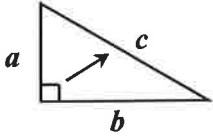
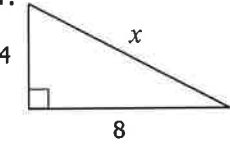
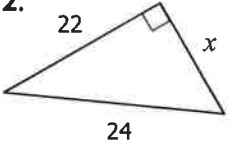
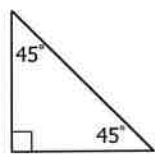
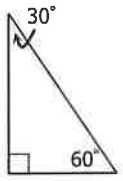
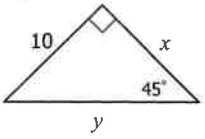
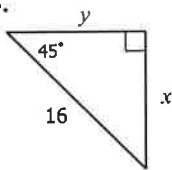
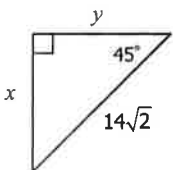
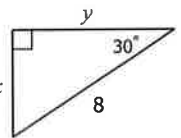
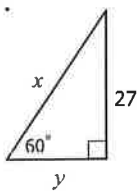
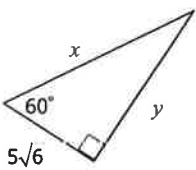


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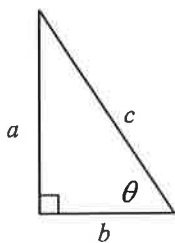
Class: _____

Topic: _____

Date: _____

Main Ideas/Questions	Notes	
<h2 style="text-align: center;">PYTHAGOREAN THEOREM</h2>	<p>Used to find a side length on a right triangle.</p> <p>Formula: <input style="width: 150px; height: 20px;" type="text"/></p> <div style="display: flex; justify-content: flex-end; align-items: center;">  </div>	
	<p>Directions: Find the missing side. Give your answer in simplest radical form.</p>	
	<p>1.</p> 	<p>2.</p> 
<h2 style="text-align: center;">SPECIAL RIGHT TRIANGLES</h2>	<h3>45°-45°-90°</h3>	<h3>30°-60°-90°</h3>
	 <p>Leg = _____</p> <p>Leg = _____</p> <p>Hypotenuse = _____</p>	 <p>Shorter Leg = _____</p> <p>Longer Leg = _____</p> <p>Hypotenuse = _____</p>
	<p>Directions: Find each missing side. Give your answer in simplest radical form.</p>	
	<p>3.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>	<p>4.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>
	<p>5.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>	<p>6.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>
	<p>7.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>	<p>8.</p>  <p>$x =$ _____</p> <p>$y =$ _____</p>

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 θ 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 $\left(\frac{1}{\sin \theta}\right)$

SECANT $\left(\frac{1}{\cos \theta}\right)$

COTANGENT $\left(\frac{1}{\tan \theta}\right)$

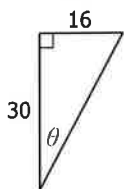
$$\csc \theta =$$

$$\sec \theta =$$

$$\cot \theta =$$

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.

$$\sin \theta =$$

$$\csc \theta =$$

$$\sin \theta =$$

$$\csc \theta =$$

$$\cos \theta =$$

$$\sec \theta =$$

$$\cos \theta = \frac{2}{3}$$

$$\sec \theta =$$

$$\tan \theta =$$

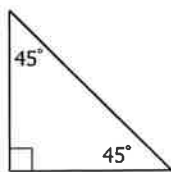
$$\cot \theta =$$

$$\tan \theta =$$

$$\cot \theta =$$

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.



$$\sin 45^\circ =$$

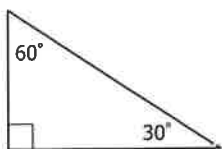
$$\cos 45^\circ =$$

$$\tan 45^\circ =$$

$$\sin 30^\circ =$$

$$\cos 30^\circ =$$

$$\tan 30^\circ =$$



$$\sin 60^\circ =$$

$$\cos 60^\circ =$$

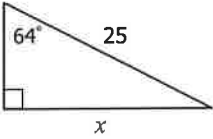
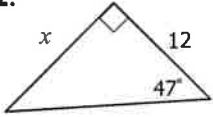
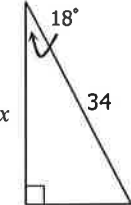
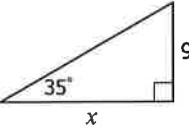
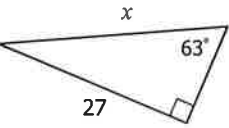
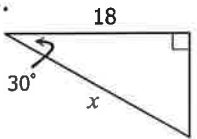
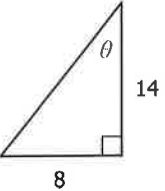
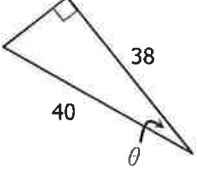
$$\tan 60^\circ =$$

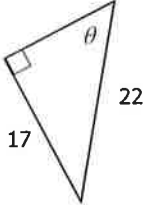

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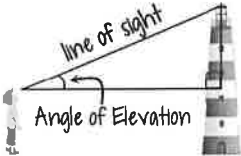
Topic: _____

Date: _____

Main Ideas/Questions	Notes		
<p style="text-align: center;">FINDING SIDES LENGTHS</p>	<p>Directions: Find the value of x. Round to the nearest tenth.</p>		
	<p>1. </p>	<p>2. </p>	
	<p>3. </p>	<p>4. </p>	
	<p>5. </p>	<p>6. </p>	
	<p>If you know the sin, cosine, or tangent ratio of an angle, you can use the inverse of the ratio (\sin^{-1}, \cos^{-1}, \tan^{-1}) to find the measure of the angle.</p>		
	<p>If $\sin \theta = x$, then</p>	<p>If $\cos \theta = x$, then</p>	<p>If $\tan \theta = x$, then</p>
<p>Directions: Find the missing angle. Round to the nearest tenth.</p>			
<p>7. </p>	<p>8. </p>		

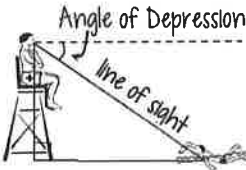
	<p>9.</p> 	<p>10.</p> 
--	---	--

ANGLE OF ELEVATION



11. The angle of elevation from a fishing boat to the top of a lighthouse is 5° . If the top of the lighthouse is 161 feet above sea level, how far is the boat from the lighthouse?
12. The angle of elevation from the bottom of a slide to the top of the slide is 44° . If the top of the slide sits 16 feet above the ground, find the length of the slide. Assume it is a straight slide.
13. A 10-foot ramp is used to unload furniture from a truck. If the back of the truck sits 3 feet above the ground, find the measure of the angle that the ramp makes with the ground.

ANGLE OF DEPRESSION



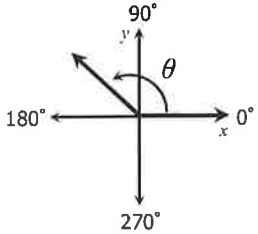
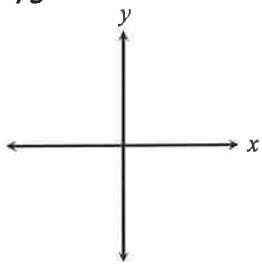
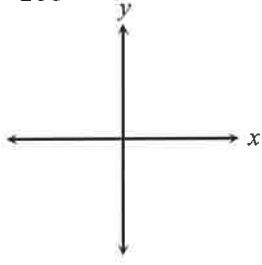
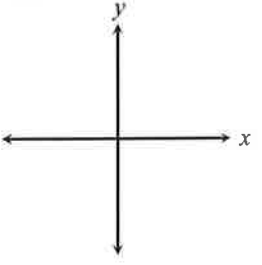
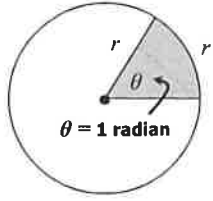
14. A fire is spotted from the top of a 125-foot tall fire tower. If the angle of depression to the fire is 19° , how far is the fire from the base of the tower?
15. An airplane is flying at an altitude of 8,900 feet over water. The pilot spots a raft floating in the water at a 28° angle of depression. What is the horizontal distance from the airplane to the raft?
16. Max is sitting in the stands at the baseball stadium. He catches a foul ball and decides to throw it back to a player standing on first base. If the horizontal distance from Max to the player is 61 feet and the ball travels 76 feet, what is the angle of depression from Max to the player?

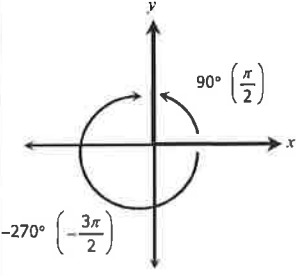
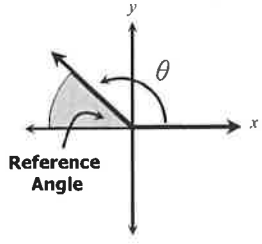
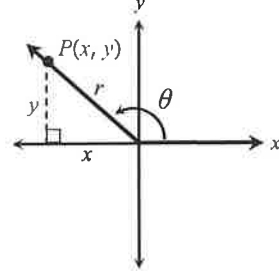
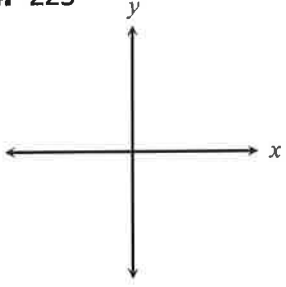
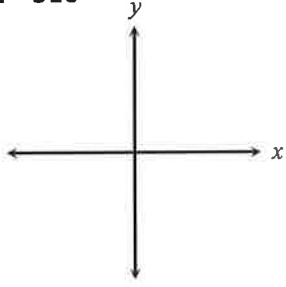
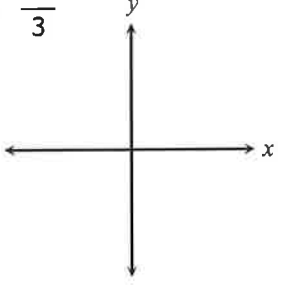
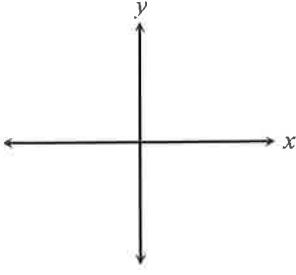
Name: _____

Class: _____

Topic: _____

Date: _____

Main Ideas/Questions	Notes		
<p style="text-align: center;">Angles in Standard Form</p> 	<ul style="list-style-type: none"> • An angle on the coordinate plane is in standard form when the vertex is on the origin and one ray lies on the positive x-axis. • The ray on the x-axis is called the _____. • The other ray is called the _____. • Counterclockwise rotations result in _____ angle measures. • Clockwise rotations result in _____ angle measures. • One full revolution = _____. 		
<p>Drawing Angles</p>	<p>Directions: Sketch an angle with the given measure in standard position.</p>		
	<p>1. 75°</p> 	<p>2. -160°</p> 	<p>3. 430°</p> 
<p>Radians vs. Degrees</p> 	<p>A radian is a unit of angle measure based on arc length. One radian is defined as the measure of the angle formed when the radius is equivalent to the length of the intercepted arc. Recall that the circumference of a circle is $2r\pi$, therefore:</p> <p>$360^\circ =$ _____ ; $180^\circ =$ _____</p>		
	<p>Converting Degrees → Radians</p>		<p>Converting Radians → Degrees</p>
	<p>Radians = Degrees $\cdot \left(\frac{\pi \text{ radians}}{180}\right)$</p>		<p>Degrees = Radians $\cdot \left(\frac{180}{\pi \text{ radians}}\right)$</p>
<p>Degrees → Radians</p>	<p>Directions: Convert each measure to radians.</p>		
	<p>4. 30°</p>	<p>5. 150°</p>	<p>6. -220°</p>
<p>Radians → Degrees</p>	<p>Directions: Convert each measure to degrees.</p>		
	<p>7. $\frac{4\pi}{3}$</p>	<p>8. $-\frac{5\pi}{36}$</p>	<p>9. $\frac{7\pi}{4}$</p>

<p>Coterminal Angles</p> 	<p>Angles in standard position with the same terminal side are coterminal angles. Give two coterminal angles for each given angle, one positive and one negative:</p>		
<p>Reference Angles</p> 	<p>10. 65°</p>	<p>11. 540°</p>	<p>12. $\frac{13\pi}{18}$</p>
<p>Trig Functions</p> 	<p>14. 225°</p> 	<p>15. -310°</p> 	<p>16. $\frac{2\pi}{3}$</p> 
	<p>Let θ be an angle in standard form and $P(x, y)$ be a point on the terminal side of θ. The distance from P to the the origin, r, can be found using the formula:</p> <p style="text-align: center;">_____ (The Pythagorean Theorem).</p>		
	<p>$\sin \theta =$</p>	<p>$\cos \theta =$</p>	<p>$\tan \theta =$</p>
	<p>$\csc \theta =$</p>	<p>$\sec \theta =$</p>	<p>$\cot \theta =$</p>
	<p>17. $P(5, -2)$ is a point on the terminal side of θ in standard form. Find the exact values of the trigonometric functions of θ:</p>		
	<p>$\sin \theta =$</p>	<p>$\cos \theta =$</p>	<p>$\tan \theta =$</p>
	<p>$\csc \theta =$</p>	<p>$\sec \theta =$</p>	<p>$\cot \theta =$</p>

Introduction to the Unit Circle

The unit circle is defined as the circle (on the x, y coordinate plane) whose center is at the _____ and whose radius is _____.

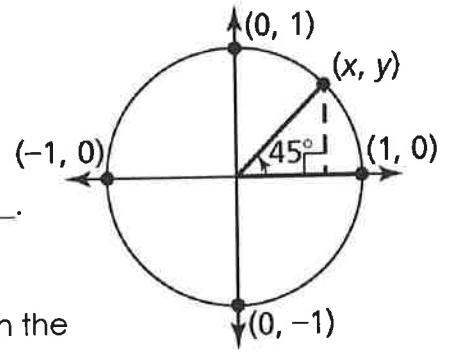


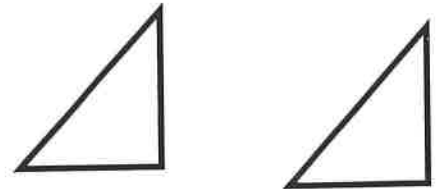
Diagram A

If we let θ be an angle in standard position and let $P(x, y)$ be a point on the _____ side of θ , then by the Pythagorean Theorem the distance " r "

from the origin to P is _____.

Trigonometric Functions, θ in Standard Position		
$\sin \theta =$	$\cos \theta =$	$\tan \theta =$
$\csc \theta =$	$\sec \theta =$	$\cot \theta =$

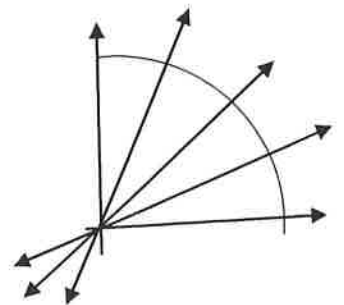
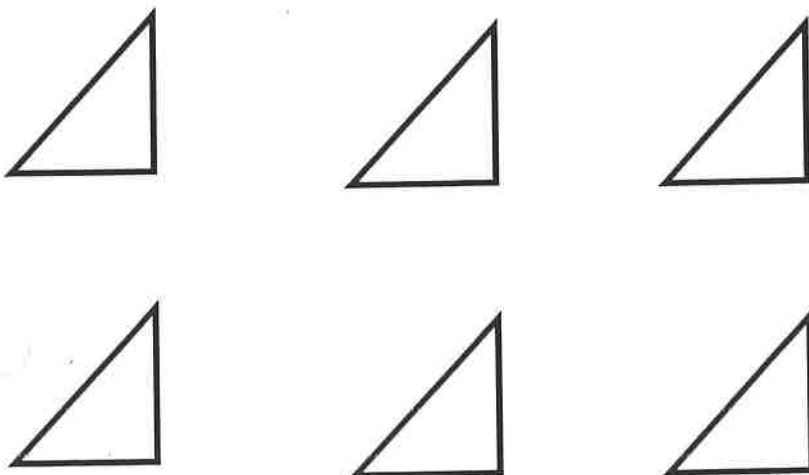
Using the Pythagorean Theorem _____
(equation of the unit circle)



And since $x = \cos \theta$ and $y = \sin \theta$ _____
(trigonometric identity)

Quadrant One

Both x ($\cos \theta$) and y ($\sin \theta$) are _____!



$\sin 0^\circ = \underline{\hspace{2cm}}$

$\sin 30^\circ = \underline{\hspace{2cm}}$

$\sin 45^\circ = \underline{\hspace{2cm}}$

$\sin 60^\circ = \underline{\hspace{2cm}}$

$\sin 90^\circ = \underline{\hspace{2cm}}$

$\cos 0^\circ = \underline{\hspace{2cm}}$

$\cos 30^\circ = \underline{\hspace{2cm}}$

$\cos 45^\circ = \underline{\hspace{2cm}}$

$\cos 60^\circ = \underline{\hspace{2cm}}$

$\cos 90^\circ = \underline{\hspace{2cm}}$

$\tan 0^\circ = \underline{\hspace{2cm}}$

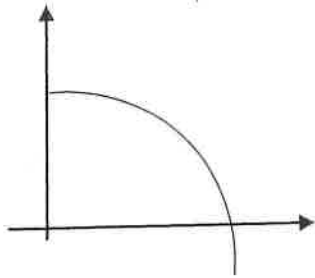
$\tan 30^\circ = \underline{\hspace{2cm}}$

$\tan 45^\circ = \underline{\hspace{2cm}}$

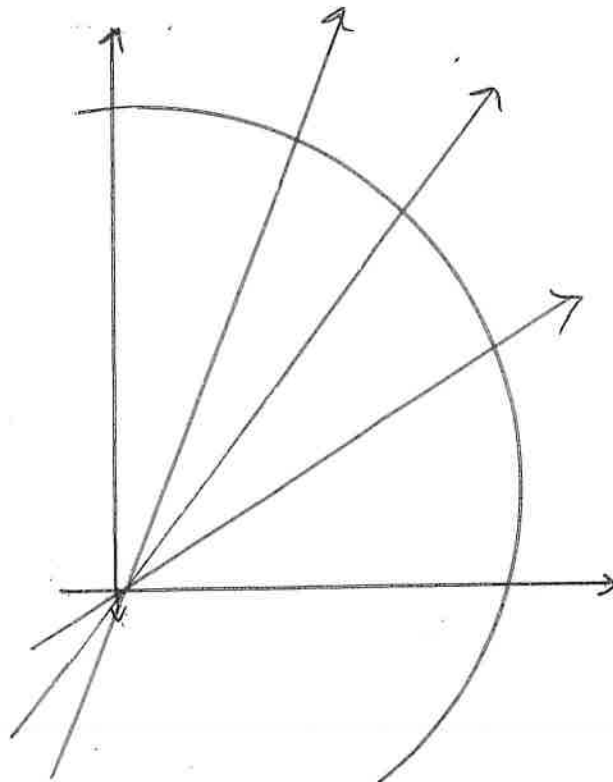
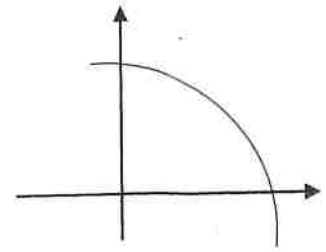
$\tan 60^\circ = \underline{\hspace{2cm}}$

$\tan 90^\circ = \underline{\hspace{2cm}}$

Cosine



Sine

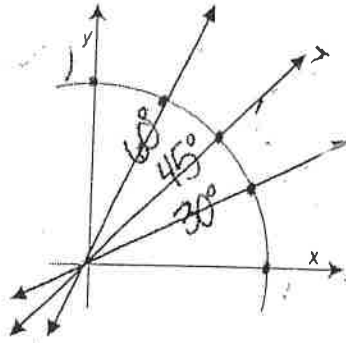


Recall: Quadrant One of the Unit Circle

$x =$ _____

$y =$ _____

$(x, y) =$ _____



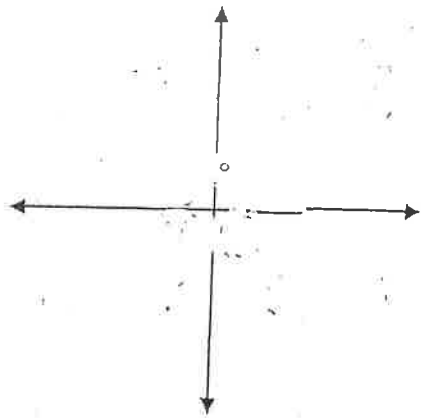
Main Idea: To complete the unit circle, we need values in _____ quadrants!

Since every reference angle has _____ possible locations

on the unit circle, we can use _____

and properties of a _____

to construct the remaining 3 quadrants!



For $\theta' = 30^\circ$ $\theta =$ _____

Quadrant One	Quadrant Two	Quadrant Three	Quadrant Four
$\theta =$	$\theta =$	$\theta =$	$\theta =$
$\sin 30^\circ =$	$\sin 150^\circ =$	$\sin 210^\circ =$	$\sin 330^\circ =$
$\cos 30^\circ =$	$\cos 150^\circ =$	$\cos 210^\circ =$	$\cos 330^\circ =$
$\tan 30^\circ =$	$\tan 150^\circ =$	$\tan 210^\circ =$	$\tan 330^\circ =$