

Name:

Math 116 Practice Exam 3

December 7, 2010

- 1) a) What are the rectangular (Cartesian) coordinates of the polar point $\left(-5, \frac{4\pi}{3}\right)$?
- b) What is a representation in polar coordinates of the rectangular point $(8, -8\sqrt{3})$?

2) Find the equation of the tangent line to the parametric curve determined by $f(t) = \langle \sin(t), \csc(t) \rangle$ at the point $t = \frac{\pi}{6}$.

3) By eliminating the parameter, find a Cartesian equation, i.e. one in x and y , for the following parametric curves.

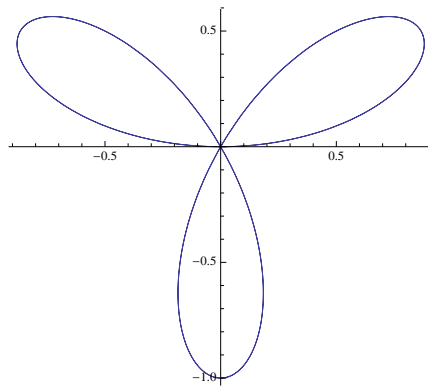
a) $\langle t + 1, \ln(3t) \rangle$

b) $\langle 3 \tan(t), 22 \sec(t) \rangle$

4) a) Set up an equation for the arclength of the parametric curve $f(t) = \langle e^{3t} + e^{-3t}, 6t - 41 \rangle$ from $t = \ln(2)$ to $t = \ln(5)$.

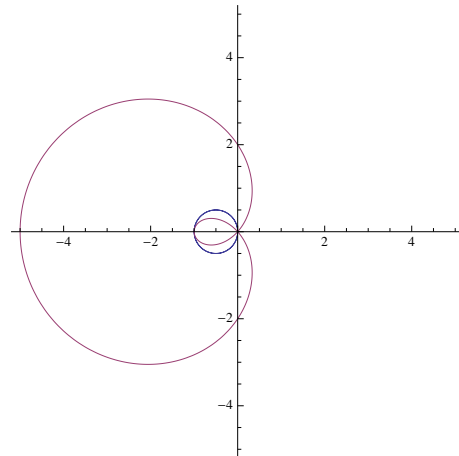
b) Find the arclength of the portion of the curve described in part a).

5) Find the area enclosed by one loop of the polar curve $r = \sin(3\theta)$. Note the graph below.



6) Your goal is to find the area inside the polar curve $r = -\cos(\theta)$ but outside the inner loop of $r = 2 - 3\cos(\theta)$.

a) Shade the area you are interested in in the picture below.



b) Calculate the area.