Math 125 G - Winter 2008
Mid-Term Exam Number Two
February 28, 2008

Name: _____ Section: _____

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
Total	60	

- Complete all questions.
- You may use a calculator, and you should have one, during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- You may use one double-sided, hand-written, 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 80 minutes to complete the exam.

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1. Evaluate the following integrals.

(a) $\displaystyle\int \frac{x}{x^2+4x-5}\,dx$

(b) $\displaystyle\int \frac{dx}{x\sqrt{4-2x^2}}$

2. Evaluate the following integrals.

(a) $\int e^x \cos(3x)\, dx$

(b) $\int \tan^4 x \sec^4 \, dx$

3. Evaluate the following integrals.

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

(b) $\displaystyle\int \frac{dx}{(7+6x-x^2)^{3/2}}\,dx$

4. Evaluate the following improper integrals.

(a) $\displaystyle\int_{-\infty}^{\infty} \frac{|x|}{(x^2+1)^{3/2}}\,dx$

(b) $\displaystyle\int_{0}^{1} x^2(\ln x)^2\,dx$

5. Consider the work done to lift all the liquid in a conical tank to the top of the tank. Consider two orientations of the same tank:

   (a) The tank's axis is vertical, and the base is above the vertex (i.e., the pointy bit)

   (b) The tank's axis is vertical, and the vertex is above the base.

   Show that, for any shaped cone, the work done in case (b) is three times the work done in case (a).

6. Find all values of p such that the average value of the function $f(x) = x^p$ on the interval $0 \leq x \leq 1$ is p.