

\*\* Marks calculator OK

**Chapter 4.1-4.3, 5.5, 5.6 (Right triangle and unit circle trig., Law of Sines and Cosines)**

1. Find the exact values of each:

a)  $\sin 300^\circ$

b)  $\cot \frac{7\pi}{6}$

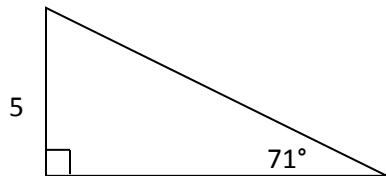
c)  $\sec 225^\circ$

d)  $\tan \pi$

e)  $\csc \frac{\pi}{2}$

f)  $\tan \frac{5\pi}{3}$

\*\*2. Solve for missing angles and sides of the triangle:



3. Convert 108 degrees to radians.

4. Convert 10 radians to degrees.

5. Evaluate the six trig. functions if point P (-8, 3) is on the terminal side of an angle  $\theta$ .

6. Find  $\sin \theta$  and  $\cot \theta$  if  $\cos \theta = \frac{3}{7}$  and  $\tan \theta < 0$ .

\*\*7. Determine if the triangle has 0, 1, or 2 possible triangles:

a)  $m\angle C = 40^\circ, a = 8, c = 4$

b)  $m\angle H = 50^\circ, a = 12, h = 10$

\*\*8. Solve the triangle and find the area of the triangle:

a)  $A = 88^\circ, b = 6, c = 7$

b)  $t = 9, a = 4, c = 6$

**Sections 4.4, 4.5, 4.7 (Trig Graphs, Inverse Trig)**

9. Sketch the following graphs and describe their characteristics:

a.  $y = 2 - 4 \cos x$

b.  $y = 5 \tan 2x$

10. For the equation  $y = -5 \sin \frac{\pi}{3} \left( x + \frac{\pi}{4} \right) - 9$ , find the amplitude, vertical shift, period and phase shift.

11. \*\*A Ferris wheel 32 feet in diameter makes one revolution every 40 seconds. If the bottom of the wheel is 6 feet above the ground, write the equation to model the path of the rider on the wheel. Then, use the equation to find the first three times a rider is 25 feet above the ground (assume he gets on at the bottom).\*\*

12. Find the following (give answers in radians):

$\sin^{-1} \left( \frac{-\sqrt{3}}{2} \right)$

$\cos^{-1} \left( \frac{-\sqrt{2}}{2} \right)$

$\tan^{-1}(-\sqrt{3})$

$\cot^{-1}(-1)$

**Chapter 5 (Trig Identities, Solving Trig Equations)**

13. Simplify the following:

a.  $\frac{\cos^2 x + \sin^2 x}{\tan x}$

b.  $\frac{1 + \tan^2 x}{\csc^2 x}$

14. Solve the following over  $[0, 2\pi)$ :

a.  $1 - \sqrt{2} \cos x = 0$

b.  $2 \sin^2 x + \sin x - 1 = 0$

c.  $\sin 2x - \cos x = 0$

d.  $3 \tan^2 x - 1 = 0$

15. Prove the following:

a.  $\csc x - \sin x = \cot x \cos x$

b.  $\cot x(\tan x \sin x + \cos x) = \csc x$

c.  $\frac{\sin x}{1 + \cos x} = \csc x - \cot x$

d.  $\cos 3x = \cos^3 x - 3\sin^2 x \cdot \cos x$

### **Chapter 6 (Vectors, Parametric Equations, Polars, Complex Plane)**

16. Convert the following coordinates from polar to rectangular or from rectangular to polar:

a.  $(3, 30^\circ)$

b.  $(-8, 265^\circ)**$

c.  $(-8, 6)**$

d.  $(5, -4)**$

17. \*\*At the driving range, a golf ball is struck from an elevated tee box 8 feet above the ground. The ball was struck with an initial velocity of 180 ft./sec. at an angle of  $38^\circ$  to the horizontal.

a. Write the parametric equations for the flight of the ball.

b. Find when and where the ball will be at its highest point.

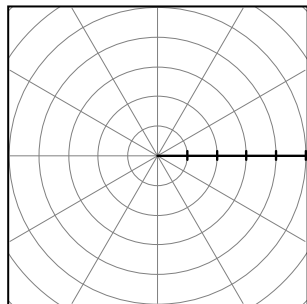
c. Determine when and where the ball will strike the ground.

18. \*\*Find the component form of a vector with a magnitude of 350 and a direction angle of  $140^\circ$ .

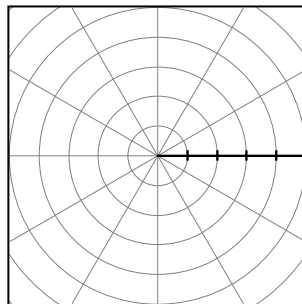
19. \*\*Find the direction angle and magnitude of a vector with a component form  $\langle -90, 68.5 \rangle$ .

20. Graph the following polar equations.

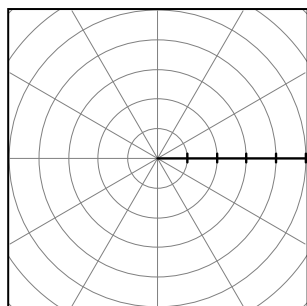
a.  $r = 2 - 3\sin\theta$



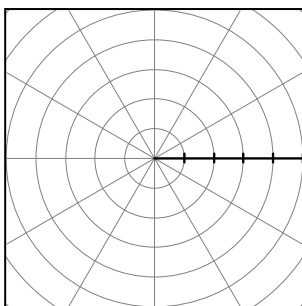
b.  $r = 5\sin(2\theta)$



a.  $r = 2 + 2\cos\theta$



b.  $r = -3\cos\theta$



21. Write the equation to match the polar described below:

- a. Write the equation of a limaçon that has x-intercepts at 4 and -4, and y-intercepts at 5 and -3.

- b. Write the equation of a circle that lies on the negative y-axis, with y-intercepts of 0 and -10.

22. Eliminate the Parameter:  $x = 2t^2 + 3$ ;  $y = t - 1$

23. Use De Moivre's Theorem to simplify  $(2\sqrt{3} - 2i)^4$ . Express your answer in standard form.

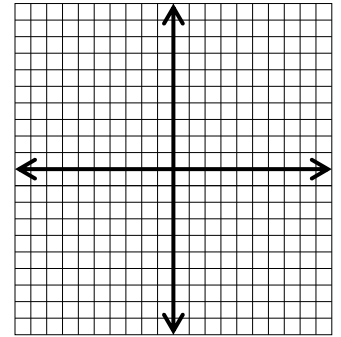
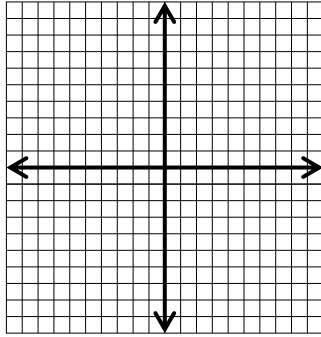
## Conics

24. Convert the following parametric equation of a conic section into general form:  $x = 2 + 3 \cos t$   
 $y = 4 + 6 \sin t$

25. Determine the shape of the conic section and identify all important information before graphing. (If necessary, convert the following equations into general form by completing the square.)

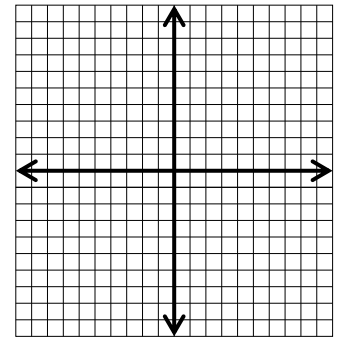
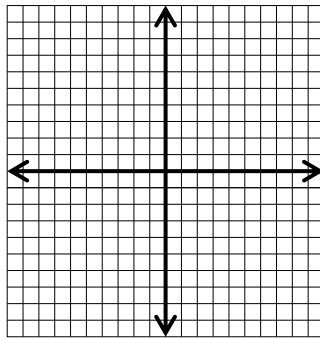
a.  $x^2 - 6x + y^2 + 8y - 11 = 0$

b.  $y^2 + 4y - 4x - 8 = 0$



c.  $\frac{(y-3)^2}{9} - \frac{(x+2)^2}{25} = 1$

d.  $x^2 + 2x + 2y^2 - 8y = 7$



26. Find the equation for a parabola with focus at  $(7, 2)$  and directrix  $x = -1$ .

27. Find the equation of an ellipse with foci at  $(-3, -2)$  and  $(1, -2)$  and major axis length = 8.