Math 125 - Fall 2009
Exam 2
November 19, 2009

Name: _____

Section: _____

Student ID Number: _____

1	10	
2	10	
3	13	
4	7	
5	10	
Total	50	

- SHOW ME YOUR WORK AND SHOW ME WHAT YOU KNOW! If you are stuck on a problem or integral, show me some of the methods you know. Don't leave anything blank.

- You are allowed to use a scientific calculator (**NO GRAPHING CALCULATORS**) and one **hand-written** 8.5 by 11 inch page of notes. Put your name on your sheet of notes and turn it in with the exam.

- Check that your exam contains all the problems listed above.

- Unless otherwise indicated, give your final answers in exact form or as a decimal correct to two digits after the decimal.

- **Guess and check methods are not sufficient, you must use appropriate methods from class. You must give an explain of where your answers are coming from to get full credit.**

- If you need more room, use the backs of the pages and indicate to the grader that you have done so.

- Raise your hand if you have a question.

- You have 80 minutes to complete the exam.

GOOD LUCK!

1. (10 points)

   (a) Evaluate $\int \dfrac{2x+1}{x^2+3x-10}\,dx.$

   (b) Evaluate $\int_1^9 \sqrt{x}\ln(x)\,dx.$

2. (10 points)

(a) Evaluate $\int \dfrac{\sin^2(x)\tan(x)}{\sec(x)}\, dx$.

(b) Evaluate $\int \dfrac{1}{\sqrt{x^2 - 2x - 8}}\, dx$.

3. (13 points)

(a) Evaluate $\int \dfrac{\ln(x)\cos(3\ln(x))}{x}\,dx$.

(b)   i. Evaluate $\displaystyle\int_1^4 x\sqrt{x^2-1}\,dx$.

   ii. Using $n=4$ subdivisions, give the Simpson's Rule approximation for the same integral $\displaystyle\int_1^4 x\sqrt{x^2-1}\,dx$. How many digits (after the decimal) is this approximation accurate?

4. (7 points) A student finds if she studies for x hours for an exam, the percentage score she gets is given by $f(x) = \dfrac{100x}{x+1}$.

(For example, if she studies for 4 hours, she will get a grade of $f(4) = \dfrac{100(4)}{(4)+1} = 80$ percent).

(a) Find the average value of this function on the interval $[4,10]$.

(b) How many hours would she need to study to get exactly the average percentage score value from part (i)? (Give your answer accurate to two digits after the decimal).

5. (10 points) For both questions below, give the correct units for your final answer.

   (a) A well is in the shape of a cylinder of radius 2 feet and depth 10 feet. The well is half full of water. Find the work required to pump all the water up and out of the top of the well. (Remember, the weight of water is 62.5 lbs/ft³.)

   (b) A small rocket is blasting off from the ground. As it burns through fuel, the rocket gets lighter. The weight (force) of the rocket when it is x meters off the ground is given by $F(x) = 40 + 50e^{-x/2}$ in Newtons.
   Find the work done by the rocket in the first 8 meters as it blasts off from the ground.