Calculus III Honors Spring 2012
Exam 1 - Practice Problems, Set 1

1. Write down 2 different parametric equations that both describe a circle of radius 1 centered at $(0, 1)$. Also write down a polar equation for the same circle.

2. Write down a polar equation for the line $y = 1$.

3. Graph the curve given by $x(t) = t^3$, $y(t) = \sin(t)$. Find the tangent line at $t = \frac{\pi}{4}$. Find the vertical and horizontal tangents.

4. Using a parametric equation, find the arc length of an arc of angle α on a circle of radius r. Do the same using polar coordinates.

5. Graph the polar curve $r = 1 + \cos(\theta)$. Find the enclosed area.

6. Graph the curve given by $x = t + t^2$ and $y = 1 - t^2$ for $t \geq 0$. Find the area between this curve and the x- and y- axes.