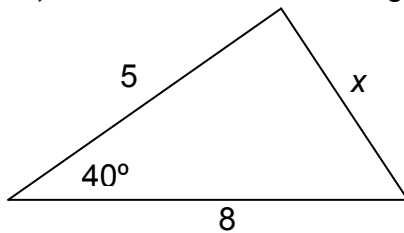


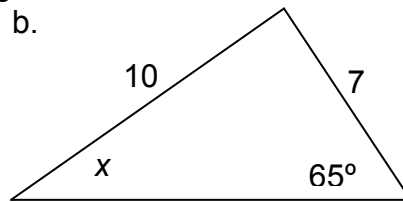
SHOW ALL WORK: Answers without adequate justification may not receive full credit. Give exact answers wherever possible.

1) (8pts) For each of the following triangles, solve for x

a.



b.



2) (8pts) To find the height of a building, a person measures the angle of elevation to the top of the building to be 76 degrees. Moving 200 feet further from the building, they measure the angle of elevation to be 68 degrees. How tall is the building?

3) (4pts) Convert the Polar point $(r, \theta) = \left(4, \frac{4\pi}{3}\right)$ to a Cartesian point (x, y)

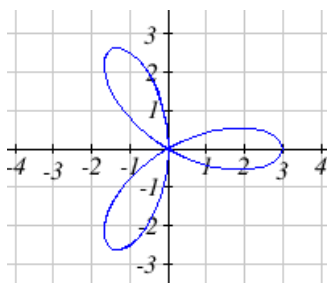
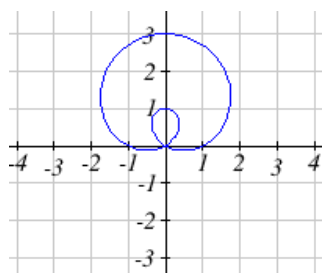
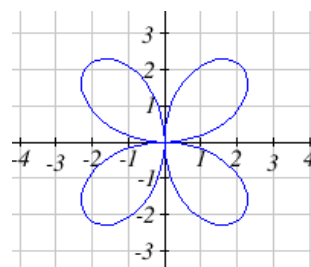
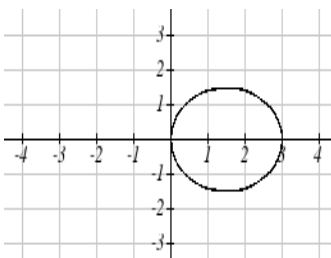
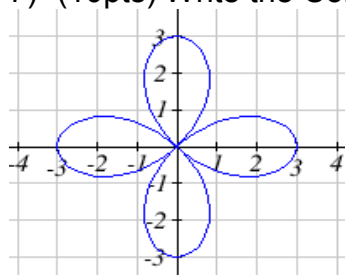
4) (6pts) Convert the Cartesian point $(x, y) = (-6, -8)$ to a Polar point (r, θ)

5) (6pts) Convert the Cartesian Equation $y = 3x + 2$ to a Polar Equation in $r =$ form.

6) (4pts) Convert the Polar Equation $r = \sin^3 \theta$ to a Cartesian Equation.



7) (10pts) Write the Correct letter on the graph.



a. $r = 3\cos(2\theta)$

b. $r = 1 + 2\sin(\theta)$

c. $r = 3\sin(2\theta)$

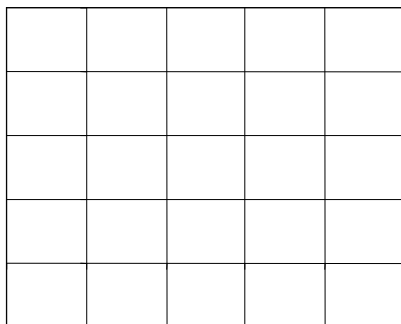
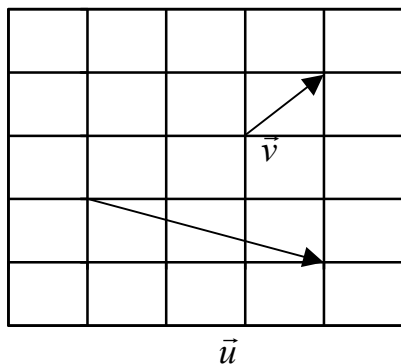
d. $r = 3\cos(\theta)$

8) (8pts) Given $Z_1 = 3 - i\sqrt{5}$ and $Z_2 = 3 + i\sqrt{5}$ find $\frac{Z_1}{Z_2}$. Simplify into $a+bi$ form

9) (10pts) Find $(1 + 2i)^{5/3}$ Write your final answer in $a+bi$ form



10) (3pts) Given the two vectors shown below, sketch $\vec{w} = 2\vec{v} - \vec{u}$

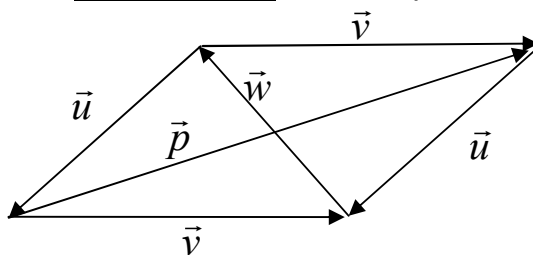


11)(4pts) Given the following vectors write **True or False** for the equations.

a. $\vec{p} + \vec{u} = \vec{v}$

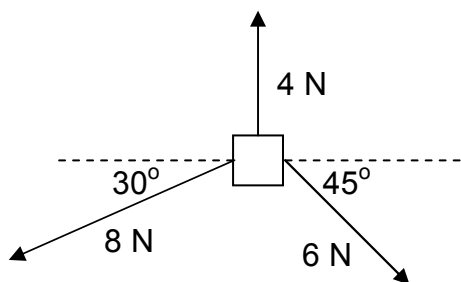
b. $\vec{v} + \vec{w} = -\vec{u}$

c. $\vec{w} + \vec{v} = \vec{u}$



12)(5pts) A fisherman is 7 miles west and 3 miles north of the marina. To head directly back to the marina, what distance and direction must he travel? For the direction, include both angle value and how it is being measured.

13)(7pts) Three forces are acting on an object as shown. Resolve each vector into components to find the total force on the object (the sum of the force vectors). (it is ok to leave the resultant vector in component form)



14)(4pts) Parameterize the curve $x = \tan(y^2)$

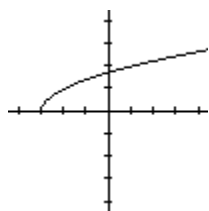
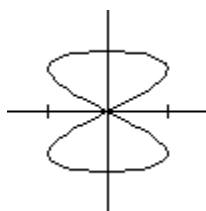
$x(t) =$ _____

$y(t) =$ _____

15)(5pts) Rewrite the parametric equation $x(t) = 4\ln(t)$
 $y(t) = t + 5$ as a Cartesian equation

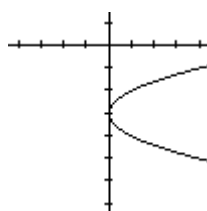
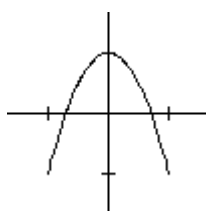


16)(8pts) Match each graph with an equation. Write the Correct letter on the graph.



a. $x = t - 3$
 $y = \sqrt{t}$

b. $x = \sin(t)$
 $y = \cos(2t)$



c. $x = \sin(2t)$
 $y = \cos(t)$

