

BOARD PROBLEMS Ch. 7

- 1) A person stood 63 feet away from a building. Using the angle of elevation this person found that the height of the building was 529 ft.

What was the angle of elevation?

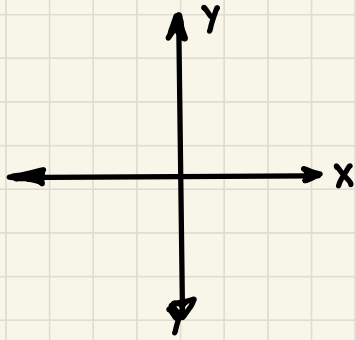
Write the equation of a circle in graphing form and standard form.

- a) Center: $(15, -8)$

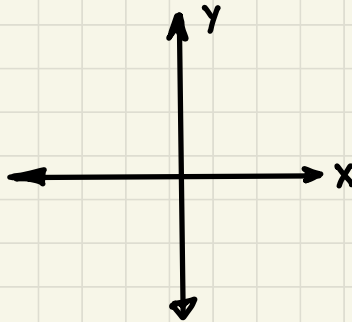
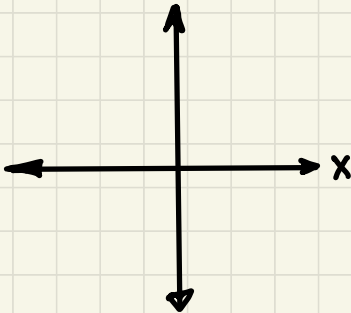
$$\text{Area} = 16\pi$$

- b) ENDS OF A DIAMETER $(11, 6)$ $(1, 14)$

Ch. 7 - REFERENCE ANGLES

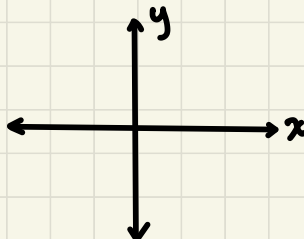
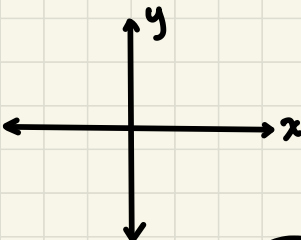
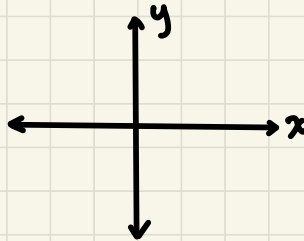
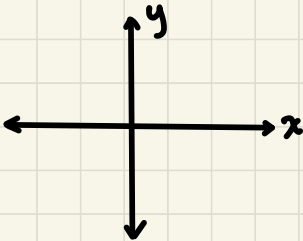


$\theta =$
 $d =$
if $\theta = 70^\circ$
 $d =$

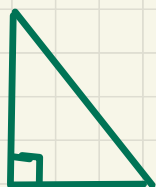


DO PRACTICE PROBLEMS 1-8

REFERENCE ANGLES - DRAW _____ to the



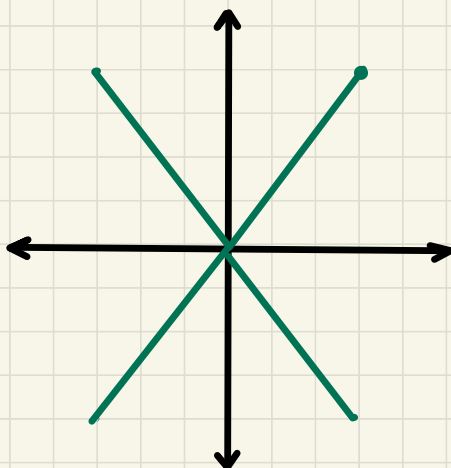
PRACTICE 2



$$\sin \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$



$$\sin \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$



$$\sin \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

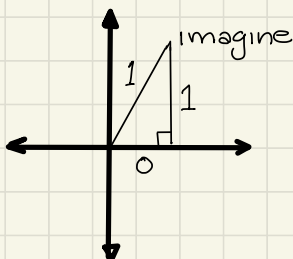


$$\sin \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

EXAMPLE 8 - BEST TO MEMORIZE



TRIG FUNCTIONS FOR 90°

$$\sin \theta = \underline{\hspace{2cm}}$$

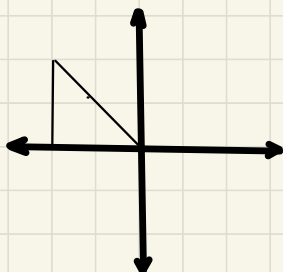
$$\csc \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\sec \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

$$\cot \theta = \underline{\hspace{2cm}}$$



TRIG FUNCTIONS FOR 180°

$$\sin \theta = \underline{\hspace{2cm}}$$

$$\csc \theta = \underline{\hspace{2cm}}$$

$$\cos \theta = \underline{\hspace{2cm}}$$

$$\sec \theta = \underline{\hspace{2cm}}$$

$$\tan \theta = \underline{\hspace{2cm}}$$

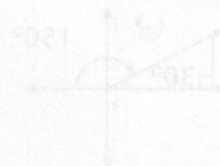
$$\cot \theta = \underline{\hspace{2cm}}$$

DO PRACTICE PROBLEMS 3 & 4

Practice Problems 1

Draw the angle and tell in what quadrant the terminal side lies.

1. -60°
2. -135°
3. 420°
4. 560°
5. 210°
6. -250°
7. -315°
8. -330°



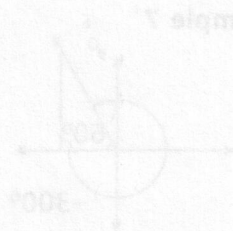
Example 4



Example 2



Example 6



Example 7

The reference angle makes it possible to have a sin, cos, or tan and thus a ratio. The quadrant in which the terminal side of the angle ends up determines whether the ratio will be positive or negative. Technically, the angles 90° , 180° , 270° , and 360° (or 0°) lie on the x- and y-axes and not in a specific quadrant, but I am going to assign them to quadrants to keep it simple. We will consider 90° to be in the first quadrant, 180° in the second, 270° in the third, and 360° in the fourth.

Practice Problems 2

For each angle, name the quadrant in which it lies and the reference angle to be used.

- | | |
|------------------|------------------|
| 1. -30° | 2. 820° |
| 3. -240° | 4. 720° |
| 5. 630° | 6. -98° |
| 7. 443° | 8. -320° |
| 9. 542° | 10. -190° |
| 11. -400° | 12. 618° |

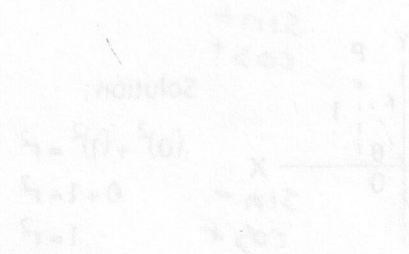
Practice Problems 3

- Find the six trigonometric ratios of an angle with the given point $(5, -12)$ on the terminal side. Draw a diagram.
- Find the six trigonometric ratios of an angle with the given point $(-15, -8)$ on the terminal side. Draw a diagram.

$$\begin{aligned}\sin \theta &= -\frac{12}{13} \\ \cos \theta &= \frac{5}{13} \\ \tan \theta &= -\frac{12}{5} \\ \csc \theta &= -\frac{13}{12} \\ \sec \theta &= \frac{13}{5} \\ \cot \theta &= -\frac{5}{12}\end{aligned}$$

Example 8 - Imaginary Angle

This is a 90° angle. Because it is hard to visualize the trig functions, we will draw an imaginary reference angle with an x value of zero. This method will help you find the trig functions for other angles that have their terminal sides on the x- or y-axis. If the denominator is zero, the answer is "undefined" because we cannot divide by zero.



$$\begin{aligned}\sin \theta &= \frac{1}{1} = 1 \\ \cos \theta &= \frac{0}{1} = 0 \\ \tan \theta &= \frac{1}{0} \text{ is undefined} \\ \csc \theta &= \frac{1}{1} = 1 \\ \sec \theta &= \frac{1}{0} \text{ is undefined} \\ \cot \theta &= \frac{0}{1} = 0\end{aligned}$$

Practice Problems 4

Sketch the angle, find the reference angle, and note in which quadrant it lies. Then fill in the table. Some values are undefined because the denominator of the ratio is zero. Use your knowledge of special triangles to write the ratios as fractions. Numbers 3 and 6 are worked out as examples.

	hypotenuse	θ	quadrant	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
1.	8	30°	I						
2.	$8\sqrt{2}$	45°	I						
3.	8	60°	I	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$
4.	4	90°	I						
5.	4	120°	II						
6.	$4\sqrt{2}$	135°	II	$\frac{\sqrt{2}}{2}$	$\frac{-\sqrt{2}}{2}$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
7.	4	150°	II						
8.	7	180°	II						

For each angle, name the quadrant where the terminal side stops and the reference angle.

1. -330°

2. -130°

3. 130°

For each angle, name the quadrant where the terminal side stops, the reference angle, and the value of the ratio in fraction form.

4. $\cos 300^\circ$

5. $\sin 405^\circ$

6. $\tan 120^\circ$

Find the six trigonometric ratios of an angle with the given point on the terminal side. Start by drawing a diagram.

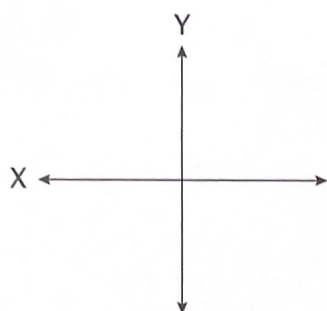
7. $(-4, 3)$

LESSON 7A

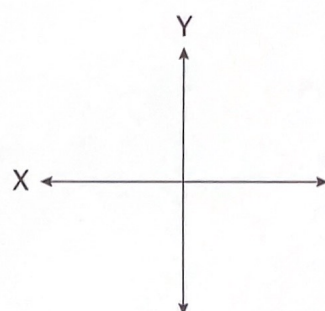
Sketch the angle, find the reference angle, and note in which quadrant it lies. Then fill in the table, using the fractional values of sin, cos, and tan.

	hypotenuse	θ	ref. angle	quadrant	$\sin \theta$	$\cos \theta$	$\tan \theta$
8.	7	210°					
9.	$7\sqrt{2}$	225°					

8. 210°

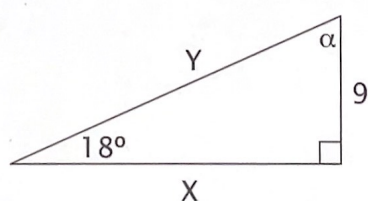


9. 225°



Solve for the measures of the angles and the lengths of the sides.

10.



11.

