MATH *Connections* Correlation to Alabama Standards

Correlation Key:
"X" Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.

"XX" In-depth coverage = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.

	MATH Connections 1A				MATH Connections 1B				MATH Connections 2A			MATH Connections 2B			MATH Connections 3A				MATH Connections 3B			
	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
ALGEBRA I **Number and Operations**																						
Students will:																						
1. Simplify numerical expressions using properties of real numbers and order of operations, including those involving square roots, radical form, or decimal approximations.	XX	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
* Applying laws of exponents to simplify expressions, including those containing zero and negative integral exponents		XX														XX						
2. Analyze linear functions from their equations, slopes, and intercepts.			XX	XX	XX	XX								XX	XX							
* Finding the slope of a line from its equation or by applying the slope formula			XX	XX	XX	XX									X							
* Determining the equations of linear functions given two points, a point and the slope, tables of values, graphs, or ordered pairs			XX	XX	XX	XX								XX	XX							
* Graphing two-variable linear equations and inequalities on the Cartesian plane			XX	XX	XX	XX				X					XX							
3. Determine characteristics of a relation, including its domain, range, and whether it is a function, when given graphs, tables of values, mappings, or sets of ordered pairs.						XX									XX	XX	XX					
* Finding the range of a function when given its domain						XX									XX							

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4. Represent graphically common relations, including x = constant, y = constant, $y = x$, $y = \sqrt{x}$, $y = x^2$, and $y = \lvert x \rvert$.			XX												XX							
* Identifying situations that are modeled by common relations, including x = constant, y = constant, $y = \sqrt{x}$, $y = x^2$, and $y = \lvert x \rvert$			XX	XX	XX	XX			XX	XX		X			XX							
5. Perform operations of addition, subtraction, and multiplication on polynomial expressions.									XX						XX							
* Dividing by a monomial		XX													XX							
6. Factor binomials, trinomials, and other polynomials using GCF, difference of squares, perfect square trinomials, and grouping.													X		XX							
7. Solve multistep equations and inequalities including linear, radical, absolute value, and literal equations.		XX	XX	XX	XX	XX			XX	X	X	X	XX	XX	XX	X			XX	XX	XX	
* Writing the solution of an equation or inequality in set notation			XX										XX						XX			
* Graphing the solution of an equation or inequality			XX	XX	XX	XX				X				X	XX	XX	XX	X	XX		X	
* Modeling real-world problems by developing and solving equations and inequalities, including those involving direct and inverse variation		XX	XX	XX	XX	XX			XX	X	XX	X	XX	XX	XX	XX	XX	XX	XX		XX	
8. Solve systems of linear equations and inequalities in two variables graphically or algebraically.		X			XX					X				XX					XX			

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* Modeling real-world problems by developing and solving systems of linear equations and inequalities					XX									XX					XX			
9. Solve quadratic equations using the zero product property.															XX							
* Approximating solutions graphically and numerically															XX							
Geometry																						
10. Calculate length, midpoint, and slope of a line segment when given coordinates of its endpoints on the Cartesian plane.			XX	X	X	XX			XX	XX		X	XX									
* Deriving the distance, midpoint, and slope formulas			XX						XX				XX									
Measurement																						
11. Solve problems algebraically that involve area and perimeter of a polygon, area and circumference of a circle, and volume and surface area of right circular cylinders or right rectangular prisms.									XX			XX	XX						XX			
* Applying formulas to solve word problems									XX			XX	XX						XX			
Data Analysis and Probability																						
12. Compare various methods of data reporting, including scatterplots, stem-and-leaf plots, histograms, box-and-whisker plots, and line graphs, to make inferences or predictions.																						
* Determining effects of linear transformations of data	XX			XX																		
* Determining effects of outliers	XX																	X				
* Evaluating the appropriateness of the design of a survey	X																	XX				

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13. Identify characteristics of a data set, including measurement or categorical and univariate or bivariate.	XX			XX	X													X				
14. Use a scatterplot and its line of best fit or a specific line graph to determine the relationship existing between two sets of data, including positive, negative, or no relationship.				XX	XX																	
15. Estimate probabilities given data in lists or graphs.								XX				X										
* Comparing theoretical and experimental probabilities								XX										X				
GEOMETRY **Algebra**																						
1. Determine the equation of a line parallel or perpendicular to a second line through a given point.			XX							XX												
Geometry																						
2. Justify theorems related to pairs of angles, including angles formed by parallel and perpendicular lines, vertical angles, adjacent angles, complementary angles, and supplementary angles.										XX												XX
3. Verify the relationships among different classes of polygons by using their properties.									XX			X										
* Determining the missing lengths of sides or measures of angles in similar polygons										X												
4. Determine the measure of interior and exterior angles associated with polygons.									XX													

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* Verifying the formulas for the measures of interior and exterior angles of polygons inductively and deductively									XX													
5. Solve real-life and mathematical problems using properties and theorems related to circles, quadrilaterals, and other geometric shapes.									XX	XX		XX	X									
* Determining the equation of a circle given its center and radius												XX										
6. Apply the Pythagorean Theorem to solve application problems, expressing answers in simplified radical form or as decimal approximations, using Pythagorean triples when applicable.									XX	X	X	X	XX									
7. Use the ratios of the sides of special right triangles to find lengths of missing sides.											X											
* Deriving the ratios of the sides of 30-60-90 and 45-45-90 triangles											X											
8. Deduce relationships between two triangles, including proving congruence or similarity of the triangles from given information, using the relationships to solve problems and to establish other relationships.										XX												XX
* Determining the geometric mean to find missing lengths in right triangles										X									X			
9. Use inductive reasoning to make conjectures and deductive reasoning to justify conclusions.									X			X									XX	
* Recognizing the limitations of justifying a conclusion through inductive reasoning																					XX	

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10. Find the missing measures of sides and angles in right triangles by applying the right triangle definitions of sine, cosine, and tangent.											XX	X										
11. Determine the areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.									XX			X										
12. Apply distance, midpoint, and slope formulas to solve problems and to confirm properties of polygons.									XX				X									
13. Identify the coordinates of the vertices of the image of a given polygon that is translated, rotated, reflected, or dilated.																						
14. Classify polyhedrons according to their properties, including the number of faces.													XX									
Measurement																						
15. Calculate measures of arcs and sectors of a circle from given information.													XX									
16. Calculate surface areas and volumes of solid figures, including spheres, cones, and pyramids.													XX									
* Developing formulas for surface area and volume of spheres, cones, and pyramids													XX									
* Calculating specific missing dimensions of solid figures from surface area or volume													XX									
* Determining the relationship between the surface areas of similar figures and volumes of similar figures													XX									
Data Analysis and Probability																						

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17. Analyze sets of data from geometric contexts to determine what, if any, relationships exist.																		X				
* Distinguishing between conclusions drawn when using deductive and statistical reasoning																		X				
* Calculating probabilities arising in geometric contexts																		X				
18. Construct with precision a circle graph to represent data from given tables or classroom																		X				
ALGEBRAIC CONNECTIONS **Algebra**																						
1. Use algebraic and geometric techniques to make financial and economic decisions, including those involving banking and investments, insurance, personal budgets, credit purchases, recreation, and deceptive and fraudulent pricing and advertising.		XX	XX		XX	XX			XX						XX	XX	X		XX			
* Generating, manually or with technological tools, graphs and tables related to personal finance and economics		XX	XX		XX	XX			XX						XX	XX			XX			
2. Solve problems using direct, inverse, and joint variation.									XX	XX												
3. Use formulas or equations of functions to calculate outcomes of exponential growth or decay.		XX	XX		XX	XX										XX						
4. Determine maximum and minimum values of a function using linear programming procedures.																			XX			

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5. Approximate rates of change of nonlinear relationships from graphical and numerical data.		X	XX	XX		XX																
6. Use the extreme value of a given quadratic function to solve applied problems.															XX							
7. Make predictions based upon tables or graphs from societal contexts.				XX	XX											XX	X	XX				
Geometry																						
8. Determine missing information in an application-based situation by using the properties of right triangles, including trigonometric ratios.										XX	XX	X	X									
9. Analyze the aesthetics of real-life situations using line symmetry, rotational symmetry, or the golden ratio.									XX			XX										
10. Use arc length and sector area to solve applied problems.												XX										
Measurement																						
11. Critique the appropriateness of measurements in terms of precision, accuracy, and approximate error.									X													
12. Use ratios of perimeters, areas, and volumes of similar figures to solve applied problems.									XX	XX		X	XX									
Data Analysis and Probability																						
13. Model a set of data by estimating the equation of a curve of best fit from tables of values or scatterplots.				XX	XX																	
14. Estimate probabilities given a frequency distribution.								X										X				
ALGEBRA II **Number and Operations**																						

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1. Determine the relationships among the subsets of complex numbers.																					X	
2. Simplify expressions involving complex numbers, using order of operations and including conjugate and absolute value.																						
Algebra																						
3. Analyze families of functions, including shifts, reflections, and dilations of $y = \frac{k}{x}$			XX			XX									XX	XX	XX					
* (inverse variation), y = kx (direct variation/linear), $y = x^2$ (quadratic), $y = a^x$ (exponential), and $y = \log_a x$ (logarithmic).															XX							
* Identifying the domain and range of a relation given its graph, a table of values, or its equation, including those with restricted domains						XX									XX	XX	XX					
* Identifying real-world situations corresponding to families of functions						X									X	XX	XX					
4. Determine approximate real zeros of functions graphically and numerically and exact real zeros of polynomial functions.															XX							
* Using completing the square, the zero product property, and the quadratic formula															XX							
5. Identify the characteristics of quadratic functions from their roots, graphs, or equations.															XX							
* Writing an equation when given its roots or graph															X							
* Graphing a function when given its equation			X		X										XX							

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* Determining the nature of the solutions of a quadratic equation															XX							
* Determining the maximum or minimum values of quadratic functions both graphically and algebraically															XX							
6. Perform operations on functions, including addition, subtraction, multiplication, division, and composition.			XX												XX	XX	XX					
* Determining the inverse of a function or a relation															XX	XX	XX					
* Performing operations on polynomial and rational expressions containing variables									X						XX							
* Constructing graphs by analyzing their functions as sums or differences						X									X							
7. Solve equations, inequalities, and applied problems involving absolute values, radicals, and quadratics over the complex numbers, as well as exponential and logarithmic functions.															XX	XX						
* Solving equations using laws of exponents, including rational and irrational exponents																XX						
* Expressing the solution of an equation, inequality, or applied problem as a graph on a number line or by using set or interval notation			X										X						XX	X		
8. Solve systems of linear equations or inequalities in two variables using algebraic techniques, including those involving matrices.			X		XX					X				XX								
* Evaluating the determinant of a 2x2 or 3x3 matrix																						

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* Solving word problems involving real- life situations			X		XX					X				XX								
Geometry																						
9. Solve coordinate geometry problems using algebraic techniques.									XX	XX		XX	XX						XX			
Data Analysis and Probability																						
10. Use different forms of representation to compare characteristics of data gathered from two populations.	XX							X										X				
* Evaluating the appropriateness of the design of an experimental study								X										XX				
* Describing how sample statistics reflect values of population parameters	X																	XX				
11. Determine an equation of linear regression from a set of data.				XX	XX							X										
* Examining data to determine if a linear or quadratic relationship exists and to predict outcomes				XX	XX							X										
12. Calculate probabilities of events using the laws of probability.								XX										XX				
* Using permutations and combinations to calculate probabilities								X										XX				
* Calculating conditional probability								X										XX				
* Calculating probabilities of mutually exclusive events, independent events, and dependent events																		XX				
ALGEBRA II WITH TRIGONOMETRY **Number and Operations**																						
1. Determine the relationships of subsets of complex numbers.																					X	

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2. Simplify expressions involving complex numbers, using order of operations and including conjugate and absolute value.																						
3. Analyze families of functions, including shifts, reflections, and dilations of $y = \frac{k}{x}$ (inverse variation), y = kx (direct variation/linear), y = [x] (greatest integer), $y = x^2$ (quadratic), y = a x (exponential), and $y = \log_a x$ (logarithmic).			XX			XX									XX	XX	XX					
* Identifying the domain and range of a relation given its graph, a table of values, or its equation, including those with restricted domains						XX									XX	XX	XX					
* Identifying real-world situations corresponding to families of functions															X	XX	XX					
4. Determine approximate real zeros of functions graphically and numerically and exact real zeros of polynomial functions.															XX							
* Using the zero product property, completing the square, and the quadratic formula															XX							
* Deriving the quadratic formula															XX							
5. Identify the characteristics of quadratic functions from their roots, graphs, or equations.															XX							
* Generating an equation when given its roots or graph															XX							
* Graphing a function when given its equation			X			X									XX							

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* Determining the maximum or minimum values of quadratic functions both graphically and algebraically															XX							
* Applying functions to real-world problems						XX									XX	XX	XX					
6. Perform operations on functions, including addition, subtraction, multiplication, division, and composition.			XX			XX									XX	X	XX					
* Determining the inverse of a function or a relation						XX									XX	XX	XX					
* Performing operations on polynomial and rational expressions containing variables									XX						XX							
* Constructing graphs by analyzing their functions as sums, differences, or products						X									X							
7. Solve equations, inequalities, and applied problems involving absolute values, radicals, and quadratics over the complex numbers, as well as simple trigonometric, exponential, and logarithmic functions.																						
* Solving equations using laws of exponents, including rational and irrational exponents																XX						
* Expressing the solution of an equation, inequality, or applied problem as a graph on a number line or by using set or interval notation.			XX										XX						XX			

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8. Solve systems of linear equations or inequalities in two or three variables using algebraic techniques, including those involving matrices.					XX					X				XX					XX			
* Evaluating the determinant of a 2x2 or 3x3 matrix					XX									XX					XX			
* Solving word problems involving real- life situations																						
9. Graph trigonometric functions of the form y=a sin(bx), y=a cos(bx), and y=a tan(bx).											X						XX					
* Determining period and amplitude of sine, cosine, and tangent functions from graphs or basic equations											X						XX					
* Determining specific unit circle coordinates associated with special angles											XX						XX					
10. Solve general triangles, mathematical problems, and real-world applications using the Law of Sines and the Law of Cosines.											XX	X										
* Deriving formulas for Law of Sines and Law of Cosines											XX											
* Determining area of oblique triangles									X	X	XX											
11. Define the six trigonometric functions using ratios of the sides of a right triangle, coordinates on the unit circle, and the reciprocal of other functions.											XX						XX					
12. Verify simple trigonometric identities using Pythagorean and/or reciprocal identities.											XX											
Data Analysis and Probability																						
13. Use different forms of representation to compare characteristics of data gathered from two populations.																						

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* Evaluating the appropriateness of the design of an experimental study	X							X										XX				
* Describing how sample statistics reflect values of population parameters	X																	XX				
14. Determine an equation of linear regression from a set of data.				XX	XX							X										
* Examining data to determine if a linear, quadratic, or exponential relationship exists and to predict outcomes				XX	XX																	
15. Calculate probabilities of events using the laws of probability.								XX										XX				
* Using permutations and combinations to calculate probabilities								X										XX				
* Calculating conditional probability								X										XX				
* Calculating probabilities of mutually exclusive events, independent events, and dependent events																		XX				
ALGEBRA III WITH STATISTICS **Number and Operations**																						
1. Utilize matrices to solve problems manually or with technological tools.														XX								
* Performing operations of addition, subtraction, and multiplication of matrices														XX								
* Solving matrix equations														XX								
* Using augmented matrices														XX								
Algebra																						
2. Solve problems involving maximum or minimum values of functions by using linear programming procedures.															XX							

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3. Graph conic sections, centered at and rotated about the origin, given the equations.																					X	
* Determining equations of conic sections from their graphs																						
4. Graph polynomial functions.															XX							
* Approximating zeros using Descartes' Rule of Signs and the bisection method															X							
* Describing the end behavior of a polynomial function given its degree and leading coefficient																						
5. Solve systems of linear and quadratic equations and inequalities.		X			XX									XX					XX			
6. Approximate solutions of trigonometric and exponential equations from tables and graphs.		XX	XX			XX										XX	XX					
7. Expand powers of binomials using the Binomial Theorem.																		X				
* Using Pascal's triangle																		X				
Geometry																						
8. Plot points in a polar coordinate system given their coordinates in polar form, a table of values, or an equation.																						
Data Analysis and Probability																						
9. Compare summary statistics for sets of data represented in a graph, a stem-and-leaf chart, a box-and-whisker graph, a histogram, a linear or quadratic equation of best fit of a scatterplot, and a frequency distribution.	XX			XX	XX													XX				

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10. Calculate descriptive statistics of univariate data, including measures of central tendency, measures of dispersion, and measures of position.	XX																					
* Defining vocabulary associated with probability and statistics, including descriptive and inferential statistics	XX																					
* Comparing descriptive statistics for samples of varying sizes generated by simulation	XX																					
11. Interpret relationships of bivariate data using linear or quadratic regression and linear correlation.				XX	XX							X										
* Testing a hypothesis by displaying a scatterplot of experimental data, determining the regression coefficient and equation, and determining the correlation coefficient																						
12. Test a hypothesis for a study that involves one or two populations, generating the appropriate descriptive statistics.																						
* Designing a study																						
* Critiquing the appropriateness of the instrument used in a study																		X				
* Using z-scores in a study																		X				
* Using a t-test, when appropriate, to test a hypothesis																						
13. Calculate probabilities of mutually exclusive, independent, and dependent events using permutations, combinations, and laws of probability.								X										XX				
* Using situations involving conditional probabilities								X										XX				

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14. Determine the probability of an event using a frequency distribution curve.								X										XX				
* Comparing the terms of a binominal expansion to the terms of a binomial probability distribution																		X				
15. Analyze the data from a student-designed study to create a distribution curve and to determine the resulting confidence interval.																						
* Using data in quality control applications																						
16. Analyze differences among experimental, simulation, and theoretical probability techniques, including the advantages and disadvantages of each.																						
* Evaluating data-based reports by examining the design of the study, appropriateness of data analysis, and validity of conclusions																		XX				
PRECALCULUS **Number and Operations**																						
1. Perform the vector operations of addition, scalar multiplication, and absolute value.																						
* Determining coincidence, parallelism, collinearity, or perpendicularity of vectors																						
* Using vectors to model real- life and mathematical situations																						
2. Define e using the limit forms of $\sum_{n=0}^{\infty} \frac{1}{n!}$, $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$, and $\lim_{n\to 0}(1+n)^{\frac{1}{n}}$.					X											XX						

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	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
Algebra																						
3. Graph conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations.																					X	
* Formulating equations of conic sections from their determining characteristics																						
4. Analyze the graphs of rational, logarithmic, exponential, trigonometric, and piecewise-defined functions by determining the domain and range; identifying any vertical, horizontal, or oblique asymptotes; and classifying the function as increasing or decreasing, continuous or discontinuous, and noting the type of discontinuity if one exists.															XX	XX	XX					
* Approximating rates of change using the difference quotient																						
5. Analyze the effects of parameter changes on the graphs of trigonometric, logarithmic, and exponential functions.																XX	XX					
* Determining the amplitude, period, phase shift, domain, and range of trigonometric functions and their inverses																	XX					
6. Apply the laws of logarithms to simplify expressions and to solve equations using common logarithms, natural logarithms, and logarithms with other bases.																						
7. Solve trigonometric equations and inequalities using sum, difference, and half- and double-angle identities.											X											
* Verifying trigonometric identities											X											

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	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
8. Use parametric equations to represent real-life and mathematical situations.												XX										
9. Solve applied problems involving sequences with recurrence relations.						XX															XX	
* Determining characteristics of arithmetic and geometric sequences and series, including those defined with recurrence relations, first terms, common differences or ratios, n th terms, limits, or statements of convergence or divergence						XX															X	
* Expanding binomials raised to a whole number power using the Binomial Theorem																		X				
10. Find limits of functions at specific values and at infinity numerically, algebraically, and graphically.																						
* Applying limits in problems involving convergence and divergence																						
Geometry																						
11. Convert coordinates, equations, and complex numbers in Cartesian form to polar form and from polar form to Cartesian form.																						
* Graphing simple polar equations in the polar coordinate plane																						
* Graphing polar coordinates and complex numbers																						
Data Analysis and Probability																						
12. Determine the equation of a curve of best fit from a set of data by using exponential, quadratic, or logarithmic functions.																						