Honors Algebra II – Curriculum Map 11-12

Marking Period	**Content** What topic(s) is being covered and what is the important vocabulary? What do students need to know		**Skills** What do students have to be able to do connected to the Content?	**Essential Questions** What are fundamental, enduring questions that will guide study and instruction?		**Instruction** What activities are used to develop the skills and knowledge?	**Resources** What materials, texts, videos, internet, software, or human resources support instruction?	**Assessment** What evidence (products and/or performances) is collected to establish that the Content and Skills have been learned?
1st section Linear functions (4 – 5 days)		***Days:***	Student will be able to: • Simplify expressions using properties and order of operations • Solve and graph inequalities with and without absolute value • Graph linear equations and inequalities • Write equation of line given two points Student will be able to: • Solve systems of equations • Solve real life word problems • Graph systems of linear inequalities	Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations. Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations. Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables. Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution. **Identify and interpret the key features of a function from its graph or its formula(e), (e.g., slope, intercept(s), asymptote(s), maximum and minimum value(s), symmetry, and average rate of change over an interval).** **Associate a given equation with a function whose zeros are the solutions of the equation** **Identify function as a member of a family of functions based on its symbolic or graphical representation.**	L1.2.1 A1.2.9 A1.1.1 A1.2.8 **A2.1.7** **A1.2.2** **A2.3.1** **A2.4.1**	Chapter 1 - 3		

				Write the general symbolic forms that characterize each family of functions (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). **Identify the family of functions best suited for modeling a given real-world situation** **Adapt the general symbolic form of a function to one that fits the specifications of a given situation by using the information to replace arbitrary constants with numbers.** **Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.** **Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range.** **Read, interpret, and use function notation and evaluate a function at a value in its domain** **Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.** **Apply given transformations (e.g., vertical or horizontal shifts, stretching or shrinking, or reflections about the *x*- and *y*-axes) to basic functions and represent symbolically**. Distinguish between an observational study and an experimental study, and identify, in context, the conclusions that can be drawn from each	**A2.4.2** **A2.4.3** **A2.1.1** **A2.1.2** **A2.1.3** **A2.2.2** S3.1.3 S4.1.1 S4.1.2			

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2nd section Quadratic functions (2 weeks)	***Section Number and name: (Topic)***		Student will be able to: • Solve quadratic equations with complex solutions	**Function standards again here.** Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function and identify its domain and range. Read, interpret, and use function notation and evaluate a function at a value in its domain Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations. Identify the zeros of a function and the intervals where the values of a function are positive or negative. Describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations Associate a given equation with a function whose zeros are the solutions of the equation . Write the general symbolic forms that characterize each family of functions (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations. Apply given transformations (e.g., vertical or horizontal shifts, stretching or shrinking, or reflections about the x- and y-axes) to basic functions and represent symbolically. Add, subtract, and multiply complex numbers. Use	A2.1.1 A2.1.2 A2.1.3 A2.1.6 A1.2.2 A2.3.3 A1.2.9 A2.2.2 L2.1.5	Chapter 5		

3rd section – Polynomials (2 – 3 weeks) (these 3 sections should be complete by end of first 9 weeks)			Student will be able to: • Identify basic features of polynomial graphs, • use special factoring patterns • use rational zero test, use long division, • use synthetic division, solve polynomial equations • find zeros of polynomial functions Add, subtract and multiply polynomials • Factor polynomial expressions	conjugates to simplify quotients of complex numbers. **Function standards here.** Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations. Add, subtract, multiply, and simplify polynomials and rational expressions (e.g., multiply $(x - 1)(1 - x^2 + 3)$; simplify $\frac{9x - x^3}{x + 3}$. Divide a polynomial by a monomial. Associate a given equation with a function whose zeros are the solutions of the equation. Solve polynomial equations and equations involving rational expressions (e.g., solve $-2x(x^2 + 4x + 3) = 0$; solve $x - \frac{1}{x+6} = 3$, and justify steps in the solution. Identify the zeros of a function and the intervals where the values of a function are positive or negative. Describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations. Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques.	L1.2.1 A1.1.4 A1.1.5 A1.2.2 A1.2.5 A2.1.6 S4.2.1 Other prob.	Chapter 6		

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Section 4 Exponents and Logarithms (one 9 week marking period)			Student will be able to: • Perform operations with powers • Recognize exponential growth and decay models • Use rational exponent notation • Solve equations that contain radicals or roots • Solve compound interest problems • find monthly payment for installment loans • construct amortization table for installment loans	Use iterative processes in such examples as computing compound interest or applying approximation procedures. Explain the exponential relationship between a number and its base 10 logarithm and use it to relate rules of logarithms to those of exponents in expressions involving numbers. Use the properties of exponents and logarithms, including the inverse relationship between exponents and logarithms, to transform exponential and logarithmic expressions into equivalent forms. Solve exponential and logarithmic equations (e.g., $3(2^x) = 24$), $2\ ln(x + 1) = 4$), and justify steps in the solution. Describe and interpret logarithmic relationships in such contexts as the Richter scale, the pH scale, or decibel measurements (e.g., explain why a small change in the scale can represent a large change in intensity). Solve applied problems. Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations. Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions (e.g., $f(x) = 10^x$, $f(x) = \log x$, $f(x) = e^x$, $f(x) = ln\ x$). Apply properties of exponential and logarithmic functions (e.g., $a^{x+y} = a^x a^y$; $\log(ab) = \log a + \log b$). Write the general symbolic forms that characterize each	L2.2.3 L2.1.3 A1.1.6 A1.2.7 L2.3.2 A1.2.9 A3.2.2 A3.2.3 A2.3.3	Chapter 7 and 8		

				family of functions (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). Combine functions by addition, subtraction, multiplication, and division. Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs (e.g., $f(x) = x^3$ and $g(x) = x^{1/3}$). **Function standards go here again**.	A2.2.1 A2.2.3			

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Section 5 Rational functions (3 weeks) **Section 6 conic sections (3 weeks)**			Student will be able to: • graph rational functions • find horizontal and vertical asymptotes • perform operations with rational expressions • multiply and divide rational expressions • simplify complex fractions • solve inverse variation problems • solve joint variation problems Student will be able to: Graph and identify conic sections Write the equation and graph parabolas Write and graph the equation of a circle, find center and radius	**Function standards apply again.** Write the general symbolic forms that characterize each family of functions (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). Solve polynomial equations and equations involving rational expressions (e.g., solve $-2x(x^2 + 4x+3) = 0$; solve $x-\frac{1}{x+6}=\frac{3}{}$, and justify steps in the solution. Write the symbolic form and sketch the graph of simple rational functions. Analyze graphs of simple rational functions (e.g., $f(x)=\frac{2x+1}{x-1}$; $g(x)=\frac{x}{x^2-4}$) and understand the relationship between the zeros of the numerator and denominator and the function's intercepts, asymptotes, and domain. **Recognize that different families of functions have different asymptotic behavior at infinity and describe these behaviors.** Understand and construct sample spaces in simple situations (e.g., tossing two coins, rolling two number cubes and summing the results). Define mutually exclusive events, independent events, dependent events, compound events, complementary events, and conditional probabilities; and use the definitions to compute probabilities.	A2.3.3 A1.2.5 A3.6.1 A3.6.2 S4.1.1 S4.1.2 A1.2.9	Chapter 9 Chapter 10		

			of a circle Write, graph find the foci of an ellipse Graph hyperbola and use the foci Write the equation of a translated conic section, identify a translated conic section for an equation	Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations. Write the general symbolic forms that characterize each family of functions (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). Find an equation of a circle given its center and radius; given the equation of a circle, find its center and radius. Identify and distinguish among geometric representations of parabolas, circles, ellipses, and hyperbolas; describe their symmetries, and explain how they are related to cones. Graph ellipses and hyperbolas with axes parallel to the *x*- and *y*-axes, given equations	A2.3.3 G1.7.1 G1.7.2 G1.7.3			

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Section 7 sequences and series (3 weeks) (3 sections in one 9 week marking period)			Student will be able to: Identify mathematical patterns Use a formula for finding the nth term of a sequence. Identify and generate arithmetic sequences Identify and generate geometric sequences. Write and evaluate arithmetic series Use summation notation Evaluate a finite geometric series Evaluate an infinite geometric series Find area under a curve	Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations. Describe, explain, and apply various counting techniques (e.g., finding the number of different 4-letter passwords; permutations; and combinations); relate combinations to Pascal's triangle; know when to use each technique. Find the *n*th term in arithmetic, geometric, or other simple sequences. Compute sums of finite arithmetic and geometric sequences. Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations.	L1.2.1 L1.3.1 L2.2.1 L2.2.2 A1.2.9	Chapter 11 Chapter 13 and 14
Section 8 trigonometric functions (4 weeks)			Student will be able to • evaluate trigonometric functions • measure angles in radians and degree measure • evaluate inverse trigonometric functions • solve a right triangle	**Function standards go here** Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = rate · time), and apply appropriately in contextual situations. Use special values of the inverse trigonometric functions to solve trigonometric equations over specific intervals (e.g., $2 \sin x - 1 = 0$ for $0 \le x \le 2\pi$). Write the general symbolic forms that characterize each family of functions	A1.2.9 A1.2.10 A2.3.3 A3.7.1	

			using trigonometric functions solve oblique triangle using law of sines and law of cosines	(e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$). Use the unit circle to define sine and cosine; approximate values of sine and cosine (e.g., sin 3, or cos 0.5); use sine and cosine to define the remaining trigonometric functions; explain why the trigonometric functions are periodic. Use the relationship between degree and radian measures to solve problems. Use the unit circle to determine the exact values of sine and cosine, for integer multiples of $\pi/6$ and $\pi/4$. Graph the sine and cosine functions; analyze graphs by noting domain, range, period, amplitude, location of maxima and minima, and asymptotes. Graph transformations of basic trigonometric functions (involving changes in period, amplitude, phase, and midline) and understand the relationship between constants in the formula and the transformed graph.	A3.7.2 A3.7.3 A3.7.4 A3.7.5	

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Section 9 Probability and			Student will be able to: Make a probability distribution Use a probability distribution in conducting a simulation Find conditional probability Use formulas and tree diagrams	Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations. Describe, explain, and apply various counting techniques (e.g., finding the number of different 4-letter passwords; permutations; and combinations); relate combinations to Pascal's triangle; know when to use each technique. Define and interpret commonly used expressions of probability (e.g., chances of an event, likelihood, odds).	L1.2.1 L1.3.1 L1.3.2	Chapter 12

statistics (5 weeks)			Calculate measures of central tendency Draw and interpret box-and-whisker plots Find the standard deviation of a set of values Use standard deviation in real world situations Find sample proportions Find the margin of error Find binomial probabilities Use binomial distributions Use a normal distribution Use the standard normal curve	Recognize and explain common probability misconceptions such as “hot streaks” and “being due.” Determine what degree of accuracy is reasonable for measurements in a given situation; express accuracy through use of significant digits, error tolerance, or percent of error; describe how errors in measurements are magnified by computation; recognize accumulated error in applied situations. Describe and explain round-off error, rounding, and truncating. Know the meaning of and interpret statistical significance, margin of error, and confidence level. Construct and interpret dot plots, histograms, relative frequency histograms, bar graphs, basic control charts, and box plots with appropriate labels and scales; determine which kinds of plots are appropriate for different types of data; compare data sets and interpret differences based on graphs and summary statistics. Given a distribution of a variable in a data set, describe its shape, including symmetry or skewness, and state how the shape is related to measures of center (mean and median) and measures of variation (range and standard deviation) with particular attention to the effects of outliers on these measures. Calculate and interpret measures of center including: mean, median, and mode; explain uses, advantages and disadvantages of each measure given a particular set of data and its context. Estimate the position of the mean, median, and mode in both symmetrical and skewed distributions, and from a frequency distribution or histogram. Compute and interpret measures of variation, including percentiles, quartiles, interquartile range, variance, and standard deviation. Explain the concept of distribution and the relationship between summary statistics for a data set and parameters of a distribution Describe characteristics of the normal distribution, including	L1.3.3 L3.2.1 L3.2.2 L3.2.3 S1.1.1 S1.1.2 S1.2.1 S1.2.2 S1.2.3 S1.3.1 S1.3.2 S1.3.3	

				its shape and the relationships among its mean, median, and mode. Know and use the fact that about 68%, 95%, and 99.7% of the data lie within one, two, and three standard deviations of the mean, respectively in a normal distribution. Calculate *z*-scores, use *z*-scores to recognize outliers, and use *z*-scores to make informed decisions. Know the meanings of a sample from a population and a census of a population, and distinguish between sample statistics and population parameters. Identify possible sources of bias in data collection and sampling methods and simple experiments; describe how such bias can be reduced and controlled by random sampling; explain the impact of such bias on conclusions made from analysis of the data; and know the effect of replication on the precision of estimates. Distinguish between an observational study and an experimental study, and identify, in context, the conclusions that can be drawn from each Understand and construct sample spaces in simple situations (e.g., tossing two coins, rolling two number cubes and summing the results). Define mutually exclusive events, independent events, dependent events, compound events, complementary events, and conditional probabilities; and use the definitions to compute probabilities. Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques. Apply probability concepts to practical situations, in such settings as finance, health, ecology, or epidemiology, to make informed decisions.	S1.3.4 S3.1.1 S3.1.2 S3.1.3 S4.1.1 S4.1.2 S4.2.1 S4.2.2	