MATH 126 C & D Exam II November 24, 2009

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:

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	Total	50	

- Your exam should consist of this cover sheet, followed by five 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.
- Turn your cell phone OFF and put it AWAY for the duration of the exam.
- There are multiple versions of this exam. Save yourself the hassle of a hearing before the Faculty Council on Academic Conduct: do not cheat.

GOOD LUCK!

1. (10 points) Suppose a particle moves with position vector

$$\mathbf{r}(t) = t^2 \mathbf{i} + (e^{t-2} - 3t) \mathbf{j} + (\frac{1}{2}t^2 + 4t) \mathbf{k}.$$

(a) Compute the tangential and normal components of the particle's acceleration vector at t = 2.

(b) Find the equation of the normal plane to $\mathbf{r}(t)$ at t = 2.

- 2. (10 points) Let $f(x, y) = e^{-xy} \cos y$.
 - (a) Compute $f_{yx}(x,y)$.

(b) Find the equation of the plane tangent to f(x, y) at $(\pi, 0)$.

(c) Use linear approximation to approximate f(3.15, 0.001). (Give an exact answer and a decimal approximation, giving at least **four** digits after the decimal.)

- 3. (10 points) Let $g(x,y) = \frac{1}{2}x^2 + xy 3x + \frac{1}{3}y^3 3y$.
 - (a) Find and classify all critical points of g(x, y).

(b) What is the smallest value of the function g(x, 0)?

4. (10 points) Evaluate the integral

$$\int_0^{\sqrt{\pi/2}} \int_x^{\sqrt{\pi/2}} \cos(y^2) \, dy \, dx.$$

5. (10 points) Evaluate the integral

$$\iint\limits_D \frac{xye^x}{(x^2+y^2)^{3/2}} \, dA,$$

where $D = \{(x, y) : x^2 + y^2 \le 9, x \ge 0, y \ge 0\}.$