Grade/Content Area: Secondary Math Honors Algebra II **GRADE LEVEL/CONTENT AREA GUIDE**

Big Understandings of the Content Area

*Understand and use the Complex Number System.
*Recognize algebraic and geometric properties of various functions.
*Understand and use matrices.
*Understand and apply introductory probability and statistics.

Content Standards **A. NUMBERS AND NUMBER SENSE: Students will understand and demonstrate a sense of what numbers mean and how they are used.**	**B. COMPUTATION: Students will understand and demonstrate computation skills.**	**C. DATA ANALYSIS AND STATISTICS: Students will understand and apply concepts of data analysis.**	**D. PROBABILITY: Students will understand and apply concepts of probability.**	**E. GEOMETRY: Students will understand and apply concepts from geometry.**	**F. MEASUREMENT: Students will understand and demonstrate measurement skills.**
Performance Indicators Students will be able to: ♦ Describe the structure of the real number system and identify its appropriate applications and limitations. ♦ Explain what complex numbers (real and imaginary) mean and describe some of their many uses.	**Performance Indicators** Students will be able to: ♦ Use various techniques to approximate solutions, determine the reasonableness of answers, and justify the results. ♦ Explain operations with number systems other than base ten.	**Performance Indicators** Students will be able to: ♦ Determine and evaluate the effect of variables on the results of data collection. ♦ Predict and draw conclusions from charts, tables, and graphs that summarize data from practical situations. ♦ Demonstrate an understanding of concepts of standard deviation and correlation and how they relate to data analysis. ♦ Demonstrate an understanding of the idea of random sampling and recognition of its role in statistical claims and designs for data collection.	**Performance Indicators** Students will be able to: ♦ Find the probability of compound events and make predictions by applying probability theory. ♦ Create and interpret probability distributions.	**Performance Indicators** Students will be able to: ♦ Draw coordinate representations of geometric figures and their transformation. ♦ Use inductive and deductive reasoning to explore and determine the properties of and relationships among geometric figures. ♦ Apply trigonometry to problem situations involving triangles and periodic phenomena.	**Performance Indicators** Students will be able to: ♦ Use measurement tools and units appropriately and recognize limitations in the precision of the measurement tools. ♦ Derive and use formulas for area, surface area, and volume of many types of figures.
Knowledge/Skills ♦ Define and perform operations on Complex Numbers. ♦ Analyze the structure of the Real Number System. ♦ Define integral and rational exponents.	♦ Cross-cutting: used in all areas ♦ Use integral and rational exponents. ♦ Apply the natural exponential function. ♦ Use logarithms.	♦ Use various statistical graphs. ♦ Find the mean, median, and mode for a data set. ♦ Use stem and leaf and box-and-whisker graphs. ♦ Find the variance and standard deviation of a set of data.	♦ Use counting principles. ♦ Use combinations and permutations. ♦ Apply the Binomial Theorem and Pascal's Triangle. ♦ Write a sample space. ♦ Find the probability of an event.	♦ Find the midpoint and length of a segment. ♦ Determine whether lines are parallel, perpendicular, or neither. ♦ Reflect graphs, and use symmetry to sketch graphs. ♦ Determine periodicity and amplitude from graphs.	♦ Cross-cutting; used in word problems.

			• Find the probability of compound events. • Determine whether events are independent. • Use the Binomial Probability Theorem. • Use combinations to solve probability problems. • Solve problems involving conditional probability.	• Stretch and shrink graphs vertically and horizontally. • Translate graphs. • Use matrices to find images of points under different types of transformations.	
Assessment • Daily Tasks • Quizzes • Projects • Test • **LAS: By the Numbers** • **LAS: Lunar Landing**	• SAME • **LAS: The Number Line** • **LAS: Lunar Landing**	• SAME	• SAME	• SAME • **LAS: Builders 'R' Us**	• SAME • **LAS: Builders 'R' Us**
Resources • Advanced Mathematics; Brown; McDougall Littell	• SAME	• SAME	• SAME	• SAME	• SAME
Instructional Strategies • Lecture • Cooperative Learning • Discovery (Experiment) • Student Presentations	• SAME	• SAME	• SAME	• SAME	• SAME

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*Understand and use the Complex Number System.
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*Understand and apply introductory probability and statistics.

Content Standards **G. PATTERNS, RELATIONS, FUNCTIONS: Students will understand that mathematics is the science of patterns, relationships, and functions.**	**H. ALGEBRA CONCEPTS: Students will understand and apply algebraic concepts.**	**I. DISCRETE MATHEMATICS: Students will understand and apply concepts in discrete mathematics.**	**J. MATHEMATICAL REASONING: Students will understand and apply concepts of mathematical reasoning.**	**K. MATHEMATICAL COMMUNICATION: Students will reflect upon and clarify their understanding of mathematical ideas and relationships.**	
Performance Indicators Students will be able to: ♦ Create a graph to represent a real-life situation and draw inferences from it. ♦ Translate and solve a real-life problem using symbolic language. ♦ Model phenomena using a variety of functions (linear, quadratic, exponential, trigonometric, etc.). ♦ Identify a variety of situations explained by the same type of function.	**Performance Indicators** Students will be able to: ♦ Use tables, graphs, and spreadsheets to interpret expressions, equations, and inequalities. ♦ Investigate concepts of variation by using equations, graphs, and data collection. ♦ Formulate and solve equations and inequalities ♦ Analyze and explain situations using symbolic representations.	**Performance Indicators** Students will be able to: ♦ Use linear programming to find optimal solutions to a system. ♦ Use networks to find solutions to problems ♦ Apply strategies from game theory to problem-solving situations. ♦ Use matrices as tools to interpret and solve problems.	**Performance Indicators** Students will be able to: ♦ Analyze situations where more than one logical conclusion can be drawn from data presented.	**Performance Indicators** Students will be able to: ♦ Restate, create, and use definitions in mathematics to express understanding, classify figures, and determine the truth of a proposition or argument. ♦ Read mathematical presentations of topics within the Learning Results with understanding.	
Knowledge/Skills ♦ Find the intersection of two lines. ♦ Graph and analyze quadratic functions. ♦ Model real world situations using linear and quadratic functions. ♦ Graph a polynomial function. ♦ Write an equation of a polynomial graph. ♦ Identify a function and determine domain, range and zeros.	♦ Apply slope of line. ♦ Find the equation of a line given certain geometric properties. ♦ Solve quadratic equations using various methods. ♦ Use synthetic substitution. ♦ Apply the Factor and Remainder Theorems. ♦ Write a polynomial function for a given situation and determine max or min. ♦ Solve polynomial equations by various methods. ♦ Solve radical equations.	♦ Solve problems using linear programming. ♦ Find the sum, difference, or scalar multiples of matrices. ♦ Find the product of two matrices. ♦ Find the inverse of a matrix. ♦ Use matrices to solve linear systems. ♦ Find expected value in situations involving gains or losses and determine whether a game is fair.	♦ Cross-cutting; used in all areas	♦ Cross-cutting; used in all areas	

• Find the inverse of a function. • Define exponential function. • Define logarithmic function.	• Solve and graph linear inequalities in one variable. • Solve and graph polynomial inequalities in one variable. • Solve and graph absolute value equations and inequalities. • Graph polynomial inequalities in two variables. • Graph the solution set of a system of inequalities. • Perform operations on functions. • Graph functions of two variables and interpret such graphs. • Solve growth and decay problems and compound interest problems. • Solve exponential and logarithmic equations.				
Assessment • SAME • **LAS: Lunar Landing**	• SAME • **LAS: Lunar Landing**	• SAME • **LAS: Matrix Operations**	• SAME • **LAS: The Number Line**	• SAME • **LAS: The Number Line**	
Resources • SAME	• SAME	• SAME	• SAME	• SAME	
Instructional Strategies • SAME	• SAME	• SAME	• SAME	• SAME	