

Name:

## Math 116 Exam 3

December 9, 2010

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

a) (6 points)  $\langle 9t - 5, -t + 22 \rangle$

b) (7 points)  $\langle 7 \sin(t), 9 \cos(t) \rangle$

**2)** (15 points) Determine the equation of the tangent line to the parametric curve determined by  $f(t) = \langle \ln(5t), \tan(5\pi t/4) \rangle$  at the point  $t = \frac{1}{5}$ .

**3)** a) (7 points) Set up an equation for the arclength of the parametric curve  $f(t) = \langle \cos(6t) + 6 \cos(t), \sin(6t) + 6 \sin(t) \rangle$  from  $t = 0$  to  $t = \frac{\pi}{15}$ .

b) (10 points) Find the arclength of the portion of the curve described in part a). *Hint:*  $\cos(A - B) = \cos(A) \cos(B) + \sin(A) \sin(B)$ .

4) Consider the power series  $\sum_{n=3}^{\infty} \frac{(5x - 15)^n}{\sqrt{n - 2}}$ .

- a) (3 points) What is the center of the series?
- b) (12 points) Find the radius of convergence of the series.

5) Given that the radius of convergence of  $\sum_{n=3}^{\infty} \frac{(5x - 15)^n}{\sqrt{n - 2}}$  is  $1/5$ , find the interval of convergence.