Mathematics 181D **Spring 2008**

Exam 3

March 27, 2008

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Name

Technology used: ____________________________________ **Only write on one side of each page.**

- Show all of your work. Calculators may be used for numerical calculations and answer checking only.

Do any six (6) of the following problems

1. Evaluate
$$\int \tan^5(2t)\sec^4(2t)\ dt$$

2. Use the method of partial fractions to evaluate
$$\int \frac{x^3+2}{4-x^2}\ dx$$

3. Use a substitution to change the following integral into one you can find in the integration table. Then evaluate the integral.
$$\int \frac{dt}{\tan(t)\sqrt{4-\sin^2(t)}}$$

4. Evaluate (be careful)
$$\int_{-2}^{0} \frac{dy}{(y+1)^{6/5}}$$

5. Do **both** of the following.

   (a) The infinite region bounded by the coordinate axes and the curve $y = -\ln(x)$ in the first quadrant is revolved about the x-axis to generate a solid. Express the volume of this solid as a sum of improper integrals each of which has exactly one impropriety which occurs at a limit of integration.

   (b) Use the integration table to evaluate at least one of these improper integrals.

6. Evaluate **one** of the following

   (a)
$$\int \theta\ \cos(2\theta+1)\ d\theta$$

   (b)
$$\int x^3 e^{x^2}\ dx$$

7. Evaluate
$$\int \frac{dy}{y^2-2y+2}$$

8. Estimate the minimum number of subintervals needed to approximate this integral with an error of magnitude less than 10^{-4} using Simpson's Rule.

$$\int_2^4 \frac{1}{(s-1)^2}\, ds$$