I. Sketch each of the following graphs in polar coordinates and SET UP the integral that finds the arc length:
(for partial credit graph in rectangular coordinates.)

1. $r = 4 - 2\sin\theta$

2. $r^2 = 4\cos 2\theta$

II. Sketch the graphs of the curves described by the parta-metric equations and find a Cartesian equation describing each curve, find arc lenghts, areas and surface areas.

3. $x = 3\sin t$, $y = \cos^2 t$

III. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for each of the following :

4. $x = 3\sin t$, $y = \cos^2 t$

5. $x = 1 + \sin t$, $y = \cos t$

IV. Graph the indicated region and find the areas of each of the following:

6. The region bounded by $r = 1 + \cos(\theta)$ and $r = 1 - \cos(\theta)$

7. The region bounded by $r = \sin(\theta)$ and $r = \cos(\theta)$

8. The region bounded by $r = 2 + 2\sin(\theta)$ and $r = 2$

V. Graph the indicated region and find the tangent at that point and find an expression for the arclength, area and surface area of each of the following:

9. The curve $x = \sqrt{2}\cos(t), y = \sqrt{2}\sin(t))$ for t from $0...\pi$. Find the equation of the tangent line at the point $t = 1$

10. The curve $x = 4 * t^2, y = 3 * t^2 + 5$ for t from $0...2$. Find the equation of the tangent line at the point $t = 1$

Math 1572   Calculus II : Exam 2   4/10/2008
I. Sketch each of the following graphs in polar coordinates :
(for partial credit graph in rectangular coordinates.)

1. $r = 2 - \sin\theta$

2. $r = 2\cos\theta$

II. Sketch the graphs of the curves described by the parametric equations and find a Cartesian equation describing each curve. (2 parts)

3. $x = \sin^2 t$, $y = \cos t$ for $0 \le t \le 2\pi$

III. Find $\frac{dy}{dx}$ and $\frac{d^2 y}{dx^2}$ for the following :

4. $x = 3\sin t$, $y = \cos^2 t$

IV. Graph the indicated region and find the areas of each of the following: (2 parts)

5. The region bounded by

$r = \sin(\theta)$ and $r = \cos(\theta)$

6. The region bounded by $r = 2\sin(\theta)$ and $r = 1$

V. Graph the indicated region and find the tangent at that point and find an expression for the arclength area and surface areaof each of the follwoing:

7. The curve $x = \cos t, y = \sin^2 t)$ for t from $0...\pi/2$(find arclength) Find the equation of the tangent line at the point $t = \pi/4$