



Algebra 2 Level 1 - Unit 7 - Trigonometric Functions

Unit Focus

This is the first time that many students will see any trigonometry beyond SOHCAHTOA, for example, radian measure, law of sines and law of cosines, the reciprocal trigonometric functions, trigonometric graphs. We chose specifically to emphasize the Unit Circle, and to simply use "circle definitions" for problems like $\sin(240)$. Students should come away from this unit feeling like many trigonometric topics can simply be done with x , y , and r (circle definitions). There are many variations of this type of problem, but students should feel the unity among them. Students need to know the basic side patterns for special right triangles along with how to draw angles in standard position.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 9-12 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. (CCSS.MATH.CONTENT.HSF.TF.A.1) - 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. (CCSS.MATH.CONTENT.HSF.TF.A.2) - Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. (CCSS.MATH.CONTENT.HSF.TF.B.5) - Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle. (CCSS.MATH.CONTENT.HSF.TF.C.8) - Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1) - Construct viable arguments and critique the reasoning of others. (CCSS.MATH.MP.3) - Use appropriate tools strategically. (CCSS.MATH.MP.5) - Look for and make use of structure. (CCSS.MATH.MP.7) Madison Public Schools Profile of a Graduate - Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2) - Collective Intelligence: Working respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective. (POG.3.1)	<i>Students will be able to independently use their learning to...</i> T1 manipulate equations/expressions or objects to create order and establish relationships. T2 draw conclusions about graphs, shapes, equations, or objects. T3 work respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Effective problem solvers work to make sense of the problem before trying to solve it. U2 Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.	<i>Students will keep considering...</i> Q1 How can I break a problem down into manageable parts? Q2 What methods can I use to monitor my thinking/accuracy? Q3 How can understanding a pattern help me?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 The six trigonometric functions, right triangle and circle definitions K2 The Law of Sines K3 The Law of Cosines K4 Hero's formula	<i>Students will be skilled at...</i> S1 fluently using the six trig functions to solve right triangles S2 fluently using the ratios of 30-60-90 and 45-45-90 triangles

Stage 1: Desired Results - Key Understandings

	K5 Area of Triangle = $\frac{1}{2}(2 \text{ sides})(\text{included angle})$ K6 Radian measure K7 The reciprocal identities K8 The Pythagorean identities K9 Vocabulary: unit circle, radian, sine, cosine, tangent, amplitude, periodic behavior, Pythagorean identity, coterminal	S3 solving applied problems involving trigonometry S4 using the unit circle to find the radian measures of angles and finding coterminal and reference angles for given angles. S5 finding sin, cos and tan of angles using the unit circle S6 finding sin, cos or tan given a point on the terminal side of the angle S7 given the trig function, finding and graphing the angle in the correct quadrant. S8 graphing sin and cos functions and their transformations S9 using sin and cos functions to model behavior S10 solving trigonometric equations
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