructing, and interpreting displays of data including multi-line graphs and scatterplots.	PO 1. Solve problems by selecting, constructing, interpreting, and calculating with displays of data, including box and whisker plots and scatterplots.	PO 1. Draw inferences about data sets from lists, tables, matrices, and plots.	PO 1. Solve problems by estimating and computing with one-variable and two-variable data.
		PO 2. Organize collected data into an appropriate graphical representation with or without technology.	
PO 2. Interpret trends in a data set, estimate values for missing data, and predict values for points beyond the range of the data set.		PO 3. Display data, including paired data, as lists, tables, matrices, and plots with or without technology; make predictions and observations about patterns or departures from patterns.	
	PO 2. Make inferences by comparing the same summary statistic for two or more data sets.	PO 4. Make inferences by comparing data sets using one or more summary statistics.	<i>PO 2. Compare data sets using graphs and summary statistics, including variance and standard deviation, with or without technology.</i>
PO 3. Identify outliers and determine their effect on mean, median, mode, and range.	PO 3. Describe how summary statistics relate to the shape of the distribution.	PO 5. Determine which measure of center is most appropriate in a given situation and explain why.	PO 3. Compute and explain summary statistics for distributions of data including measures of center and spread, including variance and standard deviation.
		PO 6. Evaluate the reasonableness of conclusions drawn from data analysis.	PO 4. Explain how sampling methods, bias, and the phrasing of questions asked during data collections impact the conclusions that can be drawn.
PO 4. Distinguish between a simple random and non-random sample.	PO 4. Determine whether information is represented effectively and appropriately given a graph or a set of data by identifying sources of bias and compare and contrast the effectiveness of different representations of data.	PO 7. Identify misrepresentations and distortions in displays of data and explain why they are misrepresentations or distortions.	PO 5. Identify misleading uses of data and explain why they are misleading.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 2: Data Analysis, Probability, and Discrete Mathematics

Concept 1: Data Analysis (Statistics)			
Understand and apply data collection, organization, and representation to analyze and sort data.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
	PO 5. Evaluate the design of an experiment.	PO 8. Design simple experiments or investigations and collect data to answer questions.	PO 6. Explain the differences between randomized experiments and observational studies and determine the appropriateness of using each in given situations.
			PO 7. Determine when arguments based on data mistake correlation for causation.
			<i>PO 8. Draw a line of best fit for a scatterplot with or without technology, describe how the correlation coefficient relates to fit, and explain when it is appropriate to use the regression equation to make predictions.</i>
			<i>PO 9. Use matrices to organize and represent data.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 2: Data Analysis, Probability, and Discrete Mathematics

Concept 2: Probability			
Understand and apply the basic concepts of probability.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Determine conditional probabilities (experimental) in compound probability experiments.	PO 1. Determine theoretical and experimental conditional probabilities in compound probability experiments.	PO 1. Make predictions and solve problems based on theoretical probability models.	<i>PO 1. Apply probability concepts to calculate the probability of events and to make informed decisions in practical situations.</i>
	PO 2. Interpret probabilities within a given context and compare the outcome of an experiment to predictions made prior to performing the experiment.	PO 2. Determine the theoretical probability of events, estimate probabilities using experiments, and compare the two.	<i>PO 2. Use the principal characteristics of the normal distribution to estimate probabilities.</i>
			<i>PO 3. Estimate probabilities and predict outcomes using one- and two-variable data.</i>
PO 2. Experiment with two different events to determine whether the two events are dependent or independent of each other.	PO 3. Use all possible outcomes (sample space) to determine the probability of dependent and independent events.	PO 3. Use simulations to model situations involving independent and dependent events.	<i>PO 4. Determine the conditional probability of an event given that another event occurs, decide if two events are dependent or independent, and determine the probability of an event given the probability of the complementary event.</i>
PO 3. Compare the results of multiple repetitions of the same probability experiment to the theoretical probability.		PO 4. Explain and use the law of large numbers (that experimental results tend to approach theoretical probabilities after a large number of trials).	
PO 4. Compare probabilities to determine fairness in experimental situations.			
		PO 5. Use concepts and formulas of area to calculate geometric probabilities.	

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 2: Data Analysis, Probability, and Discrete Mathematics

Concept 3: Systematic Listing and Counting			
Understand and demonstrate the systematic listing and counting of possible outcomes.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Analyze relationships among the tree diagrams where items repeat and do not repeat; make numerical connections to the multiplication principle of counting.	PO 1. Represent, analyze, and solve counting problems with or without ordering and repetitions.		
PO 2. Solve counting problems using Venn diagrams and represent the answer algebraically.	PO 2. Solve counting problems and represent counting principles algebraically including factorial notation.	PO 1. Apply the addition and multiplication principles of counting, representing these principles algebraically using factorial notation.	
		PO 2. Apply appropriate means of computing the number of possible arrangements of items using permutations where order matters, and combinations where order does not matter.	
		PO 3. Determine the number of possible outcomes of an event.	<i>PO 1. Use the binomial theorem and Pascal's Triangle to solve problems.</i>
			<i>PO 2. Demonstrate the connections between the binomial coefficients, entries of Pascal's triangle, and combinations.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 2: Data Analysis, Probability, and Discrete Mathematics

Concept 4: Vertex-Edge Graphs Understand and apply vertex-edge graphs.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
			PO 1. Study the following topics related to vertex-edge graphs: Euler circuits, Hamilton circuits, the Travelling Salesperson Problem (TSP), minimum weight spanning trees, shortest paths, vertex coloring, and adjacency matrices.
PO 1. Use vertex-edge graphs and algorithmic thinking to represent and find solutions to practical problems related to Euler/Hamilton paths and circuits.		PO 1. Solve network problems using graphs and matrices.	PO 2. Understand, analyze, and apply vertex-edge graphs to model and solve problems related to paths, circuits, networks, and relationships among a finite number of elements, in real-world and abstract settings.
			PO 3. Devise, analyze, and apply algorithms for solving vertex-edge graph problems.
	PO 1. Use directed graphs to solve problems.		PO 4. Extend work with adjacency matrices for graphs, such as interpreting row sums and using the n th power of the adjacency matrix to count paths of length n in a graph.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 3: Patterns, Algebra, and Functions

Concept 1: Patterns			
Identify patterns and apply pattern recognition to reason mathematically while integrating content from each of the other strands.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Recognize, describe, create, and analyze numerical and geometric sequences using tables or graphs; make conjectures about these sequences.	PO 1. Recognize, describe, create, and analyze numerical and geometric sequences using tables, graphs, words, or symbols; make conjectures about these sequences.	PO 1. Recognize, describe, and analyze sequences using tables, graphs, words, or symbols; use sequences in modeling.	<i>PO 1. Analyze sequences and series and use them in modeling, including</i> <ul style="list-style-type: none"> • <i>explicit formulas for nth terms,</i> • <i>sums of finite arithmetic series, and</i> • <i>sums of finite geometric series.</i>
		PO 2. Determine a specific term of a sequence.	
		PO 3. Create sequences using explicit and recursive formulas involving both subscripts and function notation.	PO 2. Apply recursive formulas for arithmetic and geometric sequences to solve problems.
			<i>PO 3. Distinguish between explicit and recursive formulas and convert between them, making good choices about when to use which.</i>
			<i>PO 4. Solve problems involving recursion.</i>
			<i>PO 5. Use and interpret sigma notation to represent summation.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 3: Patterns, Algebra, and Functions

Concept 2: Functions and Relationships Describe and model functions and their relationships.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
	PO 1. Sketch and interpret a graph that models a given context; describe a context that is modeled by a given graph.	PO 1. Sketch and interpret a graph that models a given context, make connections between the graph and the context, and solve maximum and minimum problems using the graph.	<i>PO 1. Express and solve problems that can be modeled using linear, quadratic, logarithmic, exponential, cubic, reciprocal, absolute value, and step and other piecewise-defined functions; interpret their solutions in terms of the context.</i>
	PO 2. Determine if a relationship represented by a graph or table is a function.	PO 2. Determine if a relationship represented by an equation, graph, table, description, or set of ordered pairs is a function.	
	PO 3. Write the rule for a simple function using algebraic notation.	PO 3. Use function notation; evaluate a function at a specified value in its domain.	<i>PO 2. Use function notation flexibly and evaluate a function at a value represented by an algebraic expression.</i>
	PO 4. Identify functions as linear or nonlinear and contrast distinguishing properties of functions using equations, graphs, or tables.		
PO 1. Use a table of values to graph an equation or proportional relationship; describe the graph's characteristics.	PO 5. Demonstrate that proportional relationships are linear using equations, graphs, or tables.	PO 4. Use equations, graphs, tables, descriptions, or sets of ordered pairs to express a relationship between two variables.	<i>PO 3. Graph absolute value, and step and other piecewise-defined functions identifying their key characteristics.</i>
			<i>PO 4. Graph exponential functions identifying their key characteristics.</i>
			<i>PO 5. Sketch the graphs and determine the key characteristics of power functions in the form $f(x) = ax^n$, $a \neq 0$, for positive integral values of n.</i>
			<i>PO 6. Graph polynomial functions identifying their key characteristics.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 3: Patterns, Algebra, and Functions

Concept 2: Functions and Relationships Describe and model functions and their relationships.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
		PO 5. Recognize and solve problems that can be modeled using a system of two equations in two variables.	
		PO 6. Recognize and solve problems that can be modeled using a quadratic function.	
		PO 7. Determine domain and range of a function from an equation, graph, table, description, or set of ordered pairs.	<i>PO 7. Find domain, range, intercepts, zeros, asymptotes, and points of discontinuity of functions.</i>
			PO 8. Find the major and minor axes, intercepts and asymptotes of conic sections.
			PO 9. Find domain, range, intercepts, period, amplitude, and asymptotes of trigonometric functions.
			<i>PO 10. Given a function</i> <ul style="list-style-type: none"> • <i>find the inverse of the function,</i> • <i>determine whether the inverse is a function,</i> • <i>explain why the graph of a function and its inverse are reflections of each other over the line $y = x$.</i>
			PO 11. Find approximate solutions for polynomial equations with or without graphing technology.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 3: Patterns, Algebra, and Functions

Concept 2: Functions and Relationships Describe and model functions and their relationships.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
			PO 12. Use theorems of polynomial behavior (including but not limited to the Fundamental Theorem of Algebra, Remainder Theorem, the Rational Root Theorem, Descartes Rule of Signs, the Conjugate Root Theorem) to find the zeros of a polynomial function.
			PO 13. Relate logarithms and exponential functions as inverses, prove basic properties of a logarithm using properties of its inverse, and apply those properties to solve problems.
			<i>PO 14. Combine functions by composition, as well as by addition, subtraction, multiplication, and division including any necessary restrictions on the domain.</i>
			<i>PO 15. Determine if functions are even, odd, or neither both algebraically and graphically.</i>
			<i>PO 16. Identify the degree of a given polynomial function and write a polynomial function of a given degree.</i>
			PO 17. Develop an informal notion of limits.

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 3: Patterns, Algebra, and Functions

Concept 3: Algebraic Representations			
Represent and analyze mathematical situations and structures using algebraic representations.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Write a single variable algebraic expression or one-step equation given a contextual situation.	PO 1. Write or identify algebraic expressions, equations, or inequalities that represent a situation.	PO 1. Create and explain the need for equivalent forms of an equation or expression.	<i>PO 1. Rewrite and describe the need for equivalent forms of algebraic expressions.</i>
		PO 2. Solve formulas for specified variables.	
			<i>PO 2. Apply the laws of exponents including rational and negative exponents to rewrite expressions in alternative forms.</i>
PO 2. Evaluate an expression containing one or two variables by substituting numbers for the variables.	PO 2. Evaluate an expression containing variables by substituting rational numbers for the variables.		
PO 3. Solve multi-step equations using inverse properties with rational numbers.	PO 3. Analyze situations, simplify, and solve problems involving linear equations and inequalities using the properties of the real number system.		
PO 4. Translate between graphs and tables that represent a linear equation.	PO 4. Translate between different representations of linear equations using symbols, graphs, tables, or written descriptions.	PO 3. Write an equation given a table of values, two points on the line, the slope and a point on the line, or the graph of the line.	
		PO 4. Determine from two linear equations whether the lines are parallel, perpendicular, coincident, or intersecting but not perpendicular.	
PO 5. Create and solve two-step equations that can be solved using inverse operations with rational numbers.		PO 5. Solve linear equations and equations involving absolute value, with one variable.	
PO 6. Create and solve one-step inequalities with whole numbers.	PO 5. Graph an inequality on a number line.	PO 6. Solve linear inequalities in one variable.	

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 3: Patterns, Algebra, and Functions

Concept 3: Algebraic Representations			
Represent and analyze mathematical situations and structures using algebraic representations.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
		PO 7. Solve systems of two linear equations in two variables.	<i>PO 3. Solve systems of three linear equations in three variables with or without technology.</i>
			<i>PO 4. Use matrices to represent everyday problems that involve systems of linear equations.</i>
		PO 8. Simplify and evaluate polynomials, rational expressions, expressions containing absolute value, and radicals.	<i>PO 5. Simplify radical expressions by performing operations on them.</i>
		PO 9. Multiply and divide monomial expressions with integer exponents.	
		PO 10. Add, subtract, and multiply polynomial and rational expressions.	<i>PO 6. Divide a polynomial by a lower degree polynomial.</i>
		PO 11. Solve square root equations involving only one radical.	
		PO 12. Factor quadratic polynomials in the form of $ax^2 + bx + c$ where a , b , and c are integers.	
		PO 13. Solve quadratic equations.	<i>PO 7. Find complex solutions for quadratic equations.</i>
		PO 14. Factor higher order polynomials.	<i>PO 8. Describe the relationships among the solutions of an equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial expression with and without technology.</i>
		PO 15. Solve problems using operations with matrices.	<i>PO 9. Use matrix operations and the inverse of a matrix to solve problems.</i>
			PO 10. Represent vectors as matrices.
			PO 11. Add, subtract, and compute the dot product of two-dimensional vectors; multiply a two-dimensional vector by a scalar.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 3: Patterns, Algebra, and Functions

Concept 4: Analysis of Change			
Analyze how changing the values of one quantity corresponds to change in the values of another quantity.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Use graphs and tables to model and analyze change.	PO 1. Interpret the relationship between a linear equation and its graph, identifying and computing slope and intercepts.	PO 1. Determine the slope and intercepts of the graph of a linear function, interpreting slope as a constant rate of change.	<i>PO 1. Analyze and describe how a change in an independent variable leads to a change in a dependent variable.</i>
	PO 2. Solve problems involving simple rates.	PO 2. Solve problems involving rate of change.	<i>PO 2. Identify patterns in a function's rate of change, including intervals of increase, decrease, and constancy; if possible, relate them to the function's verbal description or its graph.</i>
			<i>PO 3. Analyze change in various contexts by modeling and solving word problems using functions and equations.</i>
			<i>PO 4. Compare relative magnitudes of functions and their rates of change.</i>
		PO 3. Solve interest problems.	PO 5. Solve problems involving compound interest.
			PO 6. Demonstrate the relationship between <ul style="list-style-type: none"> • simple interest and linear growth and • compound interest and exponential growth.
			PO 7. Determine the total cost of purchasing consumer durables over time given different down payments, financing options, and fees.
			PO 8. Apply a variety of strategies to use tax tables and determine, calculate, and complete yearly federal income tax.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 3: Patterns, Algebra, and Functions

Concept 4: Analysis of Change			
Analyze how changing the values of one quantity corresponds to change in the values of another quantity.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
			PO 9. Develop a personal budget including debit, checking, and savings accounts by interpreting multiple personal budget examples.
			PO 10. Determine an effective retirement savings plan to meet personal financial goals including IRAs, ROTH accounts, and annuities.
			PO 11. Compare and contrast the role of insurance as a device to mitigate risk and calculate expenses of various options.

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 4: Geometry and Measurement

Concept 1: Geometric Properties			
Analyze the attributes and properties of 2- and 3- dimensional figures and develop mathematical arguments about their relationships.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Recognize the relationship between central angles and intercepted arcs; identify arcs and chords of a circle.	PO 1. Identify the attributes of circles: radius, diameter, chords, tangents, secants, inscribed angles, central angles, intercepted arcs, circumference, and area.	PO 1. Use the basic properties of a circle (relationships between angles, radii, intercepted arcs, chords, tangents, and secants) to prove basic theorems and solve problems.	
	PO 2. Predict results of combining, subdividing, and changing shapes of plane figures and solids.	PO 2. Visualize solids and surfaces in 3-dimensional space when given 2-dimensional representations and create 2-dimensional representations for the surfaces of 3-dimensional objects.	
PO 2. Analyze and determine relationships between angles created by parallel lines cut by a transversal.			
		PO 3. Create and analyze inductive and deductive arguments concerning geometric ideas and relationships.	
PO 3. Draw and classify 3-dimensional figures with appropriate labels showing specified attributes of parallelism, congruence, perpendicularity, and symmetry.		PO 4. Apply properties, theorems, and constructions about parallel lines, perpendicular lines, and angles to prove theorems.	PO 1. Perform basic geometric constructions using a variety of methods, including <ul style="list-style-type: none"> • perpendicular bisector of a line segment, • bisector of an angle, and • perpendicular or parallel lines.
		PO 5. Explore Euclid's five postulates in the plane and their limitations.	PO 2. Explore geometries other than Euclidean geometry in which the parallel postulate is not true.
PO 4. Describe the relationship between the number of sides in a regular polygon and the sum of its interior angles.		PO 6. Solve problems using angle and side length relationships and attributes of polygons.	
		PO 7. Use the hierarchy of quadrilaterals in deductive reasoning.	

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 4: Geometry and Measurement

Concept 1: Geometric Properties			
Analyze the attributes and properties of 2- and 3- dimensional figures and develop mathematical arguments about their relationships.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 5. Identify corresponding parts of congruent figures.	PO 3. Use proportional reasoning to determine congruence and similarity of triangles.	PO 8. Prove similarity and congruence of triangles.	
		PO 9. Solve problems using the triangle inequality property.	
	PO 4. Use the Pythagorean Theorem to solve problems.	PO 10. Solve problems using right triangles, including special triangles.	
		PO 11. Solve problems using the sine, cosine, and tangent ratios of the acute angles of a right triangle.	PO 3. Apply the law of cosines and the law of sines to find missing sides and angles of triangles.
			PO 4. Use basic trigonometric identities including Pythagorean, reciprocal, half-angle and double-angle, and sum and difference formulas to solve equations and problems.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 4: Geometry and Measurement

Concept 2: Transformation of Shapes			
Apply spatial reasoning to create transformations and use symmetry to analyze mathematical situations.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Model the result of a double transformation (translations or reflections) of a 2-dimensional figure on a coordinate plane using all four quadrants.	PO 1. Model the result of rotations in multiples of 45 degrees of a 2-dimensional figure about the origin.	PO 1. Determine whether a transformation of a 2-dimensional figure on a coordinate plane represents a translation, reflection, rotation, or dilation and whether congruence is preserved.	
		PO 2. Determine the new coordinates of a point when a single transformation is performed on a 2-dimensional figure.	
	PO 2. Describe the transformations that create a given tessellation.	PO 3. Sketch and describe the properties of a 2-dimensional figure that is the result of two or more transformations.	
	PO 3. Identify lines of symmetry in plane figures or classify types of symmetries of 2-dimensional figures.		
		PO 4. Determine the effects of a single transformation on linear or area measurements of a 2-dimensional figure.	<i>PO 1. Describe how changing the parameters of a quadratic function affects the shape and position of its graph $f(x) = a(x-h)^2+k$.</i>
			<i>PO 2. Describe how changing the parameters of an exponential function affects the shape and position of its graph $f(x) = ab^x$.</i>
			PO 3. Describe how changing the parameters of a trigonometric function affects the shape and position of its graph $f(x) = A \sin B(x-C)+D$ or the other trigonometric functions).

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 4: Geometry and Measurement

Concept 3: Coordinate Geometry			
Specify and describe spatial relationships using rectangular and other coordinate systems while integrating content from each of the other strands.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
	PO 1. Make and test a conjecture about how to find the midpoint between any two points in the coordinate plane.	PO 1. Determine how to find the midpoint between two points in the coordinate plane.	
	PO 2. Use the Pythagorean Theorem to find the distance between two points in the coordinate plane.	PO 2. Illustrate the connection between the distance formula and the Pythagorean Theorem.	
		PO 3. Determine the distance between two points in the coordinate plane.	
		PO 4. Verify characteristics of a given geometric figure using coordinate formulas for distance, midpoint, and slope to confirm parallelism, perpendicularity, and congruence.	
		PO 5. Graph a linear equation or linear inequality in two variables.	
		PO 6. Describe how changing the parameters of a linear function affect the shape and position of its graph.	
		PO 7. Determine the solution to a system of linear equations in two variables from the graphs of the equations.	<i>PO 1. Graph the solution set of a system of two or three linear inequalities and given an ordered pair determine whether it is a solution to the system.</i>
		PO 8. Graph a quadratic function and interpret x -intercepts as zeros.	<i>PO 2. Determine an equation of a circle given its center and radius; given an equation of a circle, find its center and radius.</i>
			PO 3. Graph equations of conic sections explaining the relationship between their algebraic form and key characteristics of the graph.

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 4: Geometry and Measurement

Concept 3: Coordinate Geometry			
Specify and describe spatial relationships using rectangular and other coordinate systems while integrating content from each of the other strands.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
			PO 4. Graph all six trigonometric functions identifying their key characteristics.
			PO 5. Evaluate all six trigonometric functions at angles between (0 degrees and 360 degrees, 0 and 2π radians) using the unit circle in the coordinate plane.
			PO 6. Convert between rectangular and polar coordinates.
			PO 7. Graph equations given in polar coordinates.

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 4: Geometry and Measurement

Concept 4: Measurement			
Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
	PO 1. Solve problems involving conversions within the same measurement system.	PO 1. Use dimensional analysis to keep track of units of measure when converting.	PO 1. Explain, use, and convert between degree and radian measures for angles.
PO 1. Solve problems involving the circumference and area of a circle by calculating and estimating.		PO 2. Find the length of a circular arc; find the area of a sector of a circle.	
PO 2. Identify polygons having the same perimeter or area.		PO 3. Determine the effect that changing dimensions has on the perimeter, area, or volume of a figure.	
PO 3. Calculate the area and perimeter of composite 2-dimensional figures.			
PO 4. Determine actual lengths based on scale drawings or maps.	PO 2. Solve geometric problems using ratios and proportions.	PO 4. Solve problems involving similar figures using ratios and proportions.	
PO 5. Create a net to calculate the surface area of a given solid.	PO 3. Calculate the surface area and volume of rectangular prisms, right triangular prisms, and cylinders.	PO 5. Calculate the surface area and volume of 3-dimensional figures and solve for missing measures.	
PO 6. Identify the appropriate unit of measure to compute the volume of an object and justify reasoning.			
PO 7. Measure to the appropriate degree of accuracy and justify reasoning.			

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level
Strand 5: Structure and Logic

Concept 1: Algorithms and Algorithmic Thinking Use reasoning to solve mathematical problems.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Create an algorithm to determine the area of a given composite figure.	PO 1. Create an algorithm to solve problems involving indirect measurements, using proportional reasoning, dimensional analysis, and the concepts of density and rate.	PO 1. Select an algorithm that explains a particular mathematical process; determine the purpose of a simple mathematical algorithm.	
		PO 2. Analyze algorithms for validity and equivalence recognizing the purpose of the algorithm.	<i>PO 1. Use a variety of approaches (inductive and deductive reasoning, estimations, generalizations, formal and informal methods of proof) to analyze algorithms.</i>

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 5: Structure and Logic

Concept 2: Logic, Reasoning, Problem Solving, and Proof			
Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 1. Analyze a problem situation to determine the question(s) to be answered.	PO 1. Analyze a problem situation to determine the question(s) to be answered.	PO 1. Analyze a problem situation, determine the question(s) to be answered, organize given information, determine how to represent the problem, and identify implicit and explicit assumptions that have been made.	<i>PO 1. Analyze a problem situation, determine the question(s) to be answered, organize given information, determine how to represent the problem, and identify implicit and explicit assumptions that have been made.</i>
PO 2. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	PO 2. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	PO 2. Solve problems by formulating one or more strategies, applying the strategies, verifying the solution(s), and communicating the reasoning used to obtain the solution(s).	<i>PO 2. Solve problems by using theorems, formulating one or more strategies, applying the strategies, verifying the solution(s), and communicating the reasoning used to obtain the solution(s).</i>
PO 3. Identify relevant, missing, and extraneous information related to the solution to a problem.	PO 3. Identify relevant, missing, and extraneous information related to the solution to a problem.		
PO 4. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.	PO 4. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.	PO 3. Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.	<i>PO 3. Evaluate a solution for reasonableness and interpret the meaning of the solution in the context of the original problem.</i>
PO 5. Apply a previously used problem-solving strategy in a new context.	PO 5. Apply a previously used problem-solving strategy in a new context.	PO 4. Generalize a solution strategy for a single problem to a class of related problems; explain the role of generalizations in inductive and deductive reasoning.	<i>PO 4. Generalize a solution strategy for a single problem to a class of related problems and explain the role of generalizations in inductive and deductive reasoning.</i>
PO 6. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.	PO 6. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.	PO 5. Summarize and communicate mathematical ideas using formal and informal reasoning.	<i>PO 5. Summarize and communicate mathematical ideas using formal and informal reasoning.</i>

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

Mathematics Standard Articulated by Grade Level Strand 5: Structure and Logic

Concept 2: Logic, Reasoning, Problem Solving, and Proof			
Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 7. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.	PO 7. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.	PO 6. Synthesize mathematical information from multiple sources to draw a conclusion, make inferences based on mathematical information, evaluate the conclusions of others, analyze a mathematical argument, and recognize flaws or gaps in reasoning.	<i>PO 6. Synthesize mathematical information from multiple sources to draw a conclusion, make inferences based on mathematical information, evaluate the conclusions of others, analyze a mathematical argument, and recognize flaws or gaps in reasoning.</i>
	PO 8. Describe when to use proportional reasoning to solve a problem.	PO 7. Find structural similarities within different algebraic expressions and geometric figures.	<i>PO 7. Analyze and explain the general properties and behavior of functions or relations using algebraic and graphing techniques.</i>
PO 8. Make and test conjectures based on information collected from explorations and experiments.	PO 9. Make and test conjectures based on information collected from explorations and experiments.	PO 8. Use inductive reasoning to make conjectures, use deductive reasoning to analyze and prove a valid conjecture, and develop a counterexample to refute an invalid conjecture.	<i>PO 8. Use inductive and deductive reasoning to make, analyze, and validate or refute conjectures and/or proofs.</i>
			PO 9. Use mathematical models to represent and analyze personal and professional situations.
			PO 10. Differentiate, interpret, apply, and develop concepts in the context of personal and professional situations.
PO 9. Solve logic problems using multiple variables and multiple conditional statements using words, pictures, and charts.	PO 10. Solve logic problems involving multiple variables, conditional statements, conjectures, and negation using words, charts, and pictures.	PO 9. State the inverse, converse, and contrapositive of a given statement and state the relationship between the truth value of these statements and the original statement.	<i>PO 11. Determine under what conditions a given statement (algebraic, geometric) is true.</i>
	PO 11. Identify simple valid arguments using <i>if... then</i> statements.	PO 10. List related <i>if... then</i> statements in logical order.	
		PO 11. Draw a simple valid conclusion from a given <i>if... then</i> statement and a minor premise.	

The bulleted items within a performance objective indicate the specific content to be taught.

The performance objectives highlighted in italics have been identified as core to an Algebra II course.

**Mathematics Standard Articulated by Grade Level
Strand 5: Structure and Logic**

Concept 2: Logic, Reasoning, Problem Solving, and Proof			
Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.			
Grade 7	Grade 8	High School (Grades 9 and 10)	College Work Readiness (Grades 11 and 12)
PO 10. Demonstrate and explain that the process of solving equations is a deductive proof.	PO 12. Make, validate, and justify conclusions and generalizations about linear relationships.	PO 12. Construct a simple formal deductive proof.	
PO 11. Use manipulatives and other modeling techniques to defend π (π) as a ratio of circumference to diameter.	PO 13. Verify the Pythagorean Theorem using a valid argument.	PO 13. Identify and explain the roles played by definitions, postulates, propositions and theorems in the logical structure of mathematics, including Euclidean geometry.	

The bulleted items within a performance objective indicate the specific content to be taught.
The performance objectives highlighted in italics have been identified as core to an Algebra II course.