Name:

Math 116 Exam 3

April 13, 2011

Directions: WRITE YOUR NAME ON THIS EXAM! Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer. DO NOT convert irrational numbers such as $\sqrt{3}$ or π into decimal approximations; just leave them as they are.

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

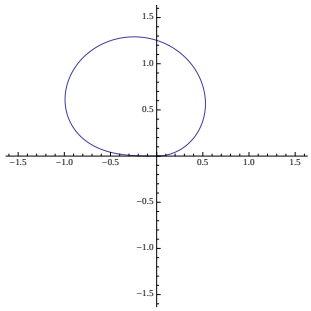
a) (9 points) $x(t) = e^{2t} + 1, y(t) = e^{-4t}$

b) (10 points) $x(t) = -5\cos(\pi t), y(t) = 11\sin(\pi t)$

2) (15 points) Determine the equation of the tangent line to the parametric curve determined by $x(t) = \arctan(t), y(t) = \ln\left(\frac{t}{e\sqrt{3}}\right)$ at the point $t = \sqrt{3}$.

SIMPLIFY ALL NUMBERS IN YOUR ANSWER!

3) Calculate the area inside the polar curve $r = \sqrt{\theta \sin(\theta)}$ from $\theta = 0$ to $\theta = \pi$. See the picture below.



4) Consider the power series $\sum_{n=3}^{\infty} \frac{(2-x)^n}{(n^{1/8})7^n}$.

a) (3 points) What is the center of the series?

b) (12 points) Find the radius of convergence of the series.

5) (12 points) Given that the radius of convergence of $\sum_{n=3}^{\infty} \frac{(2-x)^n}{(n^{1/8})7^n}$ is 7, find the interval of convergence.

6) (12 points) Determine the MacLaurin series for $f(x) = x^2 \cos(-x^3)$.