

**Quiz 6 (10 pts)**  
Math 230, Fall 2008  
Due Monday, October 27

**NAME(1 pt):**

**STUDENT ID NUMBER:**

**SHOW YOUR WORK**

1. (4 pts) Consider the function  $f(x, y) = x^3 + 2y^3 - 3y^2 - 3x - 12y$ .
  - a) Find all critical points of  $f$ .
  - b) Use the second derivative test to classify all critical points of  $f$ .

2.(5 pts) Consider the function  $f(x, y) = x^2 + \frac{1}{2}(y^2 + y)$  defined on the set  $D = \{(x, y) : x^2 + y^2 \leq 1\}$ .

- a) Explain why this function has absolute minimum and absolute maximum.
- b) Find critical points inside  $D$ .
- c) Use Lagrange multipliers method to find critical points on the boundary of  $D$ .
- d) Find absolute minimum and absolute maximum of  $f$  and where it is reached.