North Polk Community Schools Pacing & Course Description Guide

Grade Level: 9-12	Content: Trigonometry	Year: 2022-2023

Course Description/Rationale

Trigonometry is a one-semester course which is a continuation of Algebra 2 with a focus on trigonometry and an introduction to some Calculus topics. Students will study relations, functions, graphs, inverse trigonometric functions, fundamental identities, complex numbers, limits, and derivatives. The student will analyze and graph mathematical functions. There is an emphasis on verification of trigonometric identities using all of the basic trigonometric identities. Students will use graphing calculators in activities that are appropriate to the topics being studied. **A graphing calculator is <u>recommended</u> for this class.** (1 HS credit)

Name of Unit	Time Frame	Essential Learning Target	Standard(s)
Trig Functions of Angles	4 weeks	• Solve right triangles using trig ratios • Find trig values using reference angles • Solve triangles using the Laws of Sine and Cosine	F-TF Extend the domain of trigonometric functions using the unit circle. 1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.(F-TF.1.) 3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosines, and tangent for x, π + x, and 2π – x in terms of their values for x, where x is any real number.(F-TF.3.)
Trig Functions of Real Numbers	4 weeks	• Use the Unit Circle to simplify trig expressions • Find trig values using reference angles • Graph the six trig functions	F-TF Extend the domain of trigonometric functions using the unit circle. 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.(F-TF.2.)

			4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.(F-TF.4.) F-TF Model periodic phenomena with trigonometric functions. 5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.(F-TF.5.)★
Analytic Trigonometry	5 weeks	• Simplify trig expressions • Prove and verify trig equations • Solve trig equations	F-TF Model periodic phenomena with trigonometric functions. 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.(F-TF.7.)★ F-TF Prove and apply trigonometric identities. 8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.(F-TF.8.) 9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.(F-TF.9.)
Matrices	3 weeks	• Add, subtract, and multiply matrices • Find the inverse of a matrix • Solve system of equations using matrices	N-VM Perform operations on matrices and use matrices in applications. 6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a

			network.(N-VM.6.) 7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.(N-VM.7.) 8. (+) Add, subtract, and multiply matrices of appropriate dimensions.(N-VM.8.) 9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.(N-VM.9.) 10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.(N-VM.10.)