MATH 126 E
Exam II
May 17, 2011

Name ______________________________

Student ID #______________ Section ______________

HONOR STATEMENT

"I affirm that my work upholds the highest standards of honesty and academic integrity at the University of Washington, and that I have neither given nor received any unauthorized assistance on this exam."

SIGNATURE:______________________________

1	9	
2	7	
3	10	
4	12	
5	12	
Total	50	

- Your exam should consist of this cover sheet, followed by 5 problems. Check that you have a complete exam.
- Show all work and justify your answers.
- Unless otherwise indicated, your answers should be exact values rather than decimal approximations. (For example, $\frac{\pi}{4}$ is an exact answer and is preferable to its decimal approximation 0.7854.)
- You may use a scientific calculator and one 8.5×11-inch sheet of handwritten notes. All other electronic devices (including graphing calculators) are forbidden.
- The use of headphones or earbuds during the exam is not permitted.
- There are multiple versions of the exam, you have signed an honor statement, and cheating is a hassle for everyone involved. DO NOT CHEAT.
- Turn your cell phone OFF and put it AWAY for the duration of the exam.

GOOD LUCK!

1. (9 points) Compute the indicated partial derivative of

$$f(x,y) = \sin\left(\frac{y^4}{\sqrt{x}}\right).$$

You do not need to simplify your answers.

(a) $f_x(x,y) =$

(b) $f_y(x,y) =$

(c) $f_{yy}(x,y) =$

2. (7 points) Consider the integral

$$\int_0^1 \int_{\sqrt{x}}^{5-4x} g(x,y)\,dy\,dx.$$

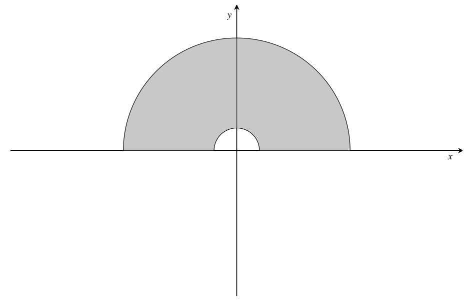
Sketch the region of integration and change the order of integration. (Note that, since you do not have a formula for $g(x,y)$, you are not expected to compute this integral.)

3. (10 points) Use linear approximation to estimate the value of $\dfrac{4.01^2}{0.99^3 + 1}$.

4. (12 points) Find all critical points of

$$f(x,y) = 4x^3 + xy^2 + 3x^2 + y^2 + 10.$$

Determine whether each critical point gives a local maximum, a local minimum, or a saddle point.



5. (12 points) The boundary of a lamina consists of the semicircles

$$y = \sqrt{1 - x^2} \text{ and } y = \sqrt{25 - x^2}$$

and the portions of the x-axis that join them, as shown:

The density of the lamina at any point is inversely proportional to its distance from the origin. That is, there is a constant k such that, the density of the lamina at the point (x, y) is

$$\rho(x, y) = \frac{k}{\sqrt{x^2 + y^2}}.$$

Find the center of mass of the lamina. Put a box around your final answer.

(You may use the fact that, by symmetry, the center of mass is on the y-axis.)