Math 125 H - Winter 2010
Mid-Term Exam Number Two
February 25, 2010

Name: _____

Student ID number: _____   Section: _____

1	20	
2	20	
3	20	
4	10	
5	10	
Total	80	

- Complete all questions.

- You may use a scientific calculator during this examination; graphing calculators and other electronic devices are not allowed and should be turned off for the duration of the exam.

- If you use trial-and-error, a guess-and-check method, or numerical approximation when an exact method is available, you will not receive full credit.

- 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) $\int \dfrac{\sqrt{x}}{x-9}\,dx$

(b) $\int \dfrac{\tan^5 x}{\sec^8 x}\,dx$

2. Evaluate the following integrals.

(a) $\int \dfrac{x+3}{(x+1)(x+2)^2}\,dx$

(b) $\int \dfrac{x^5}{\sqrt{1-x^2}}\,dx$

3. Evaluate the following integrals.

(a) $\int x^2 \ln(x^2 + 1)\, dx$

(b) $\int \dfrac{x}{\sqrt{2 + 2x - x^2}}\, dx$

4. Evaluate the following integral.

$$\int_1^\infty \frac{dx}{x\sqrt{x^2+1}}$$

5. Consider a hemispherical bowl filled with a liquid.

   (a) Express the work required to empty the bowl (by lifting all of the liquid to the top of the bowl and over the edge) in terms of the radius of the bowl, the density of the liquid, and the acceleration due to gravity.

   (b) By what factor does the work in part (a) increase if the radius of the bowl is doubled?