Math: Pre-Calculus and Trigonometry

UNIT/Weeks (not consecutive)	Timeline/Topics	Essential Questions
7.6	**Functions and Their Graphs** • Rectangular Coordinates • Graphs of Equations • Linear Equations in Two Variables • Functions • Analyzing Graphs of Functions • Transformations of Functions • Combinations of Functions: Composite Functions • Inverse Functions	• How can you use graphs of equations in solving real-life problems? • How can you describe the characteristics of and recognize graphs of parent functions? • How do you use a coordinate plane to model and solve real-life problems? • How can you explain whether relations between two variables are functions? • How can you use combinations and compositions of functions to model and solve real-life problems? • What does it mean to solve equations graphically? • How do you build new functions from existing functions using transformations?
6.8	**Polynomials and Rational Functions** • Quadratic Functions and Models • Polynomial Functions of Higher Degree • Polynomial and Synthetic Division • Complex and Synthetic Division • Complex Numbers • Zeros of Polynomial Functions • Rational Functions • Nonlinear Functions	• How can you determine the minimum and maximum values of quadratic functions in real-life applications? • How can you use the Leading Coefficient Test to determine the end behavior of graphs of polynomial functions? • How can you use the Fundamental Theorem of Algebra to determine the number of zeros of polynomial functions? • What does Descartes's Rule of Signs and the Upper and Lower Bound Rules tell you about finding zeros of polynomials? • Can you describe how you find the domains of rational functions?

5.2	**Exponential and Logarithmic Functions** • Exponential Functions and Their Graphs • Logarithmic Functions and Their Graphs • Properties of Logarithms • Exponential and Logarithmic Equations • Exponential and Logarithmic Models	• How can you graph exponential functions and use the One-to-One Property? • Where do you use logarithmic functions to model and solve real-life problems? • How do you use the change-of-base formula to rewrite and evaluate logarithmic expressions? • How can you use properties of logarithms to expand or condense logarithmic expressions? • How can you use logistic growth functions to model and solve real-life problems?
5.2	**Trigonometry** • Radian and Degree Measure • Trigonometric Functions: The Unit Circle • Right Triangle Trigonometry • Trigonometric Functions of Any Angle • Graphs and Sine and Cosine Functions • Graphs of Other Trigonometric Functions • Inverse Trigonometric Functions • Applications and Models	• How can you use angles to model and solve real-life problems? • Explain how you can evaluate trigonometric functions using the unit circle? • Why are the domain and range critical when you evaluate sine and cosine functions? • How can you use a graphing calculator to evaluate trigonometric functions? • Describe how to find reference angles. • How do you evaluate trigonometric functions of any angle? • Describe how to use amplitude and period to help sketch the graphs of sine and cosine functions?
3	**Additional Topics in Trigonometry** • Law of Sines • Law of Cosines	• How would you explain how to use the Law of Sines to

		solve oblique triangles (AAS or ASA)? • How can you describe when to use the Law of Sines to solve oblique triangles (SSA)? • When can you determine when to use the Law of Cosines to solve oblique triangles (SSS or SAS)? • When it is prudent to use Heron's Area Formula to find the area of a triangle?
4.8	**Topics in Analytic Geometry** • Lines • Introduction to Conics: Parabolas • Ellipses • Hyperbolas • Rotation of Conics	• Can you describe how to find the inclination of a line? • How can you explain how to write equations of ellipses in standard form and graph ellipses? • Can you explain how to find eccentricities of ellipses? • Are you able to explain how to rotate the coordinate axes to eliminate the -term in equations of conics? • Can you describe how to use the discriminant to classify conics?
2	**Matrices and Determinants** • Solving a System of Equations • Matrices • Matrix operations • Determinants • Matrix Methods for Square Systems	• What is an example of where you would use matrices? • How do you determine when matrices can be added, subtracted, multiplied or solved? • How do you solve a non-linear system graphically?