Name _____

Math 3 Honors Unit 7: Trigonometry

Monday	Tuesday	Wednesday	Thursday	Friday
December 10 ● No school - Snow	**December 11** ● No school - Snow	**December 12** ● Equation of a circle HW: worksheet 7.1	**December 13** ● Angles and their measure HW: worksheet 7.2	**December 14** ● Right triangle trig HW: worksheet 7.3
December 17 ● Unit circle HW: worksheet 7.4	**December 18** ● Graphs of sine and cosine ● Applications HW: worksheet 7.5, worksheet 7.6 (optional)	**December 19** ● Applications ● Review for test HW: finish review, worksheet 7.6 (optional)	**December 20** ● TEST!!	

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 from. Then state the center and radius.

8. $x^2 + y^2 + 12x = 45$
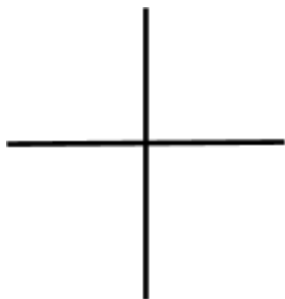
9. $x^2 + y^2 + 14y + 13 = 0$

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.
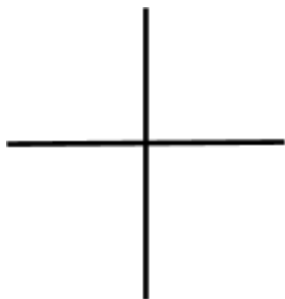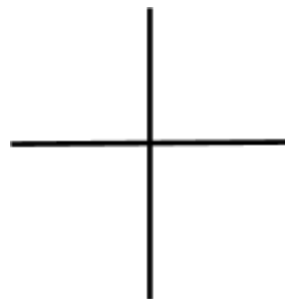
1. 215°
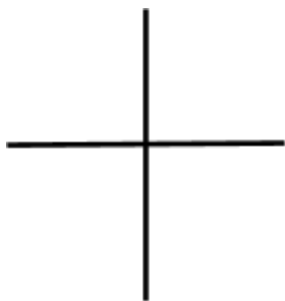
pos:　　　　neg:

radians:

2. 285°

pos:　　　　neg:

radians:

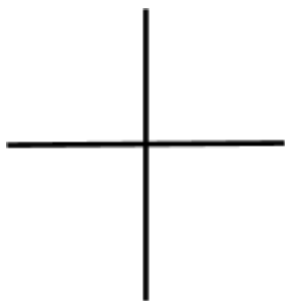3. -375°

pos:　　　　neg:

radians:

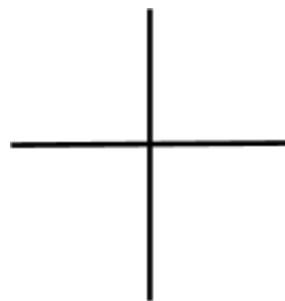4. 460°

pos:　　　　neg:

Radians:

5. 175°

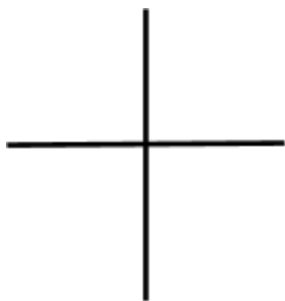pos:　　　　neg:

radians:

6. -15°

pos:　　　　neg:

radians:

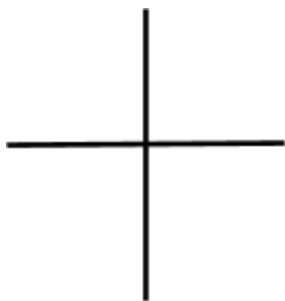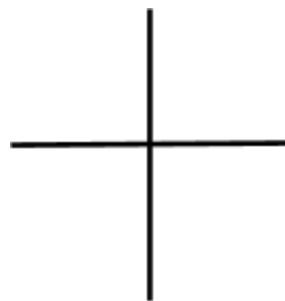7. -85°

pos:　　　　neg:

radians:

8. 190°

pos:　　　　neg:

radians:

9. -230°

pos:　　　　neg:

radians:

KEEP GOING -->

State if the given angles are coterminal.

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

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

Find a coterminal angle between 0° and 360°.

12. -330°

13. -435°

14. 640°

15. -442°

Find a coterminal angle between 0 and 2π.

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°. 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°. The angle of elevation from Patty's position to the top of the skyscraper is 71°. 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?
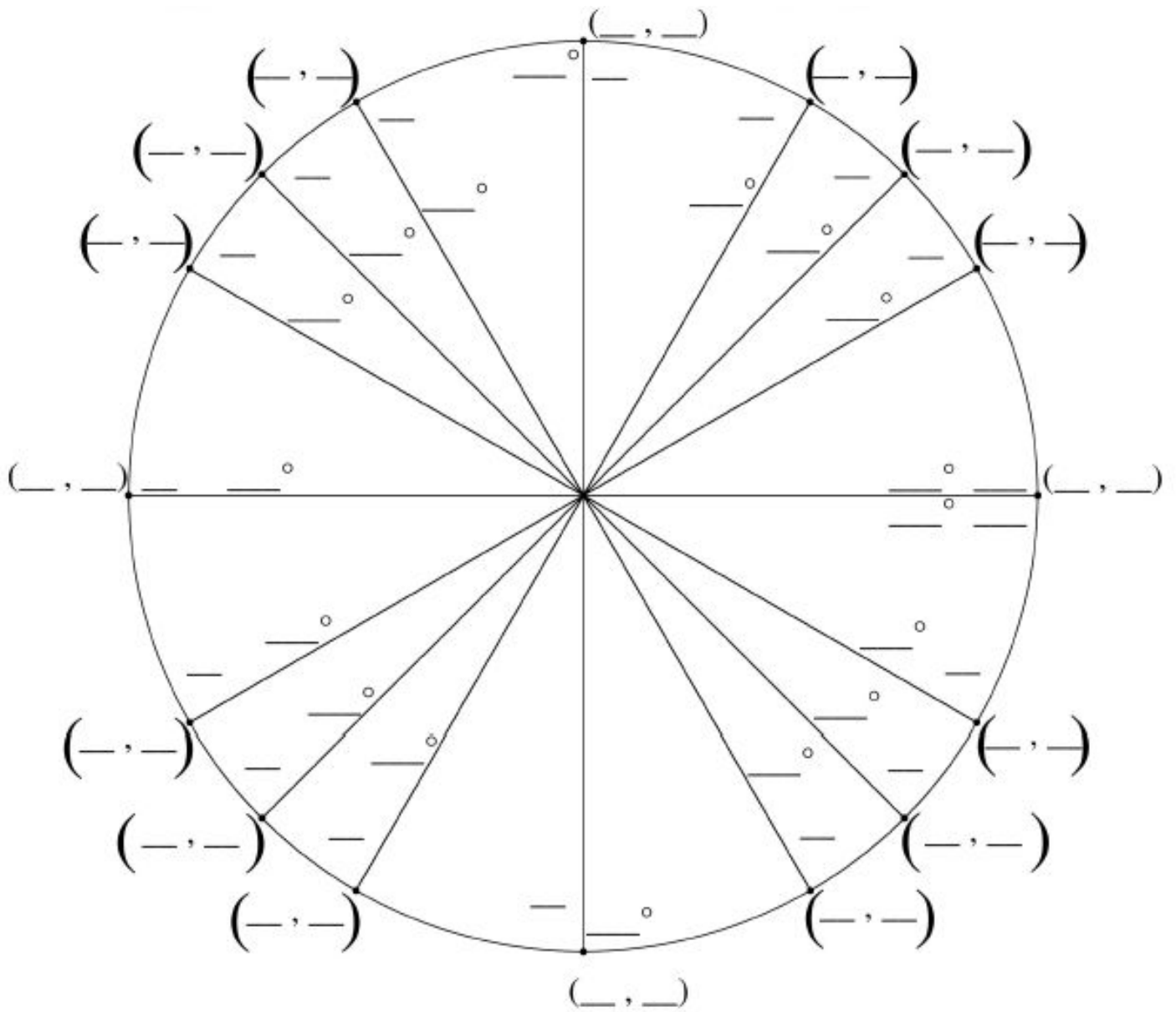
10. A forester is estimating the amount of lumber contained in a tree. When he stands 29 feet away from the tree, the angle to the top of the tree is 55° as measured from his eye-level height, 5 feet above the ground. What is the height of the tree?

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° and to the bottom of the window is 60°. What is the height of the window?

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

7.4 - Unit Circle

Complete the unit circle.

Determine the exact value of each:

1. $sin225^o$

2. $cos150^o$

3. $tan60^o$

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

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

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

7. $tan90^o$

8. $cos\pi$

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

10. $sin2\pi$

11. $cos-30^o$

12. $sec585^o$

13. $cot180^o$
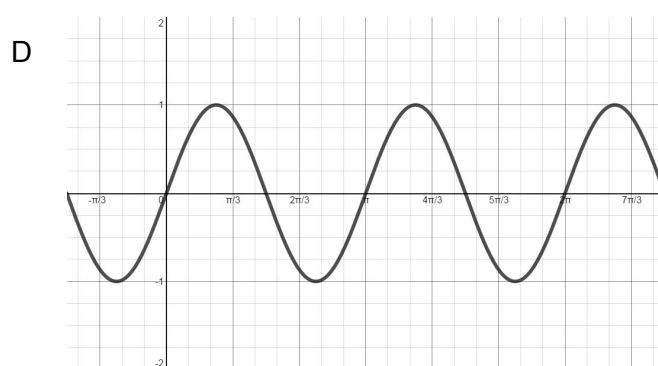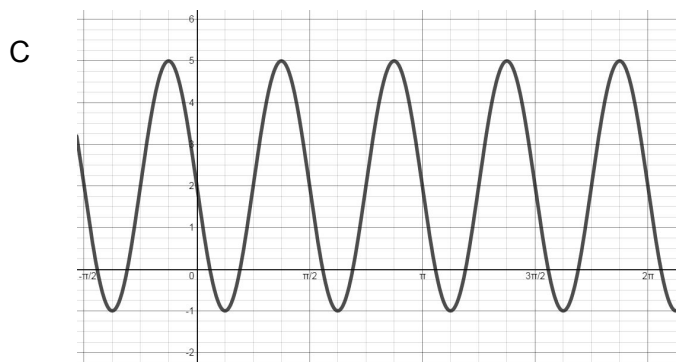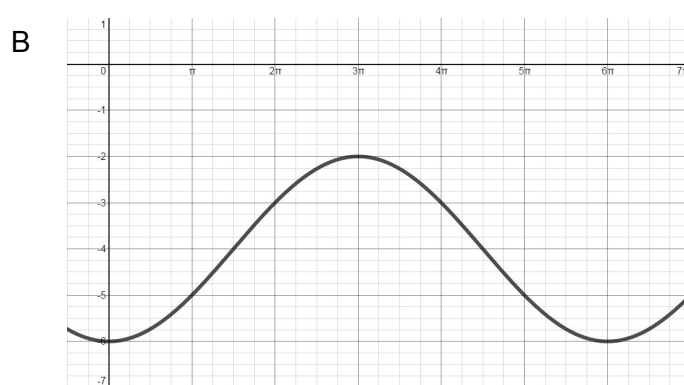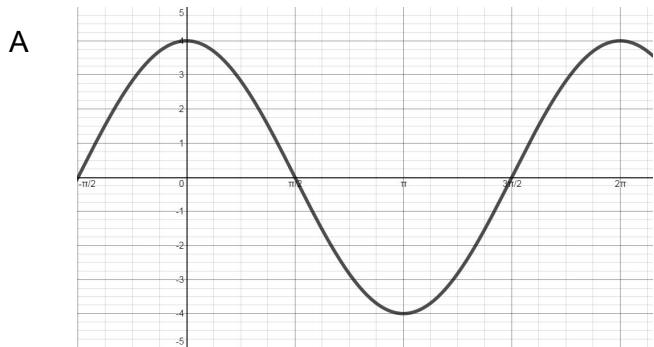
14. $sin\frac{\pi}{2}$

15. $cos270^o$

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.

A

B

C

D

	Amplitude	Period	Vertical Shift	Equation
A				
B				
C				
D				

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

1. $y = -4\cos4x + 7$

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. $y = -2\cos8x - 4$

Amplitude:_____

Period:_____

Vertical Shift:_____

6. $y = -\sin3x + 1$

Amplitude:_____

Period:_____

Vertical Shift:_____

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 the models the movement of the leaf in relationship to the equilibrium point.