

MATH 126 A & B  
Exam II  
May 17, 2012

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	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- Your exam should consist of this cover sheet, followed by 5 problems. Check that you have a complete exam.
- Pace yourself. You have 50 minutes to complete the exam and there are 5 problems. Try not to spend more than 10 minutes on each page.
- Unless otherwise indicated, show all your 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. (10 points) Find the point  $(x, y, z)$  on the curve defined by

$$\mathbf{r}(t) = \left\langle \frac{1}{3}t^3 + 16t, 10t^2, t^5 \right\rangle$$

at which the normal plane is parallel to the plane  $x - 2y + 4z = 17$ .

2. (10 points) Approximate the value of  $f(3.05, 4.05)$  if you know the following:

$$f(3, 4) = 10, \quad f_x(3, 4) = -2, \quad f_y(3, 4) = 5.$$

3. (10 points) Find and classify all critical points of

$$f(x, y) = xye^{-x-y}.$$

4. (10 points) A region  $D$  in the  $xy$ -plane is bounded by the lines  $y = \sqrt{\frac{\pi}{3}}$ ,  $y = \sqrt{\pi}$ ,  $y = 2x$ , and  $y = \frac{x}{4}$ . Sketch the region and compute  $\iint_D \sin y^2 dA$ .

5. (10 points) A lamina in the shape of the shaded region below is bounded by the  $y$ -axis, the circles  $x^2 + y^2 = 1$  and  $x^2 + y^2 = 16$ , and the line  $y = \frac{x}{\sqrt{3}}$ . The density of the lamina at  $(x, y)$  is given by  $\rho(x, y) = \frac{x}{\sqrt{y}}$ . Compute the mass of the lamina.

