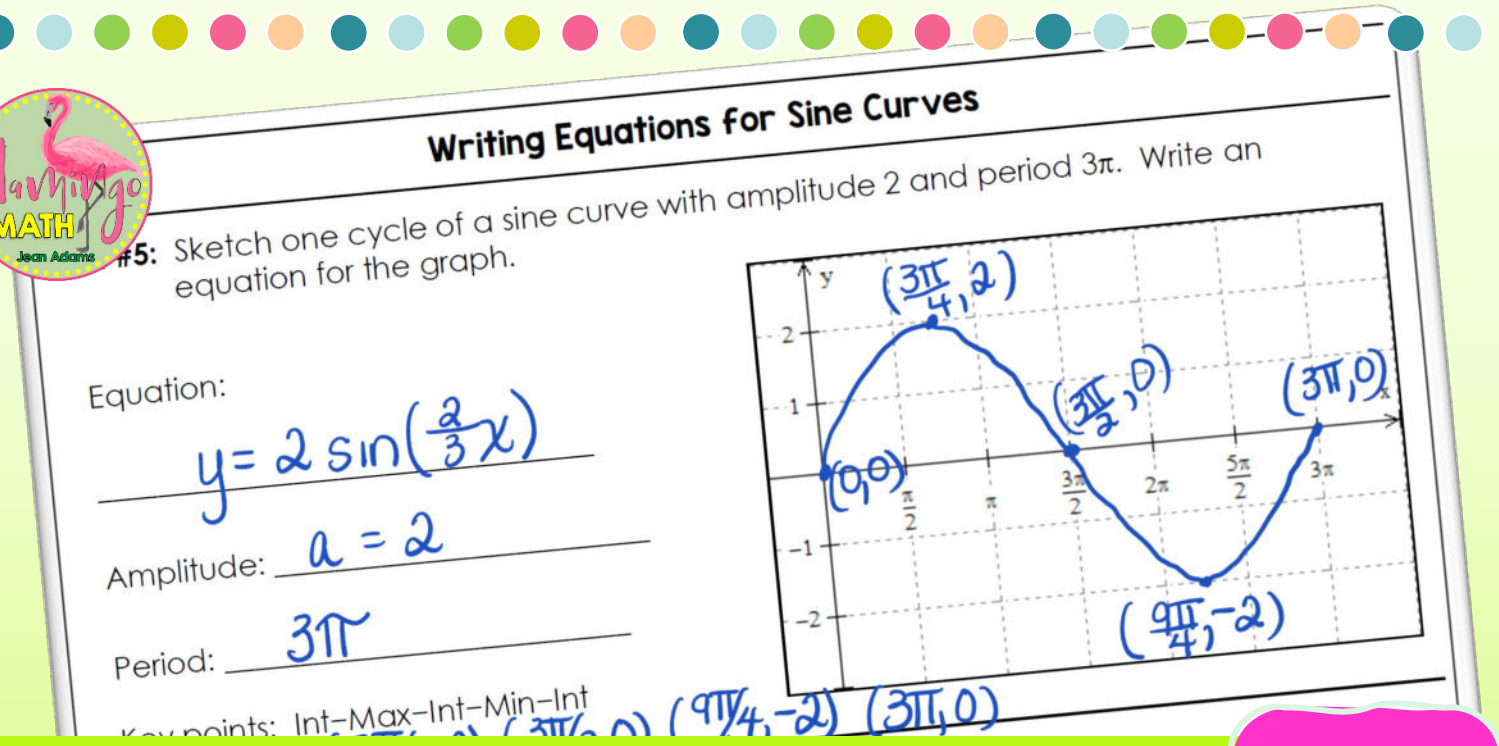
Algebra 2 Honors

Intro to Trigonometry



Guided Notes 11

Completely Editable

ALGEBRA 2 CURRICULUM

Scope and Sequence

Unit II: Introduction to Trigonometry

Lesson	Skills & Learning Objectives
[11.1] Exploring Periodic Data	❑ Understand periodic behavior and identify periodic functions ❑ Find amplitude and period for one cycle of a periodic function
[11.2] Angles and the Unit Circle	❑ Analyze, graph and evaluate angles in standard position ❑ Find and use coterminal angles ❑ Understand properties and behavior of positive and negative angles ❑ Make a connection between the 30-60-90 and 45-45-90 triangles and a unit circle and ratios (SOH-CAH-TOA)
[11.3] Radian Measure	❑ Find radian measure and convert between degrees and radians ❑ Find measures of intercepts arcs ❑ Use dimensional analysis for real-world conversions
[11.4] The Sine Function	❑ Use properties of sine function to graph and analyze ❑ Solve real-world applications
[11.5] The Cosine Function	❑ Use properties of cosine function to graph and analyze ❑ Solve real-world applications
[11.6] Right Triangle Trigonometry	❑ Use properties of right triangles to find all six trigonometric ratios ❑ Use special right triangle ratios to lengths of sides in a right triangle

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Lesson II.I: Exploring Periodic Data

Verbal Vocabulary

Periodic function – any function that repeats a pattern of y-values at regular intervals.

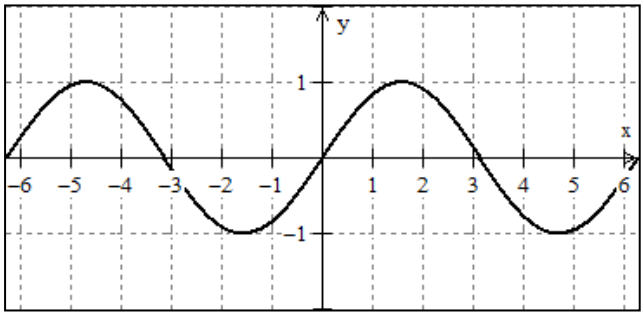
Cycle – one complete pattern of the y-values for a periodic function.

Period – the horizontal length of one cycle for a periodic or repeating function.

Amplitude – half the difference between the maximum and minimum values of the function.

Visual Vocabulary

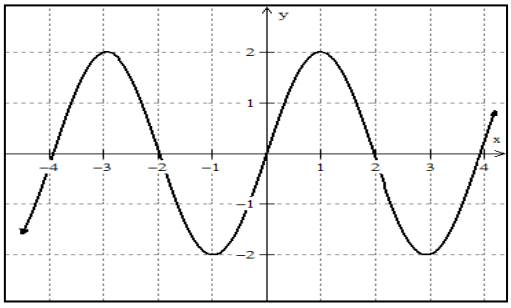
Use the graph below to label and identify the vocabulary terms.



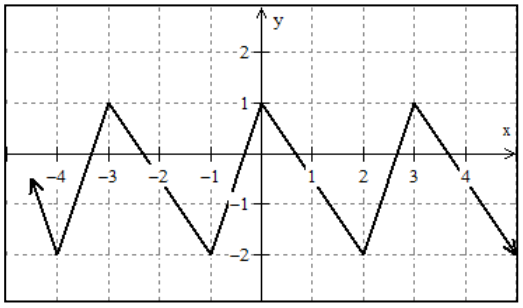
Identifying Cycles and Periods

EX #1: For each function, identify one cycle in two different ways. Then determine the period of the function.

A.

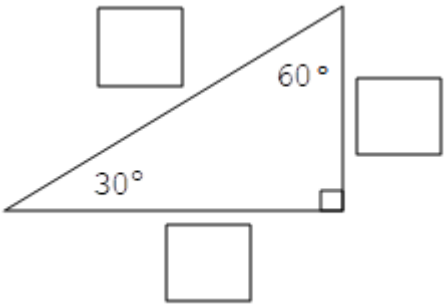


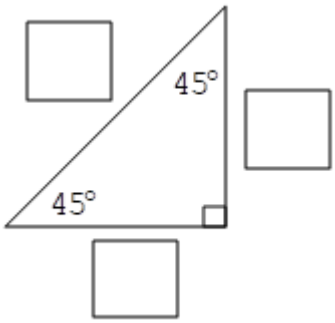
B.

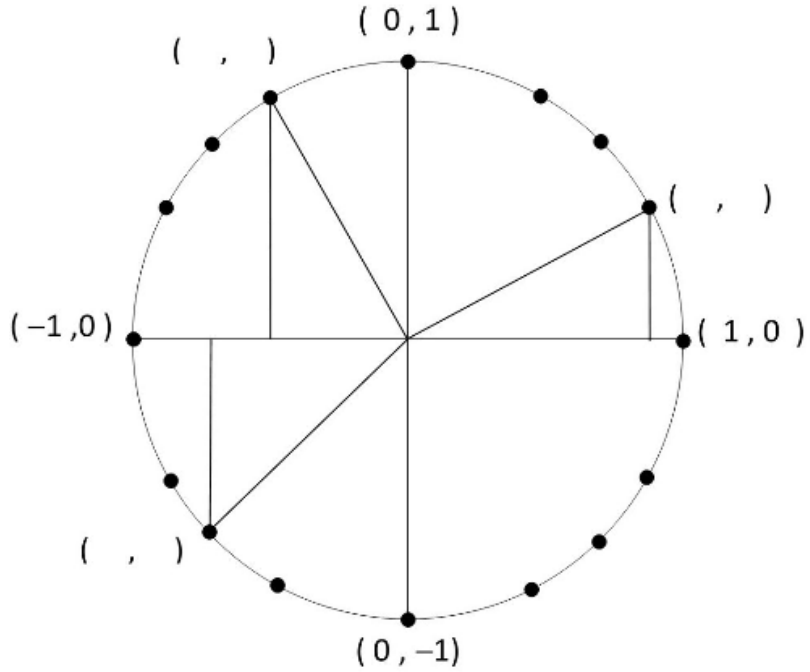


Angles on a Unit Circle

Use the special triangle ratios to find the coordinates for each angle in the unit circle below.







Cosine and Sine of an Angle

θ – Greek letter theta is the symbol used to represent the measure of an angle in standard position.

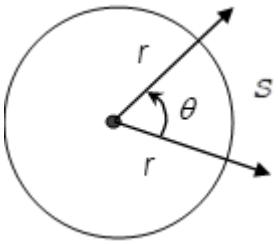
TRIGONOMETRIC RATIOS

SOH-CAH-TOA

Sine	*Cosine*	*Tangent*

Length of an Arc

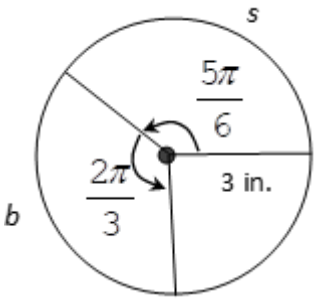
For a circle of radius r ,and a central angle of measure θ, in radians, the length S of the intercepted arc is $s = r\theta$.



EX #4: Use the circle at right:

A. Find length s to the nearest tenth.

B. Find length b to the nearest tenth.



Arc Length

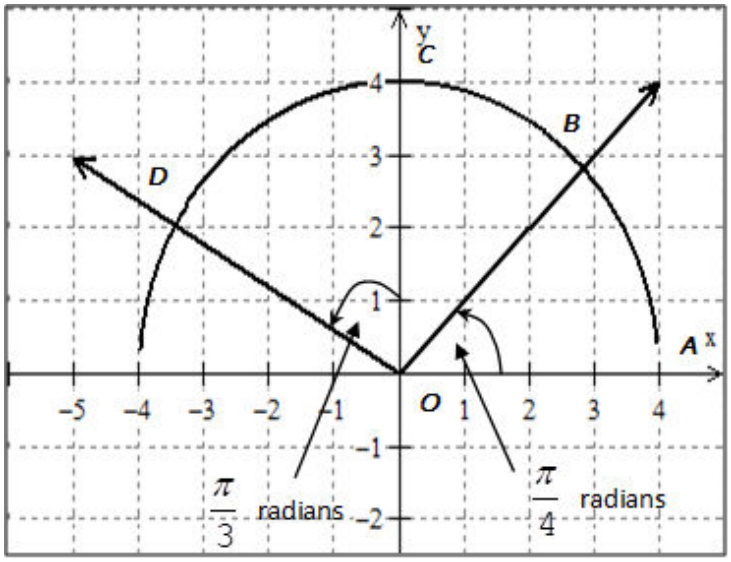
EX #5: Use the graph to find the intercepted arcs.

A. $\angle AOB$

B. $\angle COD$

C. $\angle AOC$

D. $\angle AOD$



Lesson 11.4: The Sine Function

Vocabulary

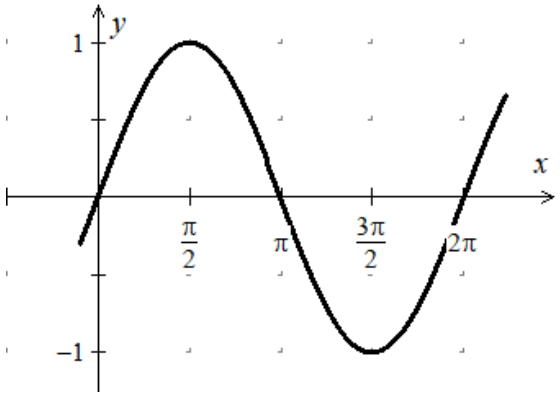
Sine function – matches the measure of an angle in standard position with the *y*-coordinate of a point on the unit circle. This point is where the terminal side of the angle intersects the unit circle.

Sine curve – the graph of a sine function

Sine of θ – the *y*-coordinate of the point at which the terminal side of the angle intersects the unit circle.

PROPERTIES OF SINE FUNCTIONS

$y = a \sin b\theta$, with $a \neq 0$, $b > 0$, θ in radians

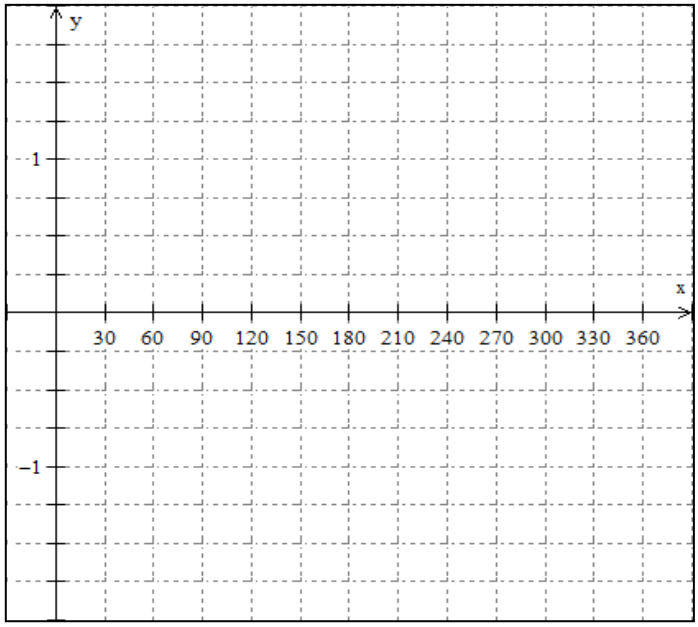
Verbal Vocabulary	Visual Vocabulary
$\lvert a \rvert$ is the amplitude of the function b is the number of cycles in the interval from 0 to 2π $\frac{2\pi}{b}$ is the period of the function	
FIVE KEY POINTS IN ONE CYCLE:	

Interpreting the Sine Function in Degrees

EX #1: Make a table of values from the unit circle.

θ	0°	30°	60°	90°	180°	225°	270°	330°	360°
$\sin\theta$									

Plot each ordered pair from the previous table on the grid at right:



Estimating Cosine Values in Radians

EX #2: Use the graph of the cosine function below to answer each of the following:

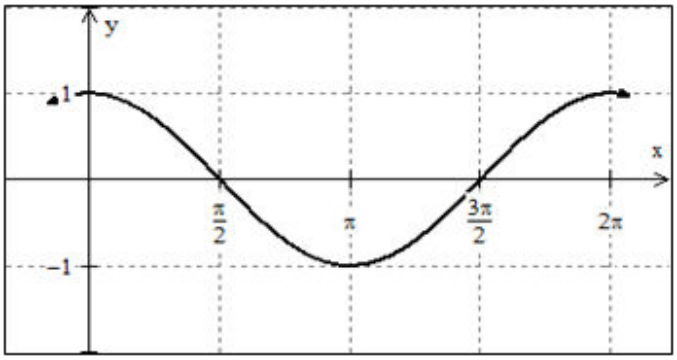
A. Find the amplitude

B. Find the period of the function in degrees and in radians

C. Find the domain and range

D. Estimate cos 4, plot your estimate.

E. Use a calculator, in radian mode, to find cos 4.



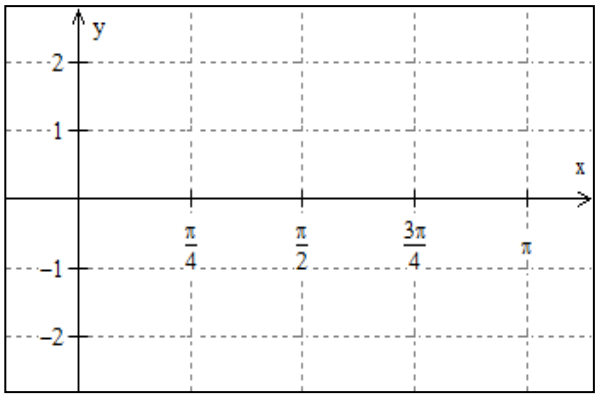
Sketching a Cosine Curve

EX #3: Sketch the graph of $y = 1.5\,cos(2\theta)$

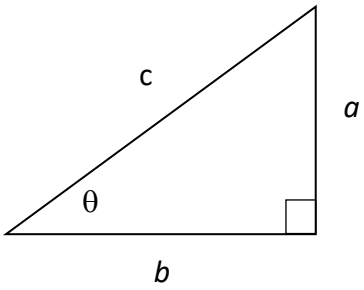
Amplitude: _____

Period: _____

Key points: Max–Int–Min–Int–Max



Lesson 11.6: Right Triangle Trigonometry

Vocabulary	Visual Vocabulary
A triangle where one angle is 90° is called a _____ triangle. The _____ side is any side of a right triangle that is next to the angle of interest, θ. Also, any side of a right triangle that is across from the angle of interest, θ is commonly called the _____ side. Then, the longest side of a right triangle is named as the _____. This side is located across from the 90-degree angle.	

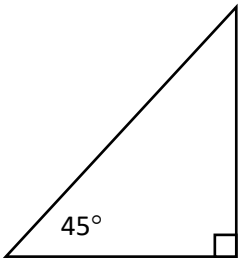
Let θ be an acute angle in the right ΔABC, as shown, then

Sine:	Cosecant:
Cosine:	Secant:
Tangent:	Cotangent:

Two Famous Triangles

45-45-90 Triangle:

EX #1:
Find all six trigonometric functions of a 45° angle.



$\sin 45° = \frac{opp}{hyp}$	$\csc 45° = \frac{hyp}{opp}$
$\cos 45° = \frac{adj}{hyp}$	$\sec 45° = \frac{hyp}{adj}$
$\tan 45° = \frac{opp}{adj}$	$\cot 45° = \frac{adj}{opp}$