NAME: SOLAR ID:

RECITATION: LECTURE:

Problem	1	2	3	4	Total
Score					
Total Score	20	20	20	20	80

MAT 132 - Calculus II, Midterm 1

March 2nd, 2011

(1) SHOW ALL WORK AND EXPLAIN REASONING WHENEVER POSSIBLE TO GET FULL CREDIT; A CORRECT ANSWER WITH INCORRECT OR NO JUSTIFICATION **will not get credit**.

(2) YOU HAVE 90 MINUTES TO COMPLETE THIS EXAM.

(3) YOU MAY NOT USE ANY BOOK, NOTES, CALCULATORS. OR ELECTRONIC DEVICES.

(4) CROSS OUT THE WORK YOU DO NOT WANT TO BE GRADED.

(5) SQUARE OR HIGHLIGHT YOUR FINAL ANSWERS.

Table of Integrals

$$\int x^n dx = \frac{1}{n+1}x^{n+1}, n \neq -1. + C$$

$$\int e^x dx = e^x + C$$

$$\int \sec x \tan x dx = \sec x + C$$

$$\int \sin x dx = -\cos x + C$$

$$\int \frac{1}{x} dx = \ln x + C$$

$$\int \csc^2 x dx = -\cot x + C$$

$$\int \cos x dx = \sin x + C$$

$$\int \frac{1}{1+x^2} dx = \tan^{-1} x + C$$

$$\int \sec^2 x dx = \tan x + C$$

$$\int \csc x \cot x dx = \csc x + C$$

(1) Evaluate each of the following indefinite integrals. Each is worth 5 points.

(a) $\int \frac{x^2-2x+1}{x^3+x}$dx.

(b) $\int \cos^3(x)\sin(x)$dx.

(c) $\int (x^2+16)^{-3/2}$dx.

(d) $\int e^x \cos x$dx EXTRA CREDIT: $\int e^{2x}\cos(e^x)$dx

(2) For each of the following improper integrals:

(i) determine whether or not it converges.

(ii) Evaluate those that converge.

(a) $\int_0^4 x(16-x^2)^{-3/2}$dx.

(b) $\int_1^\infty \frac{\ln(x)}{x}$dx. (CORRECTED)

(3) The curves $y = x^3 - 6x^2 + 8x$ and $y = x^2 - 4x$ bounds two regions in the plane. Denote by R the region containing the point $(1, 0)$. (NOTE: There was a previous version of this sample exam asking for the area of the two regions. You "use" the two regions problem as extra credit).

(a) Express the area of R as a definite integral.

(b) Evaluate the definite integral of part (a).

(4) The region bounded by the curves $y = x^2$ and $x = y^2$ is rotated about the x axis.

(a) Express the volume of the solid generated as a definite integral.

(b) Compute the volume.