Department: Mathematics
Course Name: Honors Algebra II Trigonometry

Course Description:
Honors Algebra II Trigonometry is an accelerated study of advanced algebra topics and their applications including a study of trigonometry. Students will recognize patterns and apply rules to deduce, analyze, calculate, and solve problems. Comprehension and representation of data visually will be developed. This course places an emphasis on critical thinking, complex communication, collaboration, creativity and risk-taking. Above-average, successful completion of Algebra 1 and Geometry and department approval are required.

Content:
Polynomial, rational, transcendental and trigonometric functions – their graphs and applications
In depth treatment of probability, data analysis and statistics
Brief introduction to matrices, sequences and series

Skills:
Evaluate expressions.
Classify real numbers.
Use properties to solve equations.
Solve inequalities and compound inequalities and graph the solutions.
Solve absolute value equations and inequalities.
Identify functions and one-to-one functions in multiple representations.
Identify domain and range for continuous and discrete relations.
Use function notation to evaluate function values.
Write linear equations in standard form and slope-intercept form. Interpret the meaning of slope and the y-intercept.
Identify parallel or perpendicular lines.
Determine x- and y-intercepts.
Calculate slope and average rate of change.
Use scatter plots to describe bivariate data. Find lines of fit and use a graphing utility to find regression lines or curves of best fit.
Evaluate and graph piece-wise functions including step functions.
Identify and sketch graphs of parent functions including linear, absolute value, quadratic, power functions, square root, cube root, reciprocal, exponentials and logarithms.
Describe transformations of functions.
Graph linear and absolute value inequalities.
Solve systems of linear equations graphically and algebraically.
Solve systems of linear inequalities graphically.
Use linear programming to solve real world problems.
Solve systems of linear equations in three variables algebraically and using inverse matrices.
Organize and display data using matrices.
Analyze data in matrices by performing algebraic operations with matrices.
Graph quadratic functions and write their equations.
Find and interpret the maximum and minimum values of a quadratic function.
Solve quadratic equations graphically, by factoring, by using the Square Root Property, by completing the square, and by the quadratic formula.
Perform operations with complex numbers.

Use the discriminant to determine the number and type of roots of a quadratic equation.
Write a quadratic function in vertex form and transform graphs of quadratic functions.
Solve quadratic inequalities in one variable.
Solve polynomials by factoring.
Evaluate functions using synthetic substitution.
Determine whether a binomial is a factor of a polynomial by using synthetic substitution.
Determine the number and type of roots for a polynomial equation.
Find the zeros of a polynomial function.
Identify possible rational zeros of a polynomial function.
Find the combination of functions. Find the composition of functions.
Find the inverse of a function. Determine whether two functions are inverses.
Simplify radicals and radical expressions.
Add, subtract, multiply and divide radical expressions.
Rationalize denominators.
Write expressions with rational exponents in radical form and vice versa.
Simplify expressions in exponential or radical form.
Solve equations and inequalities containing radicals.
Graph exponential growth and decay functions.
Solve exponential equations.
Evaluate logarithmic expressions.
Solve logarithmic equations.
Simplify and evaluate expressions and solve equations using properties of logarithms.
Use common and natural logarithms. Use Change of Base formula.
Simplify rational expressions and complex fractions. Identify excluded values.
Add and subtract rational expressions.
Graph rational functions with vertical and horizontal asymptotes and points of discontinuity.
Solve rational equations and inequalities.
Find the midpoint of a segment. Find the distance between two points.
Use arithmetic and geometric sequences. Find sums of arithmetic and geometric series.
Use counting techniques. Evaluate factorials.
Compute theoretical and experimental probabilities. Compute probabilities of compound events.
Find probabilities of independent and dependent events. Use Venn Diagrams. Use two-way frequency tables to find conditional probabilities.
Find measures of central tendency and dispersion.
Use shapes of distributions to select appropriate statistics. Use shapes of distributions to compare data.
Construct a probability distribution. Analyze a probability distribution and its summary statistics.
Identify and conduct a binomial experiment. Find probabilities using binomial distributions.
Use the Empirical Rule to analyze normally distributed variables. Apply the standard normal distribution and z-values.
Find confidence intervals for normally distributed data. Perform hypothesis tests on normally distributed data.
Find values of trigonometric functions for general angles.
Use trigonometric functions to find side lengths and angle measures of right triangles.
Convert between degree measures and radian measures.
Find values of trigonometric functions by using reference angles.
Use Law of Sines including the ambiguous case.
Use Law of Cosines to solve triangles.
Find values of trigonometric functions based on the unit circle.
Apply transformations of trig functions and articulate amplitude, period and phase shift changes.
Use and graph trig functions and their inverses.

Use trigonometric identities to solve trig equations.

Text and Materials:
Larson, Algebra and Trig 11th edition (Cengage, 2018, 2022)
WebAssign

Methods of Instruction:
Lecture
Demonstration
Guided practice
WebAssign practice
DeltaMath
Desmos Activities

Methods of Evaluation:
Homework
Classwork
Formative assessments
Summative assessments
Projects