problem	1	2	3	4	5	6	7	*total*
scores								

Exam #2, October 26, Calculus II (109), Fall, 2011, W. Stephen Wilson

I agree to complete this exam without unauthorized assistance from any person, materials or device.

Name (signature): _____ Date: _____

Name (print): _____

TA Name and section: _____

NO CALCULATORS, NO PAPERS, NOT MUCH PARTIAL CREDIT, SHOW WORK.
(30 points total)

In case you need them: $\cos(2x) = 2\cos^2(x) - 1 = 1 - 2\sin^2(x)$.

All solutions must be placed in the box provided.

There is an extra page to show work on for each problem.

1. (4 points total) Let $r = 4\cos(\theta) + 2\sin(\theta)$.

Find the maximum r. (1 point)

Find an associated θ. (1 point)

Find the Cartesian coordinates (i.e. (x, y)) for this point. (2 points, 1 each coordinate)

Space for problem # 1.

2. (4 points total) Let $r = 4\cos(\theta) + 2\sin(\theta)$.

Find the x values for the two points the graph crosses the x-axis. (2 points, 1 each)

Find the y values for the two points the graph crosses the y-axis. (2 points, 1 each)

Space for problem # 2.

3. (4 points total) Let $r = 4\cos(\theta) + 2\sin(\theta)$.

This can be a long tedius calculation, easy to make mistakes on. I recommend this for last.

Find the slope of the tangent line to the curve at each of the two points that the curve intersects the x-axis. (2 points, 1 point each) Be sure to specify which point goes with which slope. (2 points, 1 point each)

Space for problem # 3.

4. (4 points total) Let $r = 4\cos(\theta) + 2\sin(\theta)$.

Set up the integral for the area enclosed by the curve, the x-axis, and the y-axis when $0 \leq x$ and $0 \leq y$, (i.e. the first quadrant). (2 points for correct answer, 1 for something close)

Evaluate the integral to find this area. (2 points for correct answer, 1 point for something close)

Space for problem # 4.

5. (4 points total) Let $r = 4\cos(\theta) + 2\sin(\theta)$.

Set up the integral for the length of the curve in the first quadrant, i.e. when $0 \leq x$ and $0 \leq y$. (2 points for correct answer, 1 point for something close)

Evaluate the integral to find this length. (2 points for correct answer, 1 point for something close)

Space for problem # 5.

6. (4 points total) Let $x = \sin(t)$ and $y = t^3 - 3t$.

Find the x and y coordinates for the two points that $\frac{dy}{dx} = 0$. (2 points each, 1 for each coordinate)

Space for problem # 6.

7. (6 points total) Compute $\frac{d^2y}{dx^2}$ in terms of t. (2 points for correct answer, 1 for something close)

There are two local max/min. For each one, identify the point, the value of the second derivative, $\frac{d^2y}{dx^2}$, and state if it is the local maximum or the local minimum. (2 points each)

Space for problem # 7.