

COURSE: Algebra II
Grade Level: High School

MAIN/ GENERAL TOPIC	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW:	WHAT THE STUDENT WILL BE ABLE TO DO:	Assessments:	WHEN STUDENT DOES IT:
Polynomials and rational expressions	<ul style="list-style-type: none"> -Real numbers -Equations and Inequalities - Absolute Value -Polynomials -Factoring and Quadratic Fomula -Completing the square -Simplifying Rational expressions -Multiply/divide Rational expressions -Add/subtract rational expressions -Complex fractions -Fractions and equations 	<ul style="list-style-type: none"> -How do variables and expressions help us to represent "real life" situations? -How do properties help us to simplify algebraic expressions and equations? 	<ul style="list-style-type: none"> -Know how to evaluate expressions -Know the order of operations -Know the definition of absolute value 	<ul style="list-style-type: none"> -Classify real numbers -Use the properties of real numbers to evaluate expressions -Solve inequalities -Solve real-world problems involving inequalities -Solve compound inequalities -Solve absolute value inequalities -Simplify complex fractions 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	20 days

Complex Numbers	<ul style="list-style-type: none"> -Radicals -Simplifying Radical expressions -Operating with radicals -Radical Equations -Imaginary Numbers -Complex numbers -Conjugates and division of complex numbers -Complex roots -Product/Sum of roots of quadratic equation -Discriminant - Quadratic Inequalities 	Where are complex numbers used in the real world?	<ul style="list-style-type: none"> -Know the discriminant and quadratic formula -Know the values of i -Know the formulas for product and sum of roots 	<ul style="list-style-type: none"> -Identify the principal roots of a real number -Find the approximate value or simplest radical form of a radical expression -Simplify radical expressions -Solve radical equations -Simplify expressions containing imaginary numbers -Multiply and add complex numbers -Write the conjugate and additive and multiplicative inverse in a $+bi$ form -Solve an equation with complex roots and be able to describe the nature of roots -Write a quadratic equation if given the roots of the equation -Graph and solve a quadratic inequality. 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	21 days
Relations and Functions	<ul style="list-style-type: none"> -relations -Functions -Function notation -Special functions -Inverse Functions -Parabolas and Circles -Composing functions -Transforming functions 	-How do functions help us in everyday life? -	<ul style="list-style-type: none"> -standard form for a circle -axis of symmetry for a parabola -Vertical and horizontal line tests 	<ul style="list-style-type: none"> -Identify and graph the domain and range of a relation -Identify relations that are functions -Name functions using function notation -Identify an apply various types of functions -Find the inverse of a function -Identify and graph circles and parabolas -Apply the operation of composition of functions. 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	15 days

<p>Exponential and Logarithmic Relations</p>	<ul style="list-style-type: none"> -Exponential Functions -Logarithms and Logarithmic Functions -Properties of Logarithms -Common Logarithms -Base e and Natural Logarithms -Exponential Growth and Decay 	<p>-How do quadratic and exponential functions help us to model real world situations? -What is the difference between a quadratic and exponential function?</p>	<ul style="list-style-type: none"> - Know the difference between a quadratic and exponential function -Know the quadratic formula -Identify data that displays exponential behavior 	<ul style="list-style-type: none"> -Graph exponential functions -Solve exponential equations and inequalities -Evaluate logarithmic expressions -Solve logarithmic equations and inequalities -Simplify and evaluate expressions using the properties of logarithms -Solve logarithmic equations using the properties of logarithms -Solve exponential equations and inequalities using common logarithms -Evaluate logarithmic expressions using the Change of Base Formula -Evaluate expressions involving the natural base and natural logarithms -Solve exponential equations and inequalities using natural logarithms -Use logarithms to solve problems involving exponential decay - Use logarithms to solve problems involving exponential growth 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	<p>15 days</p>
<p>Circular Functions</p>	<ul style="list-style-type: none"> -working with circles and angle -Radian Measure -Two circular functions -Special angles -Sine and Cosine graph -Sketch Sine and cosine graph -Tangent Function -Reciprocal Functions -Finding Trig Values 	<p>What do Trig graphs have to do with the real world?</p>	<ul style="list-style-type: none"> -Know the special right triangles -Know sign values for the 4 quadrants. 	<ul style="list-style-type: none"> -Identify the quadrant in which an angle in standard position lies and determine coterminal angles. -Convert angles from radians to degree and degree to radians. -Express an ordered pair (x,y) as (cosθ, sin θ) -Calculate sine and cosine of 30, 45, 60, and their reference angles. -Identify amplitude, period, and frequency for sine and cosine graphs. -Graph $y=asinbx$ and $y=acosbx$ functions. -Calculate the value of the tangent function of an angle -Determine values for secant, cosecant, and cotangent functions. -Be able to find angles to nearest degree, minute, and second. 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	<p>21 days</p>

Applications of Circular Functions	<ul style="list-style-type: none"> -Trig Coordinates -Law of Cosine -Area of a Triangle -Law of Sines -Ambiguous Case -Solving Triangles -Trig of Right Triangle -Trigonometry and Physics 	-How do the Law of Sines and Law of Cosines help to solve real-world problems?	-Know how to use the Law of Sines and Law of Cosines to solve problems	<ul style="list-style-type: none"> -Express ordered pairs in trigonometric form or as rectangular coordinates. -Find the measure of angles and lengths of sides in triangle by applying Law of Cosines. -find the area of a triangle by applying principles of trigonometry. -Find measures of angles and lengths in triangles by applying Law of Sines. -Determine the number of existing triangles in a SSA condition. -Find all missing parts of a triangle -Find missing measures of right triangle parts by applying trigonometry -Find the magnitude of the resultant force acting at an angle to each other. 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	20 days
Trigonometric Identities and Equations	<ul style="list-style-type: none"> -Trigonometric Identities -Verifying Trigonometric Identities -Sum and Difference of Angles Formulas -Double-Angle and Half-Angle Formulas -Solving Trigonometric Equations 	-How do the trigonometric functions help to solve real-world problems?		<ul style="list-style-type: none"> -Use identities to find trigonometric values -Use trigonometric identities to simplify expressions -Verify trigonometric identities by transforming one side of an equation into the form of the other side -Verify trigonometric identities by transforming each side of the equation into the same form -Find values of sine and cosine involving sum and difference formulas -Verify identities by using sum and difference formulas -Find values of sine and cosine involving double-angle formulas -Find values of sine and cosine involving half-angle formulas -Solve trigonometric equations -Use trigonometric equations to solve real-world problems 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	13 days

Probability and Statistics	<ul style="list-style-type: none"> -The Counting Principle -Permutations and Combinations -Multiplying Probabilities -Adding Probabilities -Bernoulli experiments -Binomial Theorem -Find rth term of expansion Measures of Central Tendency -Measure of Dispersion -Normal Distribution and the Bell curve -Normal cdf -correlation coefficients and scatter plots -Regression equations 	<ul style="list-style-type: none"> -How is probability used in every-day life? -Why is it important to read and interpret graphs and statistics? -Why do we need to know about standard deviation and quartiles. 	-Know how to do a binomial expansion	<ul style="list-style-type: none"> -Solve problems involving independent events -Solve problems involving dependent events -Solve problems with Permutations with repetition -Solve problems involving combinations -Create and use graphs of probability distributions -Find the probability of two independent events -Find the probability of two dependent events -Find the probability of mutually exclusive events -Use measures of central tendency to represent a set of data -Find measures of variation for a set of data -Determine whether a set of data appears to be normally distributed or skewed -Solve problems involving normally distributed data -Use binomial expansions to find probabilities -Find probabilities for binomial experiments -Determine whether a sample is biased -Take data and find a regression equation to model it. -Determine if there is a positive or negative correlation. 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	20 days
Sequences and Series	<ul style="list-style-type: none"> -Arithmetic Sequences -Arithmetic Series -Geometric Sequences -Geometric Series -Infinite Geometric Series -Recursion and Special Sequences 	<ul style="list-style-type: none"> -What is an arithmetic sequence? -How does Pascal's triangle help with the expansion of binomials? 	<ul style="list-style-type: none"> -Know how to use sigma notation -Know how to use Pascal's triangle to expand binomials 	<ul style="list-style-type: none"> -Use arithmetic sequences -Find arithmetic means -Find sums of arithmetic series -Use sigma notation -Use geometric sequences -Find geometric means -Find sums of geometric series -Find specific terms of geometric series -Find the sum of an infinite geometric series -Write repeating decimals as fractions -Recognize and use special sequences 	<ul style="list-style-type: none"> -Practice problems -Quizzes/ tests -Class activities 	7 days