Math 212 Spring 2015

Quiz **4** MULTIVARIABLE CALCULUS

**Name**: ______________________________ Assigned: **Friday February 13**

Due: **Wednesday February 18**

Time Begun: ____________________

Time Ended: ____________________ **Prof. Ron Buckmire**

## Topic : Application of Partial Derivatives

The idea behind this bonus quiz is to provide you with an opportunity to illustrate your understanding of partial derivatives of multivariable functions and how to use them in certain situations.

## Reality Check:

EXPECTED SCORE : __________**/10** ACTUAL SCORE : __________**/10**

## Instructions:

1. Once you open the quiz, you have **30 minutes** to complete, please record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one. QUIZZES WITH UNSTAPLED SHEETS WILL NOT BE GRADED.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Relax and enjoy...
7. **This quiz is due at the beginning of class on Wednesday February 18.**
   NO LATE OR UNSTAPLED QUIZZES WILL BE ACCEPTED FOR GRADING.

**Pledge:** I, ____________________, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

**1.** Consider the function

$$f(x,y) = e^{\sin(x)\cos(xy)}$$

Our goal in this problem is to find the equation of the tangent plane to this surface at the origin.
**(a)** (*4 points*) Find the partial derivatives $f_x(0,0)$ and $f_y(0,0)$.

**(b)** (*3 points*) Show that the equation of the tangent plane to our given function $f(x,y)$ at the origin $(0,0)$ is $z = 1 + x$. [HINT: The tangent plane to a function $f(x,y)$ at a point $(a,b)$ is given by the formula $z = P(x,y) = f(a,b) + f_x(a,b)(x-a) + f_y(a,b)(y-b)$.]

**(c)** (*3 points*) Sketch 2-dimensional graphs of what the tangent plane to $f(x,y)$ at $(0,0)$ looks like in the (i) $xy$-plane with $z = 0$ (ii) $xz$-plane with $y = 0$ and (iii) $yz$-plane with $x = 0$. CLEARLY INDICATE WHICH OF THESE GRAPHS REPRESENT A GRAPH OF A CROSS-SECTION AND WHICH REPRESENTS A GRAPH OF A LEVEL SET.