00 Algebra II / Trigonometry Honors / CP / CP Core Pacing Guide

Content Area: **TEMPLATE**
Course(s):
Time Period: **Semester**
Length: **40 Weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

This course is an extension of Algebra 1. Emphasis is upon the development of insights into the structure of algebra as a deductive process. The content includes function foundations, equations and inequalities, polynomial functions and equations, rational functions and equations, radical expressions and equations, exponential and logarithmic functions and equations, trigonometric functions and equations, introductory data analysis and probability.

GENERAL OVERVIEW AND PACING				
		Suggested Pacing (Days/Weeks/Periods)		
Topic/Unit Name		**CP Core Level**	**CP Level**	**Honors Level**
Topic/Unit 1	Factoring	4 Weeks (14 - 16 Blocks)	Ongoing	Ongoing
Topic/Unit 2	Function Foundations	Ongoing	2 - 3 Weeks (7 - 10 Blocks)	Ongoing
Topic/Unit 3	Equations and Inequalities (Linear & Nonlinear with systems)	4 - 6 Weeks (14 - 22 Blocks)	4 - 5 Weeks (14 - 18 Blocks)	2 Weeks (7 - 8 Blocks)
Topic/Unit 4	Quadratic Functions and Complex Numbers	5 Weeks (16 - 18 Blocks)	2 Weeks (7 - 8 Blocks)	1 - 2 Weeks (7 - 8 Blocks)
Topic/Unit 5	Polynomial Functions and Equations	6 Weeks (20 - 22 Blocks)	4 - 5 Weeks (14 - 18 Blocks)	3 - 4 Weeks (12 - 14 Blocks)
Topic/Unit 6	Rational Functions and Equations	2 -3 Weeks (7 - 10 Blocks)	3 - 4 Weeks (12 - 14 Blocks)	3 - 4 Weeks (12 - 14 Blocks)

Topic/Unit 7	Radical Functions and Equations	2 Weeks (7 - 8 Blocks)	2 - 3 Weeks (7 - 10 Blocks)	2 - 3 Weeks (7 - 10 Blocks)
Topic/Unit 8	Exponential and Logarithmic Functions	6 - 8 Weeks (20 - 28 Blocks)	4 - 6 Weeks (14 - 22 Blocks)	5 - 6 Weeks (18 - 24 Blocks)
Topic/Unit 9	Trigonometric Relationships and Functions	2 Weeks (7- 8 Blocks)	4 - 5 Weeks (14 - 18 Blocks)	9 -10 Weeks (32 - 34 Blocks)
Topic/Unit 10	Data Analysis and Probability	Ongoing	2 - 3 Weeks (7 -10 Blocks)	2 - 3 Weeks (7 -10 Blocks)
Topic/Unit 11	Conic Sections	Not Covered	Not Covered	2 Weeks (8 - 10 Blocks)

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication.
- Rules and properties of arithmetic and algebra can be applied together with equivalence to transform polynomial expressions.
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Build functions that arise in applications in terms of the context
- Analyze functions using different representations
- Interpret functions that arise in applications in terms of the context
- Build a function that models a relationship between two quantities
- Build new functions from existing functions
- Linear refers to a constant rate of change.
- In non-constant functions, a change in one variable affects another variable.
- The solutions to a system of equations or inequalities are the values that make the system true.
- Solutions exist that are not within the set of the real numbers.
- All number systems are subsets of the complex number system.
- Polynomial functions are smooth and continuous.
- Use polynomial functions to model complex scenarios and relationships between a

domain and range.
- Analyzing the graph of a polynomial function using information about the properties of the function.
- Solve real-world problems that involve polynomial functions.
- Solving equations is a process of reasoning
- Every rational function is expressed as a ratio of two polynomial functions
- Solving equations is a process
- Model graphically using radical functions
- Represent functions and relations numerically, graphically, and algebraically.
- Describe and apply properties of functions and relations
- Perform a variety of operations and geometrical transformations on functions and relations
- Use numerical, algebraic, and graphical representations of functions and relations in order to solve real-world problems
- Apply the concept of exponential functions to be able to solve real world problems.
- Define logarithms in terms of exponential functions.
- Apply the laws of logarithms to simplify expressions.
- Solve and simplify expressions by converting from log form to exponential form.
- Trigonometric relationships are applied to both triangles and unit circles
- Trigonometric functions model periodic behavior
- Model and interpret real-world situations using the language of mathematics and appropriate technology
- Collect, organize, analyze, and present data using technology as needed
- Apply the basic concepts of statistics and probability to predict possible outcomes of real- world situations, using technology as needed
- Data analysis is part of a decision making process (decisions or predictions are often based on data—numbers in context)
- Data is gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns
- Probability assigns a numerical value for the likelihood of an event or events.
- Conic sections are a cross-section of a cone from various directions
- Conic sections are represented algebraically through distance relationships
- Graph circles, parabolas, ellipse, and hyperbolas
- Identify a conic section from its equation
- Rewrite the general form of a conic to its standard form.
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Essential Questions:

- How can polynomials be simplified and applies to solve problems?
- Can two algebraic expressions that appear to be different be equivalent?
- How are properties of real numbers related to polynomials?
- How do we model information?
- Why do we use mathematical models?

- What are functions?
- How do changes affect functions?
- What are the different types of functions?
- What are the operations that apply to all functions?
- How can you represent and describe functions?
- How can functions describe real-word situations, model predictions and solve problems?

- How can Geometric and Analytic representations be used to describe the behavior of the function?

- How are algebraic, numeric, and graphic representations of functions related?
- Why are linear inequalities useful?
- What methods can be used to solve systems of linear equations and inequalities?
- How are systems of linear equations and inequalities useful?
- How can linear equations be used to solve real world problems?
- How to variables help to model real world situations?
- How can the properties of real numbers be used to simplify algebraic expressions?
- Can I analyze, model, and solve mathematical situations using algebraic symbols?
- Why do we use system of equations for real-world applications?
- What are the advantages of a quadratic function in vertex form? In standard form?
- How is any quadratic function related to the parent quadratic?
- How are the real solutions of a quadratic equation related to the graph of the related quadratic?
- How do quadratic equations model real world problems and situations?
- Why are complex number necessary?
- How are operations and properties of complex numbers relate to those of real numbers?
- How do polynomial functions model real-world problems and their solutions?
- Why are complex numbers necessary?
- How are operations and properties of complex numbers related to those of real numbers?
- What does the degree of a polynomial tell you about its related polynomial function?
- For a polynomial function, how are factors, zeros and x0intercepts related?
- For a polynomial function, how are factors and roots related?
- Are two quantities inversely proportional if an increase in one corresponds to a decrease in the other?
- What kinds of asymptotes are possible for a rational function?
- Are a rational expression and its simplified form equivalent?
- How do power and radical functions model real-world problems and their solutions?
- How are expressions involving radicals and exponents related?
- How do you model a quantity that changes regularly over time by the same percentage?
- How are exponents and logarithms and their functions related?
- How do exponential and logarithmic functions model real-world problems?
- How are angles and trig ratios represented in the x-y coordinate plane?
- Why are radian measures used rather than degree measures in working with

trigonometric functions and their applications?
- How can you model periodic behavior?
- How does the analysis of the unit circle generate right triangle ratios?
- Why are trigonometric functions periodic?
- How does the periodic nature of the trigonometric functions help to solve problems? problems?
- How is trigonometry useful in modeling real life situations that deal with right triangles?
- How can the results of a statistical investigation be used to support an argument?
- What are conic sections?
- In what situations could you use conic sections to model a relationship?
- What is the intersection of a cone and a plane parallel to a line along the side of the cone?
- What do graphs of conics look like?
- What is the difference between the algebraic representations of ellipses and hyperbolas?
- How are the conic sections related to the equation for distance?

Enduring Understanding:

- The properties of integers apply to polynomials
- Factors are subset of a product and with the distributive property allow options in solving polynomials
- Multiplying and factoring polynomials are related.
- Solving polynomials involves the reversal of operations, the distributive property and rules of exponents
- A pairing of items from two sets is special if each item from one set pairs with exactly one item from the second set.
- Some quantities are in a relationship where the ratio of corresponding values is constant.
- Sometimes it is possible to model data from a real-world situation with a linear equation.
- There are sets of functions, called families, in which each function is a transformation of a special function called the parent.
- Just as absolute value of x is its distance from 0, the absolute value of f(x) gives the distance from the line y = 0 for each value of f(x).
- You can add, subtract, multiply, and divide functions based on how you perform these operations for real numbers. One difference, however, is that you must consider the domain of each function.
- The characteristics of linear inequalities and their representations are useful in solving real-world problems.

- System of linear equations and/or inequalities are used to model and solve real-world problems involving 2 variables.
- Real world situations can be modeled and solved by using equations and inequalities.
- Some mathematical relationships are always true; these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.
- A basis for the complex numbers is a number whose square is -1.
- Every quadratic equation has complex number solutions.
- A number system is a way of organizing numbers to accurately and consistently represent quantities and relationships
- Properties of the real number system apply to complex numbers.
- The characteristics of polynomial functions and their representations are useful in solving real-world problems.
- The domain and range of polynomial functions can be extended to include the set of complex numbers.
- A polynomial function has distinguishing "behaviors". You can look at its algebraic form and know something about its graph and you can look at its graph and know something about its algebraic form.
- The zeros of a polynomial functions can help you understand the behaviors of its graph.
- Polynomials can be divided using steps that are similar to the long division steps that you use to divide whole numbers.
- The degree of a polynomial equation tell you how many roots the equation has.
- You can use a pattern of coefficients to write the expansion of $(a + b)^n$
- A rational function is a ratio of polynomial functions. If a rational function is in simplified form and the polynomial in the denominator is not a constant, the graph of the rational function features asymptotic behavior.
- You can use much of what you know about multiplying and dividing fractions to multiply and divide rational expressions.
- To operate with rational expressions, you can use much of what you know about operating with fractions.
- When solving an equation involving rational expressions multiplying by the common denominator can result in extraneous solutions.
- The characteristics of power and radical functions and their representations are useful in solving real-world problems
- Radicals can be combined using properties of real numbers
- Radical expression can be written in an equivalent form using a fractional (rational)
- Radicals can be written with exponent as well as with radical sign
- Solving a square root equation may require that you square each side of the equation and can introduce extraneous solutions.
- You can represent repeated multiplication with a function in the form of $y = ab^x$ where b is a positive number other than 1.
- The exponential function $y = b^x$ is one-to-one, so its inverse $x = b^y$ is a function. To express “y as a function of x” for the inverse you write $y = log_b x$

- Logarithms and exponents have corresponding properties
- You can use logarithms to solve exponential equations; and conversely, you can use exponents to solve logarithmic properties
- The function $y = e^x$ and $y = ln\ x$ are inverse functions
- Trigonometric functions can be applied to areas of study involving periodic behavior
- Angles can be measured in different units
- Trigonometric functions describe periodic phenomenon
- Trigonometry is useful in modeling and solving real-life problems that involve right angles.
- Statistics and probability are used to make inferences and predictions
- A circle is the set of points in a plane equal distance from the same point
- A parabola is the set of points equal distance from a focus point and its directrix
- An ellipse is the set of points that is the sum of distances from two foci
- A hyperbola is the set of points that is the difference between distances from two foci

CONTENT AREA STANDARDS

MA.F-BF.A.2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
MA.F-BF.A.1b	Combine standard function types using arithmetic operations.
MA.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
MA.F-BF.B.5	Use the inverse relationship between exponents and logarithms to solve problems involving logarithms and exponents.
MA.F-BF.B.4a	Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.
MA.F-BF.B.4b	Verify by composition that one function is the inverse of another.
MA.F-BF.B.4c	Read values of an inverse function from a graph or a table, given that the function has an inverse.
MA.F-IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.
MA.F-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MA.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given

	a verbal description of the relationship.
MA.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
MA.F-IF.B.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
MA.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MA.F-IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
MA.F-IF.C.7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
MA.F-IF.C.7d	Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
MA.F-IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
MA.F-IF.C.8a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
MA.F-IF.C.8b	Use the properties of exponents to interpret expressions for exponential functions.
MA.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
MA.F-LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
MA.F-LE.A.4	Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to ab to the ct power = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.
MA.F-LE.A.1a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
MA.F-LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
MA.F-LE.A.1c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
MA.F-LE.B.5	Interpret the parameters in a linear or exponential function in terms of a context.
MA.F-TF.A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
MA.F-TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
MA.F-TF.A.3	Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosines, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number.
MA.F-TF.A.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.
MA.F-TF.B.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

MA.F-TF.B.6	Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
MA.F-TF.B.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
MA.F-TF.C.8	Prove the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ and use it to find $sin(\theta)$, $cos(\theta)$, or $tan(\theta)$ given $sin(\theta)$, $cos(\theta)$, or $tan(\theta)$ and the quadrant of the angle.
MA.F-TF.C.9	Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.
MA.N-CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
MA.N-CN.A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
MA.N-CN.B.4	Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
MA.N-CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.
MA.N-CN.C.8	Extend polynomial identities to the complex numbers.
MA.N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
MA.S-CP.A.1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
MA.S-CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
MA.S-CP.A.3	Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
MA.S-CP.A.4	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
MA.S-CP.A.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
MA.S-CP.B.6	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
MA.S-CP.B.7	Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
MA.S-CP.B.8	Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B \mid A)] = [P(B)] \times [P(A \mid B)]$, and interpret the answer in terms of the model.
MA.S-CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.
MA.S-IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
MA.S-IC.A.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.
MA.S-IC.B.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

MA.S-IC.B.4	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
MA.S-IC.B.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
MA.S-IC.B.6	Evaluate reports based on data.
MA.S-ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
MA.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MA.S-ID.A.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
MA.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
MA.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MA.A-APR.B.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
MA.A-APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
MA.A-APR.C.4	Prove polynomial identities and use them to describe numerical relationships.
MA.A-APR.D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
MA.A-APR.D.7	Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MA.A-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.A-REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MA.A-REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.A-REI.B.4a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

MA.A-REI.B.4b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
MA.A-REI.C.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
MA.A-REI.C.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
MA.A-REI.C.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.
MA.A-REI.C.8	Represent a system of linear equations as a single matrix equation in a vector variable.
MA.A-REI.C.9	Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).
MA.A-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
MA.A-REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
MA.A-REI.D.12	Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
MA.A-SSE.B.4	Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.
MA.A-SSE.B.3c	Use the properties of exponents to transform expressions for exponential functions.
MA.G-GPE.A.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
MA.G-GPE.A.2	Derive the equation of a parabola given a focus and directrix.
MA.G-GPE.A.3	Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
MA.G-SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
MA.G-SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.
MA.G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
MA.G-SRT.D.9	Derive the formula $A = (1/2)ab\ sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
MA.G-SRT.D.10	Prove the Laws of Sines and Cosines and use them to solve problems.
MA.G-SRT.D.11	Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CS.K-12.2.a	Cultivate working relationships with individuals possessing diverse perspectives, skills, and personalities.
CS.K-12.2.b	Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.
CS.K-12.2.c	Solicit and incorporate feedback from, and provide constructive feedback to, team members and other stakeholders.
CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CS.K-12.3.c	Evaluate whether it is appropriate and feasible to solve a problem computationally.
CS.K-12.4.a	Extract common features from a set of interrelated processes or complex phenomena.
LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
PFL.9.1.K12.P.1	Act as a responsible and contributing community members and employee.
PFL.9.1.K12.P.4	Demonstrate creativity and innovation.
PFL.9.1.K12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
PFL.9.1.K12.P.6	Model integrity, ethical leadership and effective management.
PFL.9.1.K12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
PFL.9.1.K12.P.9	Work productively in teams while using cultural/global competence.
TECH.K-12.P.1	Act as a responsible and contributing community members and employee.
TECH.K-12.P.4	Demonstrate creativity and innovation.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.6	Model integrity, ethical leadership and effective management.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.9	Work productively in teams while using cultural/global competence.

EVIDENCE OF LEARNING

Formative Assessments

- Class Discussion
- Teacher observation
- Exit/Entrance Tickets
- Classwork

- Homework

Summative Assessments

- Quizzes
- Test
- Projects

RESOURCES (Instructional, Supplemental, Intervention Materials)

- Sullivan Algebra and Trigonometry Textbook
- Khan Academy
- Deltamath
- Illustrative Mathematics Tasks by standard
- Illustrative Mathematics Curriculum
- Desmos

INTERDISCIPLINARY CONNECTIONS

Interdisciplinary connections are frequently addressed through modeling and application problems whereby students solve and analyze situations such as navigation, surveying, sound waves, and tides. Examples can be found in topic specific textbook problems and digital resources.

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.