Name:_____
SID:_____
Section:_____

Midterm Exam #3-Math 022-F '07
Instructor: Devin Greene

The exam is 50 minutes long. No calculators or notes are permitted. Show your work. You do not need to simplify your answers. The following formula may be of some use:

$$\int \sqrt{1+x^2}\,dx = \frac{1}{2}x\sqrt{1+x^2} + \frac{1}{2}\ln(x+\sqrt{1+x^2}) + C$$

Problem	Score out of 10
1	
2	
3	
4	
5	
Total	

For problems #1-#2, evaluate the integral.

Problem #1

Express the arclength of the curve $y = e^x,\ 0 \le x \le 1$ as an integral. You do not need to evaluate the integral.

Problem #2

Find the area of the surface generated by rotating the curve in Problem #1 around the x-axis.

Problem #3

Let *C* be the curve traced out by the parametric equations $x = t^3 + t, y = t^3 + t^2 + t$.

a) Find all the points on *C* where the tangent line has slope 1.
b) At how many points does *C* intersect the line $y = x$?

Problem #4

Sketch the curve given by the polar equation $r = |\sin\theta|$.

Problem #5

Decide which of the following parametric equations represents the curve below. **Incorrect choices with zero explanation will lead to 0 points for this problem and a deduction of 2 points from the rest of the exam.**

a) $x = \cos 2t, y = \cos t$

b) $x = \sin t, y = \cos 2t$

c) $x = \sin(10t), y = \arctan(t)$

d) $x = e^t, y = e^{2t}$