

<p>problems.*</p> <p><u>CCSS.MATH.CONTENT.HSG.SRT.C.6</u> Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</p> <p><u>CCSS.MATH.CONTENT.HSA.REI.A.2</u> Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise Students show graphic representation of data.</p> <p><u>CCSS.MATH.CONTENT.HSA.CED.A.1</u> Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p> <p><u>CCSS.MATH.CONTENT.HSA.REI.D.10</u> Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be</p>	<p>tangent, cosecant, and secant, and their general behaviors</p> <ul style="list-style-type: none"> ● Inverse trigonometric functions and the restrictions on their ranges ● Compositions of trigonometric functions ● Key Terms: Pythagorean Theorem, trigonometric ratios, (sine, cosine, tangent),sine, cosine, tangent, cosecant, secant, cotangent, radian, degree, coterminal, complementary, supplementary, unit circle, angle in standard position, cyclic, reference angle, amplitude, period, phase shift, vertical shift, inverse trigonometric functions 	<ul style="list-style-type: none"> ● Identify specific points on the unit circle ● Define the trigonometric functions as related to the x and y coordinates and radius on the unit circle ● Use reference angles and definitions of the trigonometric functions to find the specific values on the unit circle. ● Fill in the trigonometric table for values of special and quadrantal angles ● Graph sine, cosine, tangent, cosecant, and secant functions and identify special characteristics such as amplitude, period, phase shift, and vertical shift ● Identify the domain and range of inverse trigonometric functions ● Find the exact values of inverse trigonometric functions and composite trigonometric functions ● Use graphing calculators to check graphs of trigonometric values and to find approximate solutions to problems ● Solve real-world applications involving right triangle trigonometry.
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<p>a line) Students use technology tools (i.e., calculators, data collection probes, videos) for problem solving, self-directed learning, and extended learning activities.</p>		
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UNIT 9: Exploring Trigonometric Functions		
Stage 2 – Evidence		
Code	Evaluative Criteria	Assessment Evidence
T, M A	Scoring rubric: used to evaluate a correct method of calculation, accurate collection of data, and calculation of solution.	<p>PERFORMANCE TASK(S): Students will show that they really understand evidence of...</p> <p>You can use a function to model real-world situations based on data from the situation.</p> <p><u>Performance Task 1</u> Goal: To use right triangle trigonometry to solve real-world application problems Role: Surveyor Audience: Land development company Situation: Given various situations, you are to calculate unknown distances to report to the land development company for construction purposes . Product: Calculated distances with work shown. Standards for Success: Mathematic department scoring rubric</p> <p>To Differentiate: Allow students to choose from problems at a variety of difficulty levels.</p>

		<p><u>Performance Task 2</u> Goal: To calculate your personal biorhythm chart for the current month Role: Social scientist Audience: School staff Situation: You are to convince school staff whether or not your personal academic performance will be stronger or weaker based on your biorhythm Product: Your completed biorhythm Standards for Success: Mathematics department scoring rubric</p> <p><u>Performance Task 3</u></p> <p>In one year on the Arctic and Antarctic Circles, the amount of daylight each day varies from 0 h to 24 h. Let $Ar(d)$ and $An(d)$ represent the amount of daylight as a function of the day of the year d at the two locations, respectively.</p> <p>Things to think about:</p> <ul style="list-style-type: none"> ● If $Ar(d) = 24$, what does the value of $An(d)$ have to be? ● What will the values for $Ar(d)$ and $An(d)$ sum to for a given value of d? <p>Product:</p> <ul style="list-style-type: none"> ● Describe the graph of one of the functions. ● Tell how the graph of the other function relates to the first graph. ● Do the graphs resemble patterns you have seen elsewhere? If so, what patterns? ● How could you predict the future behavior of these functions?
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UNIT 9: Exploring Trigonometric Functions

Stage 3 – Learning Plan

Code	Pre-Assessment	
M	<ul style="list-style-type: none"> Teacher checks for prerequisite and prior knowledge via warm-ups and entrance tickets Questioning activities, such as basic problems with exponents and radicals. As the lessons progress, students can also be given questions such as “Find the mistakes...” Warm-ups and skill checks contain review of previous material during the unit to ensure retention and mastery, and check on vertical alignment with prior curriculum. 	
<p>M</p> <p>M, A</p> <p>T, M, A</p> <p>T, M, A</p> <p>M, A</p> <p>M, A</p> <p>M, A</p>	<p>Summary of Key Learning Events and Instruction</p> <p>Student success at transfer meaning and acquisition depends on...</p> <ul style="list-style-type: none"> Teacher reviews the Pythagorean Theorem and right triangle trigonometry. Students will practice solving right triangles using trigonometry by working in teacher created groups. Teacher gives review and practice problems as class work to find missing sides and angles. Lesson leads into the introduction of the three reciprocal trigonometric functions, and applications of trigonometry will be discussed. Students will also identify the values of the reciprocal functions and will use their calculators to find specific values. Teacher introduces the concept of the Unit Circle by first discussing radian measure as a representation of the length of the arc on the circle. Teacher leads class through the discovery of the relationship between degrees and radians and how to convert degrees to radians and radians to degrees. Students will work independently on changing measures from degrees to radians and radians to 	<p>Progress Monitoring</p> <ul style="list-style-type: none"> Monitoring class work through board work, group work, questioning, and walk-arounds. Strategic Questioning: Ask students higher-order questions such as “how” and “why,” so the teacher can discern the level and extent of the students’ understanding. Quick homework check to assess common errors to inform future instruction. Formative Assessments

M, A	degrees.	
T, M, A	<ul style="list-style-type: none"> Teacher continues to demonstrate the relations on the Unit Circle to points on the circle and angle measures. 	
T, M, A	<ul style="list-style-type: none"> After a review of special right triangles, teacher models how to find specific points given particular reference angles. 	
T, M, A	<ul style="list-style-type: none"> Students will complete the Unit Circle chart with specific degree measure, radian measure, and the coordinate of the associated points. Students may collaborate with a partner on their solutions. 	
T, M	<ul style="list-style-type: none"> Teacher prepares materials (garland, laminated color coded cards with degree measures, radian measures, and coordinates of points) for the Unit Circle activity where students physically construct a model of the Unit Circle. 	
T, M	<ul style="list-style-type: none"> Students will work cooperatively as a group to construct the Unit Circle in the rotunda using garland and laminated values on the circle. 	
T, M, A	<ul style="list-style-type: none"> Students will then use the Unit Circle and reference angles to fill in the trigonometric table. Students will then play the "Move It" game where they must move to a specific value on the circle. 	
M, A	<ul style="list-style-type: none"> Teacher reviews the relationships of trigonometric functions in right triangles and then shows the connection with the x, y, and r values of the Unit Circle. Lesson leads into applications of the trigonometric functions to any point in the coordinate plane, which the teacher models and explains. 	
T, M, A	<ul style="list-style-type: none"> Students will apply the definitions of the trigonometric functions to the Unit Circle. Students will then find the values of the trigonometric functions at any value. 	
M, A	<ul style="list-style-type: none"> With the help of the graphing calculator, teacher leads class through graphing the sine and cosine curves. Discussion on the general shape of the curves, their 	

M, A	<p>periodic behavior, and their amplitude, period, phase shift, and vertical shift occurs.</p> <ul style="list-style-type: none"> • Teacher leads class through examples on how to graph sine and cosine functions. 	
T, M, A	<ul style="list-style-type: none"> • Students will work at the board to practice graphing sine and cosine functions, identifying the amplitude, period, phase shift, and vertical shift. 	
M, A	<ul style="list-style-type: none"> • Teacher has class make a t-table to graph the tangent curve. The general shape of the curve and its period will be discussed. 	
M, A	<ul style="list-style-type: none"> • Teacher models how to graph the secant and cosecant functions by using the sine and cosine graphs as “helpers.” 	
M, A	<ul style="list-style-type: none"> • Students will graph $y=\tan x$ as well as various cosecant and secant curves by working in teacher created groups. 	
M, A	<ul style="list-style-type: none"> • Teacher models how to use the graphing calculator and trigonometric table to find approximate and exact values of inverse trigonometric functions. Teacher also explains how to find composite trigonometric values. 	
T, M, A	<ul style="list-style-type: none"> • Students will work in pairs to find inverse and composite trigonometric functions using their calculators and the trigonometric table. 	
M, A	<ul style="list-style-type: none"> • Teacher determines cooperative groups for various activities during this unit. 	

Suggested Resources:

- Textbook: Charles, Randall et al. *Algebra 2 Common Core*, Boston, MA: Pearson, 2012.
- Supplemental activities from the textbook resources on solving trigonometric equations and application problems.
- Teacher-made supplemental activities on solving trigonometric equations, applications, performance tasks, and chapter review.
- Graphing calculator TI Emulator software.
- On-line resources such as You Tube, Khan Academy, Desmos, etc.