

Name \_\_\_\_\_

# Math 3 Honors Unit 7: Trigonometry

Monday	Tuesday	Wednesday	Thursday	Friday
	<b>April 23</b> <ul style="list-style-type: none"> <li>Equation of a circle</li> </ul> HW: worksheet 7.1	<b>April 24</b> <ul style="list-style-type: none"> <li>Angles and their measure</li> </ul> HW: worksheet 7.2	<b>April 25</b> <ul style="list-style-type: none"> <li>Right triangle trig</li> </ul> HW: worksheet 7.3	<b>April 26</b> <ul style="list-style-type: none"> <li>Unit circle</li> </ul> HW: worksheet 7.4
<b>April 29</b> <ul style="list-style-type: none"> <li>Graphs of sine and cosine</li> </ul> HW: worksheet 7.5	<b>April 30</b> <ul style="list-style-type: none"> <li>Applications</li> </ul> HW: worksheet 7.6	<b>May 1</b> <ul style="list-style-type: none"> <li>Review for test</li> </ul> HW: finish review	<b>May 2</b> <ul style="list-style-type: none"> <li>TEST!!</li> </ul>	

## **7.1 - Equation of a Circle**

*Write an equation of a circle with the given center and radius:*

1.  $(2, 3)$ ,  $r = 5$

2.  $(-3, 0)$ ,  $r = 2.5$

*State the center and radius for the circle which has the equation:*

3.  $(x - 1)^2 + y^2 = 36$

4.  $x^2 + (y + 7)^2 = 20$

5.  $(x + 2)^2 + (y - 6)^2 = 256$

6.  $(x - 3)^2 + (y + 12)^2 = 169$

7. Write the equation of a circle with center  $(-1, 4)$  and containing the point  $(5, -4)$ .

*Use completing the square to write each equation in standard form. Then state the center and radius.*

8.  $x^2 + y^2 + 12x = 45$

9.  $x^2 + y^2 + 14y + 13 = 0$

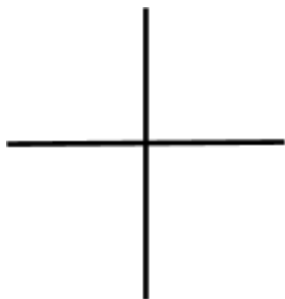
10.  $x^2 + y^2 - 2x + 6y = 3$

11.  $x^2 + y^2 - 6x + 6y - 26 = 4x - 2y + 30$

## 7.2 - Angles and Their Measures

Draw the angle in standard position. Then find one positive and one negative coterminal angle with the given angle. Finally, convert each of your angle measures from degrees to radians.

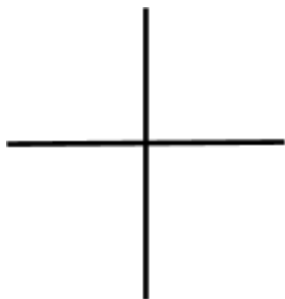
1.  $215^\circ$



pos:                  neg:

radians:

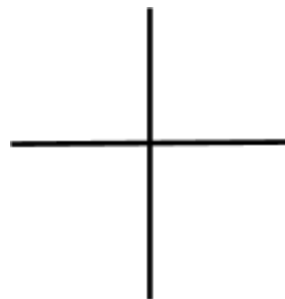
2.  $285^\circ$



pos:                  neg:

radians:

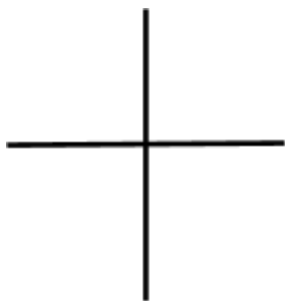
3.  $-375^\circ$



pos:                  neg:

radians:

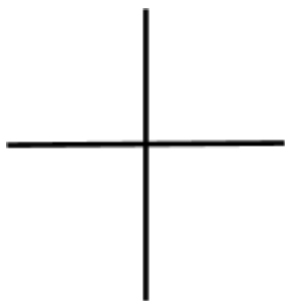
4.  $460^\circ$



pos:                  neg:

Radians:

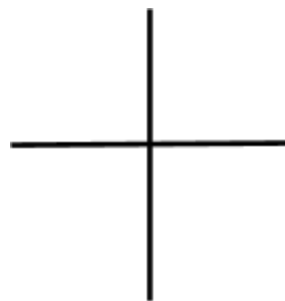
5.  $175^\circ$



pos:                  neg:

radians:

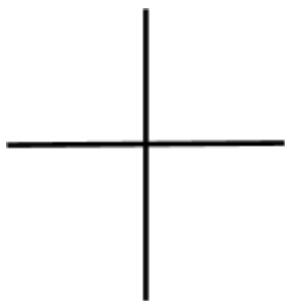
6.  $-15^\circ$



pos:                  neg:

radians:

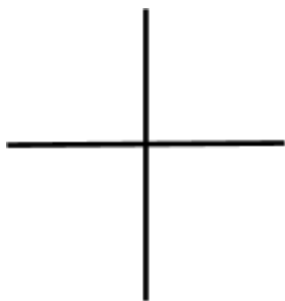
7.  $-85^\circ$



pos:                  neg:

radians:

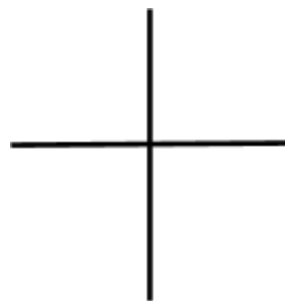
8.  $190^\circ$



pos:                  neg:

radians:

9.  $-230^\circ$



pos:                  neg:

radians:

**KEEP GOING -->**

State if the given angles are coterminal.

10.  $185^\circ$ ,  $-545^\circ$

11.  $\frac{17\pi}{36}$ ,  $\frac{161\pi}{36}$

Find a coterminal angle between  $0^\circ$  and  $360^\circ$ .

12.  $-330^\circ$

13.  $-435^\circ$

14.  $640^\circ$

15.  $-442^\circ$

Find a coterminal angle between 0 and  $2\pi$ .

16.  $\frac{11\pi}{3}$

17.  $-\frac{35\pi}{18}$

18.  $\frac{15\pi}{4}$

19.  $-\frac{19\pi}{12}$

Convert each radian measure into degrees.

20.  $\frac{\pi}{18}$

21.  $-\frac{25\pi}{12}$

22.  $\frac{35\pi}{18}$

23.  $\frac{41\pi}{36}$

24.  $-\frac{3\pi}{2}$

25.  $\frac{107\pi}{36}$

### **7.3 - Right Triangle Trigonometry**

Find all missing trig functions with the given information.

1.  $\sin\theta = \frac{2}{3}$ ,  $\cos\theta = \frac{\sqrt{5}}{3}$

2.  $\tan\theta = \sqrt{3}$

3.  $\sin\theta = \frac{6}{7}$

4.  $\csc\theta = \frac{13}{12}$

5. Lucy is flying a kite with an angle of elevation of  $72^\circ$ . The string of the kite is 65 meters long. How far is the kite above the ground?



6. Charlie Brown is observing the Washington Monument from 1320 feet away. The monument is 555 feet tall. What is the angle of elevation to the top of the building?

7. Snoopy is trapped on a tree branch 6.5 meters above the ground. Your ladder is only 6.7 meters long. If you place the ladder's tip on the branch, what angle will the ladder make with the ground?

8. Patty is standing a distance away from a skyscraper that is 780 feet tall. Patty is between Marcie and the skyscraper. The angle of elevation from Marcie's position to the top of the skyscraper is  $42^\circ$ . The angle of elevation from Patty's position to the top of the skyscraper is  $71^\circ$ . How far is Marcie from Patty?

9. Woodstock is in a helicopter is taking pictures of a waterfall that is 240 meters tall. The helicopter is hovering 50 meters away from the waterfall and level with its highest point. Woodstock is focusing his camera on a point halfway down the waterfall. At what angle is the camera lens tilted down from the horizontal?

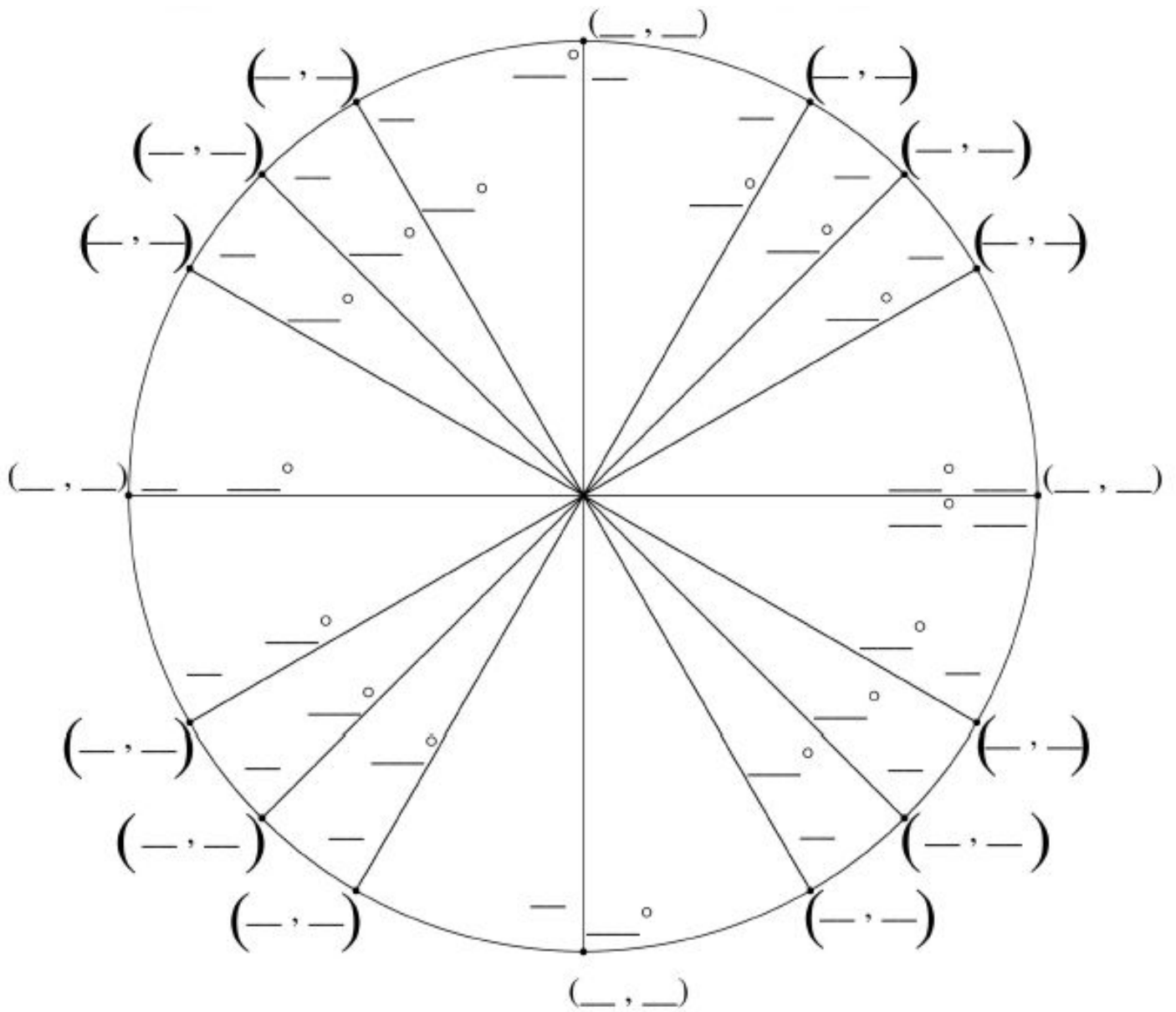
10. A forester is estimating the amount of lumber contained in a tree. When he stands 29 feet away from the tree, the angle to the top of the tree is  $55^\circ$  as measured from his eye-level height, 5 feet above the ground. What is the height of the tree?

11. Schroeder is standing 30 feet away from a building. His angle of elevation to the top of a window in the building is  $65^\circ$  and to the bottom of the window is  $60^\circ$ . What is the height of the window?

12. At a certain distance, the angle of elevation to the top of a building is  $60^\circ$ . From 40 feet further back, the angle of elevation is  $45^\circ$ . Find the height of the building.

### 7.4 - Unit Circle

Complete the unit circle.



KEEP GOING -->

Determine the exact value of each:

1.  $\sin 225^\circ$

2.  $\cos 150^\circ$

3.  $\tan 60^\circ$

4.  $\sin \frac{\pi}{6}$

5.  $\sec \frac{2\pi}{3}$

6.  $\cot \frac{5\pi}{3}$

7.  $\tan 90^\circ$

8.  $\cos \pi$

9.  $\csc \frac{3\pi}{4}$

10.  $\sin 2\pi$

11.  $\cos -30^\circ$

12.  $\sec 585^\circ$

13.  $\cot 180^\circ$

14.  $\sin \frac{\pi}{2}$

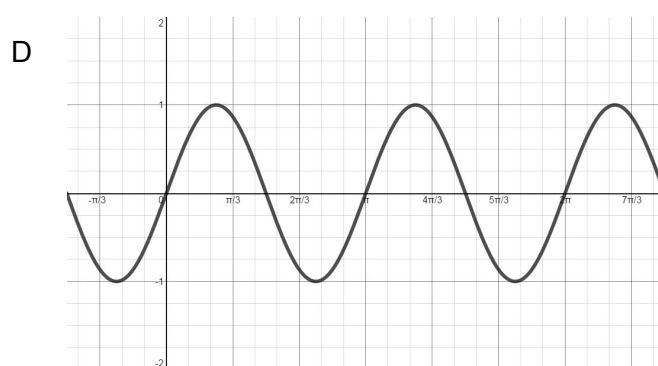
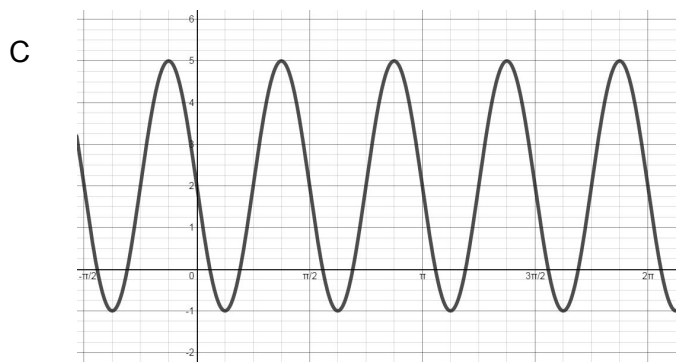
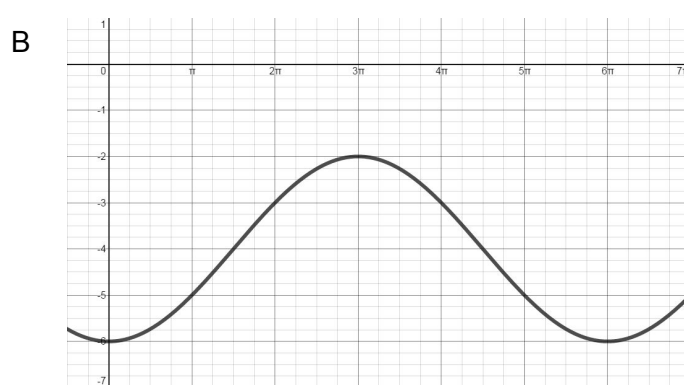
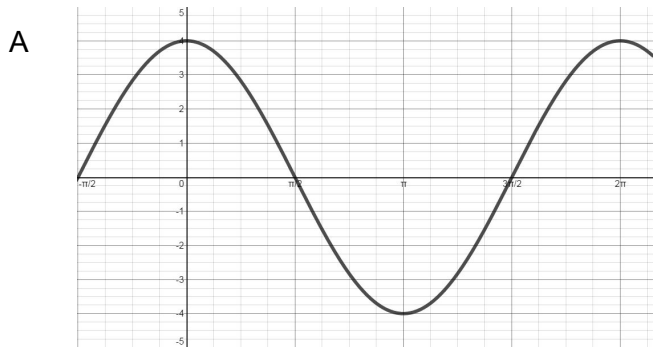
15.  $\cos 270^\circ$

16.  $\sec \frac{7\pi}{6}$



## 7.5 - Graphs of Sine and Cosine

Determine the amplitude, period, frequency, vertical shift, and equation for each graph below.



	Amplitude	Period	Vertical Shift	Equation
A				
B				
C				
D				

Determine the amplitude, period, and vertical shift of each:

1.  $y = -4\cos 4x + 7$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

2.  $y = 6\sin \frac{1}{3}x - 4$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

3.  $y = \sin x + 2$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

4.  $y = \frac{1}{2}\cos \frac{4}{3}x$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

5.  $y = -2\cos 8x - 4$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

6.  $y = -\sin 3x + 1$

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Vertical Shift: \_\_\_\_\_

## **7.6 - Applications of Trig Functions (optional)**

1. If the equilibrium point is  $y = 0$ , then  $y = -4\cos\left(\frac{\pi}{6}t\right)$  models a buoy bobbing up and down in the water. Find the period of the function and the location of the buoy at  $t = 10$ .
  
2. The function  $y = 25\sin\left(\frac{\pi}{6}t\right) + 60$ , where  $t$  is in months and  $t = 0$  corresponds to April 15, models the average high temperature in degrees Fahrenheit in Centerville.
  - a. Find the period of the function.
  
  - b. What does the period represent?
  
  - c. What is the maximum high temperature?
  
  - d. When does the maximum occur?
  
3. The population of predators and prey in a closed ecological system tends to vary periodically over time. In a certain system, the population of owls  $O$  can be presented by  $O = 30\sin\left(\frac{\pi}{10}t\right) + 150$ , where  $t$  is the time in years since January 1, 2001.
  - a. Find the maximum number of owls.
  
  - b. When does the maximum occur?
  
  - c. Find the minimum number of owls.
  
  - d. When does the minimum occur?
  
4. A leaf floats on the water bobbing up and down. The distance between its highest point is 4 centimeters. It moves from its highest point down to its lowest point and back to its highest point every 10 seconds. Write a cosine function that models the movement of the leaf in relationship to the equilibrium point.