

Let $u = \langle -4, -1 \rangle$, $v = \langle 1, 3 \rangle$, and $w = \langle -6, -3 \rangle$. Find:

1. $u + 2v - w$

2. Find the component form of a vector AB with $A = (4, -3)$ and $B = (-2, -2)$.

3. Find the magnitude and direction angle of the vector in #2.

4. A ship sails at a bearing of 128 degrees and at a speed of 40 knots. Find the component form of the velocity vector of the ship.

Eliminate the parameter and identify the type of graph it is.

5. $x = 2t^2 + 3$, $y = t - 1$

6. $x = 3\cos t$, $y = 3\sin t$

Find a parametrization for each. Be sure to state the limits on T.

7. The line *segment* through points (-5, 5) and (1, 3).

8. A circle with radius of 6 and center at (4, 5).

9. Stewart shoots an arrow straight up from the top of a building with initial velocity of 245 ft/sec. The arrow leaves from a point 200 feet above the ground.

a) Write parametric equations to model the height of the arrow. (Make X = some #)

b) How high is the arrow after 4 seconds? (round to the hundredth)

c) What is the maximum height of the arrow? When does it reach that height?

d) When will the arrow hit the ground?

10. Junior practices kicking field goals 40 yards from a goal post with a crossbar that is 10 feet high. If he kicks the ball with an initial velocity of 60 feet per second at a 47 degree angle with the ground, will he make a field goal (clear the cross bar)? (Write parametric equations and use your calculator to graph.)

Football:

X = _____

Y = _____

Cross Bar:

X = _____

Y = _____

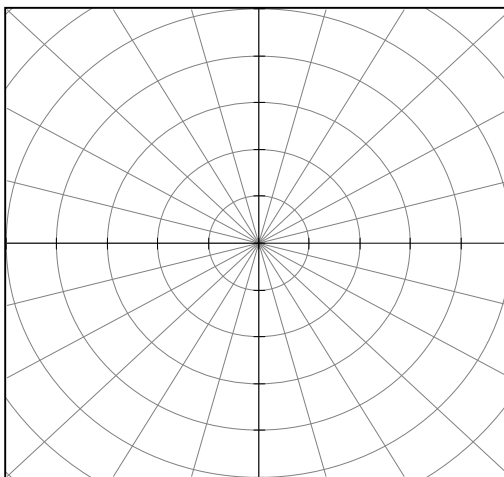
11. Plot the points on the polar grid. Label all points.

A) $(3, \frac{\pi}{3})$

B) $(1, -135^\circ)$

C) $(-3, 330^\circ)$

D) $(-5, -\frac{3\pi}{2})$



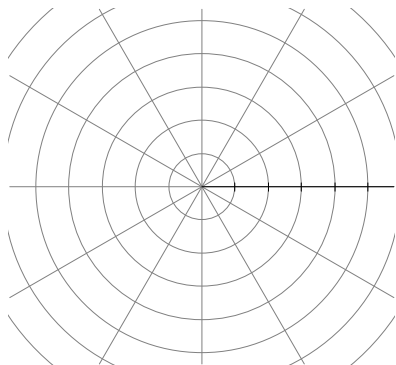
12. Change $(-3, 3)$ to Polar Coordinates. Give two answers – one with a positive r and one with a negative r . (NO CALC!)

13. Change $(2, -5)$ to Polar Coordinates. Give two answers – one with a positive r and one with a negative r . (CALC OK!)

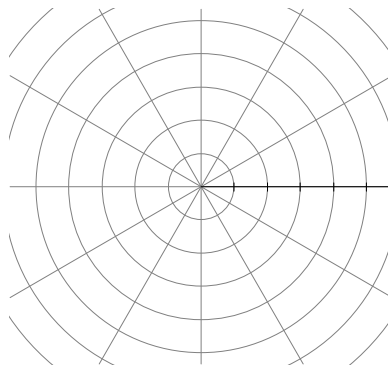
For questions 14 - 20, identify each of the following as a line, circle, rose, cardioid, or limaçon. Then graph each equation.

DO NOT USE A CALCULATOR!!

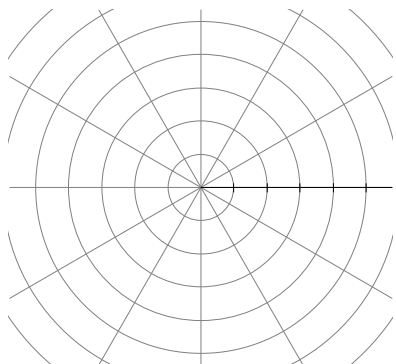
14) $r(\theta) = 4 + 4\sin\theta$



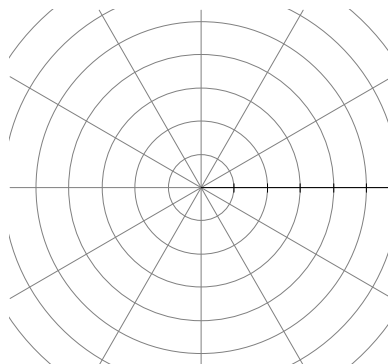
15) $\theta = \frac{\pi}{6}$



16) $r(\theta) = 1 - 3\cos\theta$



17) $r(\theta) = 4\cos 5\theta$



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

19) Write the equation of a rose with 8 petals, length 2, the first one placed at 22.5° .

20) Write the equation of a circle that lays on the negative y-axis, with y-intercepts of 0 and -10.