

# *Wallenpaupack Area School District*

## **COURSE: TRIGONOMETRY**

**GRADE LEVEL:** Grades 11 - 12

**LENGTH OF COURSE:** 90 Days/84 Minutes Per Day

**TEXT:** Trigonometry

**PUBLISHER:** D.C. Heath and Company

**COPYRIGHT:** 1993

### **COURSE DESCRIPTION:**

Trigonometry includes a right triangular and a circular approach, curve sketching, identities, solving triangles, logarithms and polar coordinates.

### **CURRICULUM WRITING TEAM:**

Lynn Cunningham

Mel Vogler

Betty Mang

Jim Ball

### **DATE OF REVISION:**

2002

# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Prerequisites for Trigonometry

**PA Standards:** 2.1.11.A      2.8.11.E  
 2.2.11.C      2.8.11.K  
 2.2.11.E      2.8.11.L  
 2.2.11.F      2.8.11.N  
 2.3.11.C      2.8.11.O  
 2.5.11.B      2.8.11.Q  
 2.5.11.C      2.8.11.S  
 2.8.11.A      2.8.11.T

<b>Topics:</b>	<b>Skills:</b>
<p>The real number system            Solving equations            The Cartesian plane and graphs of equations            Lines in the plane: slope            Functions            Graphs of functions            Combinations of functions and inverse functions</p>	<p>Categorize numbers as natural numbers, integers, rational numbers or irrational numbers            Order the real numbers on the number line            Distinguish the difference between bounded and unbounded intervals            Solve linear, quadratic and polynomial equations of higher degree            Utilize the distance and midpoint formulas            Determine the center and radius of a circle            Recognize and determine the equation of a circle            Utilize tests of symmetry            Determine x and y intercepts of graphs of equations            Determine the slope of a line            Utilize the point-slope form, slope intercept form, and intercept form of lines            Test for and evaluate algebraic functions            Determine domain and range of algebraic functions            Graph algebraic functions            Distinguish between even and odd algebraic functions            Determine increasing or decreasing intervals of algebraic functions            Perform function transformations            Determine horizontal and vertical asymptotes and utilize them as an aid in graphing rational functions            Perform the function operations of additions, subtraction, multiplication, division and composition            Determine the existence of an inverse function            Find the inverse of an algebraic function</p>

## *Wallenpaupack Area School District*

<b>Activities:</b>	<b>Performance Assessments:</b>
Textbook problem solving Partner work Board work Utilize the scientific and graphing calculator	Teacher produced tests and quizzes Class assignments Class participation Teacher observation Board work Homework

# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Trigonometry

**PA Standards:** 2.1.11.A      2.8.11.E  
 2.2.11.A      2.8.11.O  
 2.2.11.E      2.8.11.Q  
 2.2.11.F      2.8.11.S  
 2.3.11.A      2.8.11.T  
 2.3.11.B      2.9.11.G  
 2.3.11.C      2.9.11.I  
 2.4.11.E      2.10.11.A  
 2.5.11.C      2.10.11.B  
 2.8.11.A      2.11.11.A

<b>Topics:</b>	<b>Skills:</b>
Radian and degree measure The trigonometric functions and the unit circle Trigonometric functions and right triangles Trigonometric functions of any angle Graphs of sine and cosine functions Graphs of other trigonometric functions Other graphing techniques Inverse trigonometric functions Applications of trigonometry	Know angle terminology Know what a radian is Find coterminal, complementary and supplementary angles Perform manual and calculator conversions between degrees and radians Perform manual and calculator conversions between degrees-minutes-seconds and decimal degrees Apply knowledge of radians to solve angular speed situations Define the six trigonometric functions as a product of the unit circle Utilize the periodic nature of the six trigonometric functions Use the unit circle to evaluate trigonometric functions Use the scientific or graphics calculator to evaluate trigonometric functions Know and use the right triangle definitions of the six trigonometric functions Revisit and use the Pythagorean Theorem Apply the right triangle definitions to solve real world applications Determine reference angles and use those reference angles to evaluate trigonometric functions Recognize and use key points and characteristics to graph the six trigonometric functions Use addition of ordinates to sketch the graph of a trigonometric function Evaluate inverse functions with or without a calculator Know and utilize the properties of inverse

## *Wallenpaupack Area School District*

	<b>Skills: (continued)</b>
	functions to evaluate trigonometric expressions Solve practical problems involving right triangles using the trigonometric functions, their inverses and the Pythagorean Theorem
<b>Activities:</b>	<b>Performance Assessments:</b>
Textbook problem solving Partner work Board work Utilize the scientific and graphing calculator	Teacher produced tests and quizzes Class assignments Class participation Teacher observation Board work Homework

# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Analytic Trigonometry

**PA Standards:** 2.1.11.A      2.4.11.C  
 2.2.11.E      2.5.11.B  
 2.2.11.F      2.5.11.C  
 2.4.11.A      2.5.11.D  
 2.4.11.B

<b>Topics:</b>	<b>Skills:</b>
<ul style="list-style-type: none"> <li>Applications of fundamental identities</li> <li>Verifying trigonometric identities</li> <li>Solving trigonometric equations</li> <li>Sum and difference formulas</li> <li>Multiple-angle and product-sum formulas</li> </ul>	<ul style="list-style-type: none"> <li>Know and use the fundamental identities to evaluate trigonometric functions</li> <li>Use the fundamental identities to simplify trigonometric expressions</li> <li>Use the fundamental identities to develop and verify additional trigonometric identities</li> <li>Use the fundamental identities to solve trigonometric equations</li> </ul>
<b>Activities:</b>	<b>Performance Assessments:</b>
<ul style="list-style-type: none"> <li>Textbook problem solving</li> <li>Partner work</li> <li>Board work</li> <li>Utilize the scientific and graphing calculator</li> </ul>	<ul style="list-style-type: none"> <li>Teacher produced tests and quizzes</li> <li>Class assignments</li> <li>Class participation</li> <li>Teacher observation</li> <li>Board work</li> <li>Homework</li> </ul>

# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Additional Applications of Trigonometry

**PA Standards:** 2.1.11.A      2.4.11.E  
 2.2.11.A      2.5.11.B  
 2.2.11.E      2.5.11.C  
 2.2.11.F      2.5.11.D  
 2.3.11.A      2.8.11.D  
 2.3.11.C      2.9.11.G  
 2.4.11.B      2.9.11.I  
 2.4.11.C      2.10.11.B

<b>Topics:</b>	<b>Skills:</b>
Law of Sines Law of Cosines Vectors in the plane The dot product	Use the Law of Sines and Law of Cosines to solve (find sides and angles of) oblique triangles Know what the Law of Sines' ambiguous case is and how to apply it to solve oblique triangles Calculate the area of an oblique triangle Demonstrate the usefulness of the law of sines and the law of cosines to solve problems relating to real life situations Use Heron's formula to calculate the area of a triangle Know and use vector vocabulary Use and apply the vector operations of scalar multiplication, vector addition, and dot product Find the component form, the magnitude, and direction angle of a vector Determine a unit vector Calculate the dot product of two vectors Calculate the angle between two vectors Determine if two vectors are orthogonal, parallel, or neither Determine the projection of one vector onto another Apply vector mathematics to work related problems
<b>Activities:</b>	<b>Performance Assessments:</b>
Textbook problem solving Partner work Board work Utilize the scientific and graphing calculator	Teacher produced tests and quizzes Class assignments Class participation Teacher observation Board work Homework

# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Complex Numbers

**PA Standards:** 2.1.11.A  
 2.2.11.C  
 2.2.11.F  
 2.5.11.C  
 2.8.11.J  
 2.8.11.N

<b>Topics:</b>	<b>Skills:</b>
<ul style="list-style-type: none"> <li>Complex numbers</li> <li>Complex solutions of equations</li> <li>Trigonometric form of a complex number</li> <li>DeMoivre's Theorem and nth roots</li> </ul>	<ul style="list-style-type: none"> <li>Know and utilize vocabulary associated with complex numbers</li> <li>Apply the operations of complex numbers</li> <li>Solve quadratic and polynomial equations with complex solutions</li> <li>Find zeros of polynomial functions</li> <li>Write the equation of a polynomial when given the zeros</li> <li>Represent a complex number graphically</li> <li>Convert complex numbers to trigonometric form</li> <li>Convert a number in trigonometric form into a complex number</li> <li>Perform multiplication and division of complex numbers in trigonometric form</li> <li>Use DeMoivre's Theorem to raise a complex number to a power and to take a root of a complex number</li> </ul>
<b>Activities:</b>	<b>Performance Assessments:</b>
<ul style="list-style-type: none"> <li>Textbook problem solving</li> <li>Partner work</li> <li>Board work</li> <li>Utilize the scientific and graphing calculator</li> </ul>	<ul style="list-style-type: none"> <li>Teacher produced tests and quizzes</li> <li>Class assignments</li> <li>Class participation</li> <li>Teacher observation</li> <li>Board work</li> <li>Homework</li> </ul>



# Wallenpaupack Area School District

**Course:** Trigonometry

**Grade Level:** Grade 11 & 12

**Unit:** Exponential and Logarithmic Functions

**PA Standards:** 2.1.11.A      2.5.11.D  
 2.2.11.A      2.8.11.A  
 2.2.11.B      2.8.11.B  
 2.2.11.E      2.8.11.D  
 2.2.11.F      2.8.11.E  
 2.3.11.C      2.8.11.N  
 2.4.11.B      2.8.11.O  
 2.4.11.C      2.8.11.Q  
 2.4.11.E      2.8.11.S  
 2.5.11.C      2.8.11.T

<b>Topics:</b>	<b>Skills:</b>
Exponential functions Logarithmic functions Properties of logarithms Solving exponential and logarithmic equations Exponential and logarithmic applications	Use a scientific or graphics calculator to evaluate transcendental functions (exponential and logarithmic functions) Evaluate logarithmic expressions manually Graph transcendental functions Know and apply the properties of exponential and logarithmic functions Solve exponential and logarithmic equations Solve real life situations that can be modeled with transcendental functions
<b>Activities:</b>	<b>Performance Assessments:</b>
Textbook problem solving Partner work Board work Utilize the scientific and graphing calculator	Teacher produced tests and quizzes Class assignments Class participation Teacher observation Board work Homework