



Northern York County School District

Curriculum Overview

Course: Academic Trigonometry / Advanced Mathematics	
Grade Level: 10 – 12	
Approval Date: January 2025	Length of Time: 180 Days
Course Description: Academic Trigonometry / Advanced Mathematics is designed to bridge the gap between Academic Algebra II and Calculus. A strong emphasis is placed on trigonometric functions and exploring the special trigonometric relationships that exist within the unit circle. Reinforcement of algebraic skills and concepts is an additional outcome of the course. Successful completion of this course will result in more adequate preparation for the study of collegiate level mathematics and/or a collegiate major that is dependent on mathematics.	
Prerequisite: Students must have a teacher recommendation and an Academic Algebra II grade of 77% or higher. Students who have taken Algebra II require a parental override to enroll in this course.	
Course Objectives: <ul style="list-style-type: none"> • Evaluate mathematical expressions. • Apply algebraic rules and processes to simplify mathematical expressions. • Apply algebraic rules and processes to solve mathematical equations and / or inequalities (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic, and trigonometric). • Construct graphical representations of mathematical equations and / or inequalities (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic, and trigonometric.). • Evaluate, graph, and analyze functions (determine end behavior, zeros and their multiplicities, y-intercept, and symmetry), and find the inverses of functions. • Understand trigonometric relationships that exist within the unit circle. • Use fundamental trigonometric identities to determine exact values of trigonometric functions. • Use fundamental trigonometric identities to verify other trigonometric identities. • Use fundamental trigonometric identities, the law of sines and the law of cosines to solve various problems. • Solve systems of equations and inequalities. 	
Related Standards: <ul style="list-style-type: none"> • CC.2.2.HS.C.2 – Graph and analyze functions and use their properties to make connections between the different representations. • CC.2.2.HS.C.4 – Interpret the effects transformations have on functions and find the inverses of functions. • CC.2.2.HS.C.7– Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. • CC.2.2.HS.C.8 – Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. • CC.2.2.HS.D.2 – Write expressions in equivalent forms to solve problems. • CC.2.2.HS.D.6 – Extend the knowledge of rational functions to rewrite in equivalent forms. 	

<ul style="list-style-type: none"> • CC.2.2.HS.D.8 – Apply inverse operations to solve equations or formulas for a given variable. • CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. • CC.2.3.HS.A.7 – Apply trigonometric ratios to solve problems involving right triangles. 	
Units: <ul style="list-style-type: none"> • Fundamental Concepts of Algebra • Equations and Inequalities • Functions and Graphs • Polynomial and Rational Functions • Exponential and Logarithmic Functions • Trigonometric Functions • Analytic Trigonometry • Additional Topics in Trigonometry • Systems of Equations and Inequalities 	
Concepts: <ul style="list-style-type: none"> • FUNDAMENTAL ALGEBRAIC CONCEPTS – There are many rules which result from patterns in mathematics that can be applied to the simplification of algebraic expressions. • EQUATIONS AND INEQUALITIES – Solutions to equations and inequalities can be found using fundamental algebraic concepts and the solutions can then be interpreted to provide practical meaning. • FUNCTIONS AND GRAPHS (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic and trigonometric) – Functions can be used to model real world phenomena and graphs of functions provide a visual representation of the phenomena. • ANALYTIC TRIGONOMETRY – Trigonometric functions can be used to model phenomena that occur in cycles. Fundamental trigonometric Identities can be used to verify other trigonometric identities. • ADDITIONAL TRIGONOMETRIC TOPICS – The law of sines and law of cosines can be used to solve oblique triangles. • SOLVING SYSTEMS OF EQUATIONS AND INEQUALITIES – There are many real-life situations that can be modeled using systems of equations or systems of inequalities. There are often different methods for solving these systems and the solutions provide practical meaning. 	Competencies: <ul style="list-style-type: none"> • Evaluate expressions. • Simplify expressions (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic, and trigonometric). • Solve equations (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic, and trigonometric). • Find the inverse of a function. • Graph functions (linear, exponential, radical, rational, quadratic, polynomial, absolute value, logarithmic, and trigonometric). • Use identities to find the exact value of trigonometric functions and inverse trigonometric functions. • Use the unit circle to find exact values for each trigonometric function. • Solve applications of trigonometric functions. • Verify trigonometric identities. • Solve trigonometric equations. • Solve oblique triangles with the Law of Sines and the Law of Cosines. • Solve systems of equations and inequalities.
Learning Activities: <ul style="list-style-type: none"> • Warm Up Problems • Direct Instruction • Class Discussions 	Performance Tasks: <ul style="list-style-type: none"> • Quizzes • Unit Test • Unit Activities

<ul style="list-style-type: none"> • Collaboration Activities • Guided Practice • Independent Practice 	<ul style="list-style-type: none"> • Unit Project(s)
Other Assessment Measures: <ul style="list-style-type: none"> • Homework • Classwork • Presentations 	
Textbook/Primary Resource: Blitzer, Algebra and Trigonometry, Seventh Edition (ISBN 13:9780137393961)	
Supplemental Resource Materials: <ul style="list-style-type: none"> • District / Teacher Created Resources • Online Resources 	