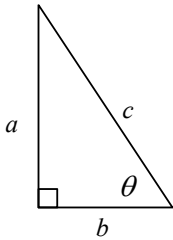| TRIGONOMETRIC FUNCTIONS	• A **trigonometric function** is a function whose rule is defined by a trigonometric ratio.
	• A **trigonometric ratio** compares the lengths of two sides of the triangle.
	• The Greek letter _____ is used to represent the measure of an acute angle in a right triangle.

	SINE	COSINE	TANGENT
	$\sin\theta$ =	$\cos\theta$ =	$\tan\theta$ =

RECIPROCAL FUNCTIONS	COSECANT $\left(\dfrac{1}{\sin\theta}\right)$	SECANT $\left(\dfrac{1}{\cos\theta}\right)$	COTANGENT $\left(\dfrac{1}{\tan\theta}\right)$
	$\csc\theta$ =	$\sec\theta$ =	$\cot\theta$ =

EXAMPLES

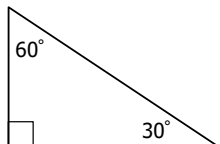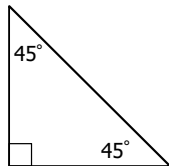**9.** Find all six trig ratios for θ shown in the triangle below.
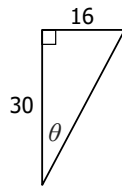
10. Given the ratio for $\cos\theta$, find the remaining ratios.

$\sin\theta$ =	$\csc\theta$ =	$\sin\theta$ =	$\csc\theta$ =
$\cos\theta$ =	$\sec\theta$ =	$\cos\theta = \dfrac{2}{3}$	$\sec\theta$ =
$\tan\theta$ =	$\cot\theta$ =	$\tan\theta$ =	$\cot\theta$ =

TRIG RATIOS OF SPECIAL ANGLES

Angles of 30°, 60°, and 45° are used frequently in trigonometry. You can use your knowledge of the side relationships in special right triangles to find the values of the trigonometric ratios.
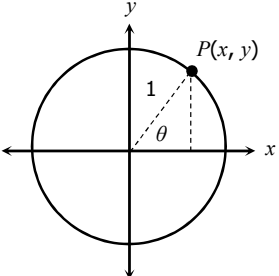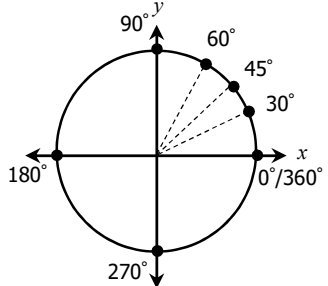

$\sin 45° =$	$\cos 45° =$	$\tan 45° =$
$\sin 30° =$	$\cos 30° =$	$\tan 30° =$
$\sin 60° =$	$\cos 60° =$	$\tan 60° =$
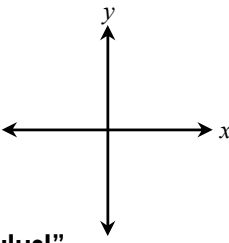
Name:	Class:
Topic:	Date:

Main Ideas/Questions	Notes

The Unit Circle

A unit circle is a circle with a radius of 1 unit.

Because the value of r is 1 for each point $P(x, y)$ on the circle, the sine, cosine, and tangent values for θ are defined as:

$sin\ \theta$ =	$cos\ \theta$ =	$tan\ \theta$ =

** The coordinates of P can be written as _____. **

Special Angles

The following angles are used frequently with the unit circle:
0°, 30°, 45°, 60°, 90°, 180°, 270°, and 360°

Because the terminal side of 0°, 90°, 180° and 270° angles lie on an axis, they are called **quadrantal angles.**

*Memorize these values!**

Degrees	Radians	*sin* θ	*cos* θ	*tan* θ	$P(x, y)$
0°/360°					
30°					
45°					
60°					
90°					
180°					
270°					

Labeling the Unit Circle

- Label the ordered pairs for each angle above.
- Use these angles as reference angles for the remaining angles around the circle.
- Adjust your coordinates by looking at which quadrant the point is located in.

Signs of Trig Functions	Which trig functions are POSITIVE in:
	• Quadrant I? _____
	• Quadrant II? _____
	• Quadrant III? _____
	• Quadrant IV? _____
	Remember the phrase "All Students Take Calculus!"

1. If tan $\theta > 0$, which quadrant(s) could the terminal side of θ lie?

2. If sec $\theta < 0$, which quadrant(s) could the terminal side of θ lie?

3. If sin $\theta > 0$, which quadrant(s) could the terminal side of θ lie?

4. If cos $\theta < 0$ and cot $\theta > 0$, which quadrant(s) could the terminal side of θ lie?

Using Reference Angles to find Trig Values

Step 1: Find the measure of the reference angle.
Step 2: Identify the trig function for the reference angle.
Step 3: Adjust the sign, if needed.

Directions: Give the **exact value** for each trigonometric function.

5. sin 150°

6. tan 300°

7. cos 225°

8. cot 315°

9. tan 240°

10. sec 300°

11. cos $\dfrac{11\pi}{6}$

12. csc $\dfrac{7\pi}{4}$

13. sin $\dfrac{4\pi}{3}$

14. tan $\dfrac{3\pi}{4}$

15. sin $\dfrac{7\pi}{6}$

16. sec $\dfrac{\pi}{2}$

THE UNIT CIRCLE

(,)

II   (,) y (,)   I

90°

(,)   120°   60°   (,)

135°   45°

(,)   150°   30°   (,)

(,)   180°   0°/360° x (,)

(,)   210°   330°   (,)

225°   315°

(,)   240°   300°   (,)

270°

III   (,)   (,)   IV

(,)

Trig Values:

$sin\ \theta =$	
$cos\ \theta =$	
$tan\ \theta =$	

Summary of Signs in the Quadrants:

	I	II	III	IV
$sin\ \theta$				
$cos\ \theta$				
$tan\ \theta$				