

East Penn School District
Secondary Curriculum

A Planned Course Statement
For

Algebra III Trigonometry (Honors)

Course # 352

Grade(s) 9 - 12

Department: Mathematics

Length of Period (mins.) 42

Total Clock Hours: 126

Periods per Cycle: 6

Length of Course (yrs.) 1

Type of Offering: required ✓ elective

Credit: 1

Adopted: 6/28/10

Developed by:

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Description of Course #352

Course Title: Algebra III/Trigonometry (Honors)

Description: The course is designed to provide those students with an exceptional background in mathematics with a concentrated and in-depth study of real and complex numbers, trigonometric and circular functions, exponential and logarithmic functions, sequences and series, vectors and conic sections.

Goals:

- To attain proficiency in the above mentioned topics
- To prepare students for courses in Analytic Geometry/Calculus.

Requirements:

- A graphing calculator

Prerequisite: Algebra II Honors and Geometry Honors or by teacher recommendation

Text: Richard G. Brown, Advanced Mathematics. McDougal Littell/Houghton Mifflin, 1992

***** A graded project will be completed during each semester in this course.**

***** Careers that utilize the mathematics taught in this course will be discussed during the first semester.**

Key to Levels of Achievement (Listed with each learning objective)

Awareness (A):	Students are introduced to concepts, forms, and patterns.
Learning (L):	Students are involved in a sequence of steps and practice activities which involved further development and allow evaluation of process.
Understanding (U):	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R):	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication.

Unit	Num	Objective	Level	Content	Evaluation	Standard
Coordinate Geometry & Linear Functions	1	Students will: <ul style="list-style-type: none"> - Review the coordinate geometry of lines - Determine the equations of linear functions 	U	<ul style="list-style-type: none"> • Find the point of intersection of two lines by graphing or by solving a system of linear equations • Find the length and midpoint of a line segment • Find the slope of a non-vertical line • Determine whether two lines are parallel, perpendicular or neither • Find an equation of a line given certain geometric properties of the line 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.8.11 (D) 2.2.11 (A) 2.8.11 (J) 2.8.11 (J) 2.8.11 (L)
Quadratic Functions	2	Students will: <ul style="list-style-type: none"> - Graph quadratic functions and determine points of intersection 	L	<ul style="list-style-type: none"> • Solve a quadratic equation for real and imaginary roots by factoring, completing the square, or quadratic formula • Define and graph quadratic functions • Apply advanced tool and equipment manipulation to solve problems 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.8.11 (N) 2.8.11 (N) 3.7.10
Polynomial Functions	3	Students will: <ul style="list-style-type: none"> - Solve and graph polynomial equations with and without the use of technology 	L	<ul style="list-style-type: none"> • Find the zeros of a polynomial function • Solve second and higher degree equations by factoring • Apply the Remainder Theorem and the Factor Theorem • Find the rational roots of a polynomial equation and graph the polynomial functions • Write a polynomial function for a given situation and find the maximum and minimum value of the function • Approximate the real roots of a polynomial equation using a graphing calculator • Find the sum and product of the roots of a polynomial equation 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.1.11 (A) 2.8.11 (S) 2.2.11 (A) 2.2.11 (A) 2.11.11 (B) 2.2.11.(F) 2.2.11 (A)

Unit	Num	Objective	Level	Content	Evaluation	Standard
Functions	4	Students will: <ul style="list-style-type: none"> - Use functions to produce new functions - Explore the relationships between the graph of a function and an algebraic rule 	L	<ul style="list-style-type: none"> • Interpret the graph of a functional relationship and answer questions concerning the graph • Find specified function values given an equation of the function • Determine the domain, range and zeros of a function • Write the equation and sketch the graph of the inverse of a function • Apply various graphic and electronic information techniques to solve real world problems 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.5.11 (B) 2.8.11 (Q) 2.8.11 (O) 2.5.11 (B) 3.6.12
Trigonometric Functions	5	Students will: <ul style="list-style-type: none"> - Use the basic Trigonometry concepts to solve related problems. 	L	<ul style="list-style-type: none"> • Convert between degree and radian measure • Find the area and arc length of a sector • Define angles in terms of positive and negative rotations • Evaluate trigonometric functions of quadrantal angles and special angles • Use a calculator to evaluate trigonometric functions • Graph trigonometric functions • Graph and find values of the inverse trigonometric functions • Simplify trigonometric expressions, prove trigonometric identities and solve trigonometric equations 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.3.11 (B) 2.2.11 (A) 2.3.11 (B) 2.10.11 (B) 3.7.10 2.8.11 (S) 2.8.11 (S) 2.8.11 (S)
Right Triangle Trigonometry	6	Students will: <ul style="list-style-type: none"> - Use trigonometry to find unknown angles and sides of triangles 	L	<ul style="list-style-type: none"> • Use trigonometry to solve right triangles • Find the area of a triangle given two sides and the included angle • Use the Law of Sines and Law of Cosines to solve triangles • Determine which concepts of triangle trigonometry can be used to do application problems and solve. 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.10.11 (B) 2.10.11 (B) 2.10.11 (B) 2.5.11 (A)

Unit	Num	Objective	Level	Content	Evaluation	Standard
Advanced Graphing	7	Students will: - Explore changes in curves including period, amplitude, horizontal and vertical translations	L	<ul style="list-style-type: none"> Determine whether a function is periodic and find the period and amplitude of a periodic function Sketch the graphs of equations of the $y = cf(x)$, $y = -f(x)$, $y = f(-x)$, $y = f^{-1}(x)$, $y - k = f(x - h)$ given the graph of $y = f(x)$ Determine whether a graph is symmetric with respect to the coordinate axes, the origin, or the line $y = x$ 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.10.11 (A) 3.7.10 2.9.11 (J)
Trigonometric Formulas	8	Students will: - Use trigonometric formulas	L	<ul style="list-style-type: none"> Use the trigonometric addition, double angle, and half angle formulas to simplify and evaluate expressions, prove identities and solve equations Find the angle between two intersecting lines 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.8.11 (S) 2.8.11 (S)
Inequalities	9	Students will: - Solve and graph linear and polynomial inequalities	R L	<ul style="list-style-type: none"> Solve and graph linear and polynomial inequalities in one and two variables Graph the solution set of a system of simultaneous inequalities 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.8.11 (D) 2.8.11 (H)
Exponents/Logarithms	10	Students will: - Study the laws of exponents and logarithms	L	<ul style="list-style-type: none"> Use the laws of exponents and logarithms to simplify and evaluate expressions and solve equations Define and graph exponential functions and their inverse logarithmic functions Find logarithms of numbers to any base by applying a conversion formula to base 10 common logarithms Solve problems involving exponential growth and decay, including half-life problems Define the number e and the natural logarithm 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.1.11 (A) 2.8.11 (N) 2.1.11 (A) 3.6.12 2.1.11 (A)

Unit	Num	Objective	Level	Content	Evaluation	Standard
Polar Coordinates and Complex Numbers	11	Students will: - Learn a new way of locating Points in a plane	L	<ul style="list-style-type: none"> Convert from polar coordinates to rectangular coordinates and vice versa Graph equations using polar coordinates Represent complex numbers in the complex plane Find powers and roots of complex numbers 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.1.11 (A) 2.2.11 (F)
Conic Sections	12	Students will: - Explore and graph equations of conic sections	L	<ul style="list-style-type: none"> Identify the type of conic section an equation represents and locate its vertex(vertices) and focus (foci) Graph and find the equations of parabolas, ellipses and hyperbolas Find the intersection points of a system of conic equations 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.8.11 (E) 2.8.11 (E) 2.8.11 (G)
Sequences and Series	13	Students will: - Study finite and infinite sequences and series	L	<ul style="list-style-type: none"> Identify an arithmetic or geometric sequence and find a formula for the nth term Use sequences defined recursively to solve problems Find the sum of the first n terms of an arithmetic or geometric series Find or estimate the limit of an infinite sequence or determine that the limit does not exist Find the sum of an infinite geometric series Represent series using sigma notation 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.8.11(C) 2.8.11 (A) 2.11.11(D) 2.11.11(D) 2.11.11 (D) 2.11.11(D)

Unit	Num	Objective	Level	Content	Evaluation	Standard
Vectors (Optional Topic, teach after Sequences and Series if time allows)	14	Students will: <ul style="list-style-type: none"> - Learn how to perform basic operations on vectors and how to convert vector equations into parametric equations 	L	<ul style="list-style-type: none"> • Draw arrows representing sums, differences and multiples of vectors given arrows representing the vectors • Express a vector in polar or component form given its endpoints • Perform vector operations in component form • Given two points on a line, find a direction vector, a vector equation and a pair of parametric equations of the line 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.2.11 (A)