Math 173 - Quiz 6

March 31, 2011

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4.5 points) Find all relative extreme points and saddle points.

$$f(x, y) = -x^3 + 4xy - 2y^2 + 1$$

2. (2 points) It is easy to see that any point of the form $(0, b)$ or $(a, 0)$ is a critical point of $f(x, y) = x^2y^2$. However, the second derivative test is inconclusive at each of these points since they give rise to zero determinants. Nonetheless, each point yields a minimum value. How can we be so sure of this?

3. (3.5 points) Use Lagrange multipliers to find the extreme values of $f(x, y) = x^2y$ subject to the constraint $x^2 + y^2 = 1$.