Albuquerque Public Schools
High School District Benchmark Assessment
Algebra II Assessment Alignment 2009 DRAFT

PROCESS STANDARDS

To help New Mexico students achieve the Content Standards enumerated below, teachers are encouraged to base instruction on the following Process Standards:

These standards should be embedded in the classroom assessment and instruction.

Problem Solving • Build new mathematical knowledge through problem solving • Solve problems that arise in mathematics and other contexts • Apply and adapt a variety of appropriate strategies to solve problems, and • Monitor and reflect on the process of problem solving.	**Connections** • Recognize and use connections among mathematical ideas, • Understand how mathematical ideas interconnect and build on one another to produce a coherent whole, and • Recognize and apply mathematics in contexts outside of mathematics.
Reasoning and Proof • Recognize reasoning and proof as fundamental aspects of mathematics, • Make and investigate mathematical conjectures, • Develop and evaluate mathematical arguments and proofs, and • Select and use various types of reasoning and methods of proof.	**Representation** • Create and use representations to organize, record, and communicate mathematical ideas, • Select, apply, and translate among mathematical representations to solve problems, and • Use representations to model and interpret physical, social, and mathematical phenomena.
Communication • Organize and consolidate their thinking through communication, • Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, • Analyze and evaluate the mathematical thinking and strategies of others, • Use the language of mathematics to express mathematical ideas precisely, and • Describe mathematical concepts using developmentally appropriate definitions.	

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Strand II: Algebra, Functions, and Graphs			
Content Standard: Student will understand algebraic concepts and applications.			
Benchmark A.1: Represent And Analyze Mathematical Situations And Structures Using Algebraic Symbols.			
Performance Standards	**Form 1 33 ques.**	**Form 2 35* ques.**	**Form 3 36* ques.**
A.1.2 *Classify and use equivalent representations of natural, whole. Integer, rational, irrational numbers and* ***complex numbers****, and choose which type of number is appropriate in a given context.*		5 quest.	
A.1.6 Simplify numerical expressions using the order of operations, including integer exponents.	1 quest.		
A.1.7 Translate verbal statements into algebraic expressions or equations.	1 quest.	.	2 quest.
A.1.8 Solve formulas for specified variables.	1 quest.		
A.1.9 *Solve quadratic equations in one variable.*		4 quest.	
A.1.10 *Solve radical equations involving one radical.*			1 quest.
A.1.11 Describe the properties of rational exponents and apply these properties to simplify algebraic expressions.	2 quest.		
A.1.12 Explain and use equivalent representations for algebraic expressions (e.g., simplify using the distributive property).	1 quest.	1 quest.	1 quest.
A.1.13 Simplify rational expressions by factoring and reducing to lowest terms.			2 quest.
A.1.14 *Evaluate polynomial, rational,* ***radical****, and absolute value expressions for one or more variables.*			
A.1.16 Factors polynomials of various types (e.g., difference of squares, perfect square trinomials, sum and difference of cubes).			1 quest.
A.1.17 Solve linear equations and inequalities in one variable including those involving the absolute value of a linear function.	4 quest.		
A.1.18 Use the four basic operations (+, -, x, ÷) with linear, polynomial, and rational expressions in contextual situation.	2 quest.		3 quest.
AX.1.1 Solve three-by-three linear systems.		2 quest.	
Benchmark A.2: Understand Patterns, Relations, Functions, and Graphs.			
A.2.2 Determine whether a relation defined by a graph, a set of ordered pairs, a table of values, an equation, or a rule is a function.			
A.2.3 Translate among tabular, symbolic, and graphical representations of functions and relations.	1 quest.		

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A.2.5 Explain and use function notation in both abstract and contextual situations and evaluate a function at a specific point in its domain.	1 quest.		
A.2.6 Graph a linear equation and demonstrate that is has a constant rate of change.	1 quest.		
A.2.7 Graph a linear inequality in two variables.	1 quest.		
A.2.8 *Graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of its graph.*		4 quest.	
A.2.9 *Graph exponential functions and identify their key characteristics as related to contextual situations.*			3 quest.
A.2.10 *Identify and describe symmetries of graphs.*			
A.2.11 *Use the quadratic formula and factoring techniques to determine whether the graph of a quadratic function intersect the x-axis in zero, one, or two points (include quadratic functions that represent real phenomena).*		4 quest.	
A.2.12 *Explain the meaning of the real and complex roots of quadratic functions in contextual situations.*			
A.2.13 Read information and draw conclusions from graphs, and identify properties of a graph that provide useful information about the original problem	4 quest.	2 quest.	1 quest.
A.2.14 Understand the relationship between the coefficients of a linear equation and the slope and x-and y- intercepts of graphs.	3 quest.		
A.2.15 Evaluates the estimated rate of change in the context of the problem.	1 quest.		
AX.2.1 Factor polynomials of degree higher than two using the fundamental theorem of algebra (i.e., an nth degree polynomial has at most n distinct linear factors), integral and rational zero theorems, and factor and remainder theorems.		*	
AX2.2 Graph 2nd, 3rd and 4th degree polynomials using the intermediate value theorem		*	
AX.2.6 Identify the relationship between the degree of a polynomial function and the maximum number of turning points in its graph, and the relationship between the leading term and the behavior of the function for large values of lxl.			
Benchmark A.3: Use mathematical models to represent and understand quantitative relationships.			
A.3.1 Model real-world phenomena using linear equations and linear inequalities, interpret resulting solutions, and use estimation to detect errors.	1 quest.	1 quest.	

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A.3.2 *Model real-world phenomena using quadratic equations, interpret resulting solutions, and use estimation to detect errors.*		2 quest.	
A.3.3 *Model real-world phenomena using exponential equations, interpret resulting solutions, and use estimation to detect errors.*			3 quest.
A.3.4 Solve systems of linear equations in two variables algebraically and graphically.		2 quest.	
A.3.5 *Solves applications involving systems of two equations in two variables.*		2 quest.	
A.3.6 Write the equation of the line that passes through two given points.	1 quest.		
A.3.7 Verify that a point lies on a line, given an equation of the line, and be able to derive linear equations given a point and a slope.	2 quest.		
A.3.8 Determine whether the graphs of two given linear equations are parallel, perpendicular, coincide or none of these.	1 quest.		
AX.3.1 Determine the composition of functions (e.g., find f(g(x)) when f(x) = 2x - 3 and g(x) = 3x - 2), and find the domain, range, intercepts, zeros, and local maxima or minima of the final function.			
AX.3.2 Find and use inverse functions involving ordered pairs, graphs, and explicit statements of a function rule.			3 quest.
AX3.3 Determine the domain and range of linear and quadratic functions expressed symbolically and graphically, and of functions defined by a finite set of ordered pairs in mathematical and contextual situations.	3 quest.		1 quest.
AX.3.7 Analyzes the effects of parameter changes on these functions: quadratic (e.g., f{x-a}, changes in coefficients and constants), exponential (e.g., changes caused by changing the base or the exponent), and polynomial (e.g., changes caused by positive or negative values of + or – a_n, or in a constant a_0).		2 quest.	2 quest.
AX.4.1 Prove basic properties of a logarithm using properties of its inverse.			2 quest.
AX.4.2 Apply exponential functions and common and natural logarithms to understand real-life situations (e.g.,half-life, amortization, logistic growth).			2 quest.
AX4.3 Apply logarithms and exponents to solve equations.			2 quest.

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Strand III: Geometry & Trigonometry			
Content Standard: Students will understand geometric concepts and applications.			
Benchmark G.4: Use visualization, spatial reasoning, and geometric modeling to solve problems.			
Performance Standards	**Form 1**	**Form 2**	**Form 3**
G.4.3 Know that the effect of a scale factor *k* on length, area, and volume is to multiply each by k, k^2, and k^3, respectively.	1 quest.		

Strand IV: Data Analysis and Probability			
Content Standard: Students will understand how to formulate questions, analyze data, and determine probabilities.			
Benchmark D.2: Select and use appropriate statistical methods to analyze data and make predictions.			
Performance Standards	**Form 1**	**Form 2**	**Form 3**
D.2.4 *Calculate and apply measures of variability (e.g., standard deviation).*			1 quest.
D.2.5 *Compare distributions of univariate data using back-to-back stem and leaf plots and parallel box and whisker plots.*			*
D.2.6 *Describe the characteristics of a normal distribution.*			*
D.2.7 *Compare and draw conclusions between two or more sets of univariate data using basic data analysis techniques and summary statistics.*			*
D.2.8 *Describe the shape of a scatter plot.*			*
D.2.10 *Use technological tools to find the line of best fit.*			*
D.2.11 *Describe the relationship between the two variables and determine its strength with and without technological tools.*			*
D.2.12 *Explain why correlation does not imply a cause-and-effect relationship.*			*
D.2.13 *Use the results of simulations to explore the variability of sample statistics from a known population and construct sampling distributions.*			*
D.2.14 *Describe how sample statistics, including the law of large numbers, reflect the values of population parameters and use sampling distributions as the basis for informal inference.*			*
D.2.15 *Evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analysis, and the validity of conclusions.*			*

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Benchmark D.3: Understand and apply basic concepts of probability.			
Performance Standards			
D.3.2 Explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome.			1 quest.
D.3.4 Compute the probability of an event using the complement rule, addition rule for disjoint and joint events, multiplication rule independent events, and the rules for conditional probability.			

* *N.B.* In the coming weeks, about four new items will be added to AX.2.1 and AX2.2 for the winter assessment. Additionally, about five new items will be added to the Data Analysis and Probability standards for the spring assessment.

Blue (italicized) and red (bold) font represent Algebra II standards.

Summary of the Algebra I Standards Assessed on the District Benchmark Assessment (DBA)

Fall DBA standards & (items): A.1.6 – (1), A.1.7 - (1), A.1.8 – (1), A.1.11 - (2), A.1.12 – (1), A.1.17 – (4), A.1.18 - (2), A.2.3 – (2), A.2.5 – (1), A.2.6 – (1), A.2.7 – (1), A.2.13 (4), A.2.14 – (3), A.2.15 – (1) A.3.6 – (1), A.3.7 – (2), A.3.8 – (1), AX.3.3 – (3), G.4.3 – (1). Total items = 33.

Winter DBA standards & (items): A.1.2 – (5), A.1.9 - (4), A.1.12 – (1), A.2.8 - (4), A.2.11 – (4), A.2.13 – (2), A.3.1 - (1), A.3.2 – (2), A.3.4– (2), A.3.5 – (2), AX.1.1 – (2), AX.3.7 - (2) .
Total items = 35*.

*About four additional items on factoring and graphing polynomials will be inserted soon.

Spring DBA standards & (items): A.1.7 – (2), A.1.10 - (1), A.1.12 – (1), A.1.13 - (2), A.1.16 – (1), A.1.18 – (3), A.2.9 – (3), A.2.13– (1), A.3.3 – (3), AX.3.2 – (3), AX.3.3 – (1), AX.3.7 (2), AX.4.1 – (2), AX.4.2 – (2), AX.4.3 – (2), D.2.4 – (1), D.3.2 – (1). Total items = 36*.

*About five additional items on data analysis and probability will be inserted soon.