Math 212 Fall 2005

Quiz **8** **Multivariable Calculus**

Name: ____________________________

Date: ____________________ **Friday November 4**
Time Begun: ____________________ Ron Buckmire
Time Ended: ____________________

Topic : The Method of Lagrange

The idea behind this quiz is to provide you with an opportunity to illustrate your ability to use Lagrange multipliers to solve a constrained multivariable optimization problem.

Reality Check:

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

Instructions:

0. Please look for a hint on this quiz posted to `http://faculty.oxy.edu/ron/math/212/05/`
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.
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 on Monday November 7, in class**. NO LATE QUIZZES WILL BE ACCEPTED.

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.

Math 212 Fall 2005 **SHOW ALL YOUR WORK** Quiz **EIGHT**

1. Our goal is to find the coordinates of the points on the surface given by $f(x, y, z) = z^2 - xy - 1 = 0$ closest to the origin and compute this minimum distance. You can solve this problem by minimizing the expression for the square of the distance between the origin $(0, 0, 0)$ and any point (x, y, z) in $\mathbb{R}^3$.

(a) (*5 points*) Write down **ALL** the equations which you will need to solve the problem using the Method of Lagrange.

(b)(*4 points*) Solve the equations from part (a). [HINT: think carefully about how many unknown variables and equations you should have!]

(c) (*1 point*) Write down the coordinates of the points which you found in (b) and the minimized distance they are from the origin.