



Trigonometry

Diocese of Greensburg Curriculum

Unit	Standards	Content	Skills
<p>Radicals</p>	<p>CCSS: Mathematics CCSS: Grade 8</p> <hr/> <p>Expressions & Equations 8.EE.A. Work with radicals and integer exponents.</p> <p>8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.</p> <hr/> <p>CCSS: HS: Num/Quantity</p> <p>The Real Number System HSN-RN.A. Extend the properties of exponents to rational exponents.</p> <p>HSN-RN.A.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p> <hr/> <p>CCSS: HS: Algebra</p> <p>Reasoning with Equations & Inequalities HSA-REI.A. Understand solving equations as a process of reasoning and explain the reasoning.</p> <p>HSA-REI.A.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.</p> <p>© Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.</p>	<ul style="list-style-type: none"> • Reduce radicals • Combine radicals - add, subtract, multiply, divide • Multiply by the conjugate • Complex numbers 	
<p>Trigonometric Functions</p>	<p>CCSS: Mathematics CCSS: HS: Functions</p> <hr/> <p>Trigonometric Functions HSF-TF.B. Model periodic phenomena with trigonometric functions.</p> <p>HSF-TF.B.6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.</p>	<ul style="list-style-type: none"> • Supplementary & complementary angles • Adding/subtracting degree, minute, & second • Standard position • Coterminal angles • Quadrantal angles • ASTC • Trig ratios (with x, y, r) 	

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<p>Acute Angles and Right Triangles</p>	<p>SAT: SAT Domains SAT: High School</p> <hr/> <p>Additional Topics in Math Domain Right triangles and trigonometry</p> <p>4. Solve problems using the relationship between sine and cosine of complementary angles.</p> <p>5. Fluently apply properties of special right triangles to determine side-lengths and calculate trigonometric ratios of 30, 45, and 60 degrees.</p>	<ul style="list-style-type: none"> ● Trig functions from a triangle (SOH, CAH, TOA) ● Special right triangles ● Cofunctions ● Reference angles ● Word problems with right triangles ● Find all 6 trig functions of a non-acute angle (with 30, 45, or 60 degree reference angle) ● Use a calculator to solve trig functions 	
<p>Radian Measure and Circular Functions</p>	<p>CCSS: Mathematics CCSS: HS: Functions</p> <hr/> <p>Trigonometric Functions HSF-TF.A. Extend the domain of trigonometric functions using the unit circle.</p> <p>HSF-TF.A.1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.</p> <p>HSF-TF.A.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.</p> <hr/> <p>CCSS: HS: Geometry</p> <p>Circles HSG-C.B. Find arc lengths and areas of sectors of circles</p> <p>HSG-C.B.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.</p> <p>PA: Core - Mathematics (2014)</p>	<ul style="list-style-type: none"> ● Unit circle ● Radian/degree conversions ● Finding trig functions of angles in radian measure ● Arc length ● Area of a sector ● Linear velocity ● Angular velocity 	

	<p>PA: Grades 9-12</p> <hr/> <p>CC.2.2: Algebraic Concepts (C) Functions</p> <p>CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.</p> <p>SAT: SAT Domains SAT: High School</p> <hr/> <p>Additional Topics in Math Domain Circles</p> <p>2. Solve problems using a. radian measure; b. trigonometric ratios in the unit circle.</p> <p>6. Convert between angle measures in degrees and radians.</p> <p>© Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.</p>	
<p>Graphs of the Circular Functions</p>	<p>PA: Core - Mathematics (2014) PA: Grades 9-12</p> <hr/> <p>CC.2.2: Algebraic Concepts (C) Functions</p> <p>CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs.</p> <p>PA: Alternate Eligible Content - Math (2015) PA: Grade 11</p> <hr/> <p>Algebraic Concepts CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs.</p> <p><i>Not Applicable</i></p> <p>SAT: Mathematics and Statistics SAT: High School</p> <hr/> <p>Precalculus Standard PC.2 Trigonometric Functions Objective PC.2.1 Student solves problems involving measures in triangles by applying</p>	<ul style="list-style-type: none"> • Graph all 6 trig functions • Amplitude • Vertical shift • Period • Asymptotes

	<p><i>trigonometric functions of the degree or radian measure of a general angle and shifts from primarily viewing trigonometric functions as based on degree measure to viewing them as functions based on radian measure, and ultimately to viewing them as general periodic functions of real numbers. Student investigates the properties of trigonometric functions, their inverse functions, and their graphical representations.</i></p> <p><i>PC.2.1.5 Constructs the graphs of the trigonometric functions, and describes their behavior, including periodicity, amplitude, zeros, and symmetries.</i></p> <p>Objective PC.2.2 <i>Student uses transformations of trigonometric functions, their properties, and their graphs to model and solve trigonometric equations and a variety of problems.</i></p> <p><i>PC.2.2.1 Graphs functions of the form $f(t) = A \sin(Bt + C) + D$ or $g(t) = A \cos(Bt + C) + D$, and interprets A, B, C, and D in terms of amplitude, frequency, period, and vertical and phase shift.</i></p> <p>SAT: Integrated Mathematics and Statistics SAT: Integrated</p> <hr/> <p>Integrated Mathematics VI</p> <p>Standard IMVI.2 Trigonometric Functions Objective IMVI.2.1 <i>Student solves problems involving measures in triangles by applying trigonometric functions of the degree or radian measure of a general angle and shifts from primarily viewing trigonometric functions as based on degree measure to viewing them as functions based on radian measure, and ultimately to viewing them as general periodic functions of real numbers. Student investigates the properties of trigonometric functions, their inverse functions, and their graphical representations.</i></p> <p><i>IMVI.2.1.5 Constructs the graphs of the trigonometric functions, and describes their behavior, including periodicity, amplitude, zeros, and symmetries.</i></p> <p><i>Copyright © 2015 Commonwealth of Pennsylvania. All Rights Reserved</i></p>	
<p><u>Trigonometric Identities</u></p>	<p>CCSS: Mathematics CCSS: HS: Functions</p> <hr/> <p>Trigonometric Functions HSF-TF.C. Prove and apply trigonometric identities.</p> <p>HSF-TF.C.8. Prove the Pythagorean identity $\sin^2(?) + \cos^2(?) = 1$ and use it to calculate trigonometric ratios.</p>	<ul style="list-style-type: none"> • Reciprocal identities • Quotient identities • Pythagorean identities • Negative angle identities • Simplify trig expressions using identities • Prove verifications

HSF-TF.C.9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

SAT: Mathematics and Statistics

SAT: High School

Precalculus

Standard PC.2

Trigonometric Functions

Objective PC.2.1

Student solves problems involving measures in triangles by applying trigonometric functions of the degree or radian measure of a general angle and shifts from primarily viewing trigonometric functions as based on degree measure to viewing them as functions based on radian measure, and ultimately to viewing them as general periodic functions of real numbers. Student investigates the properties of trigonometric functions, their inverse functions, and their graphical representations.

PC.2.1.7 Develops the fundamental Pythagorean trigonometric identities, sum and difference identities, double-angle identities, and the secant, cosecant, and cotangent functions, and uses them to simplify trigonometric expressions.

SAT: Integrated Mathematics and Statistics

SAT: Integrated

Integrated Mathematics VI

Standard IMVI.2

Trigonometric Functions

Objective IMVI.2.1

Student solves problems involving measures in triangles by applying trigonometric functions of the degree or radian measure of a general angle and shifts from primarily viewing trigonometric functions as based on degree measure to viewing them as functions based on radian measure, and ultimately to viewing them as general periodic functions of real numbers. Student investigates the properties of trigonometric functions, their inverse functions, and their graphical representations.

IMVI.2.1.7 Develops the fundamental Pythagorean trigonometric identities, sum and difference identities, double-angle identities, and the secant, cosecant, and cotangent functions, and uses them to simplify trigonometric expressions.

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