

Math 13 Spring 2010: Exam 2

March 30, 2010

Name:

Instructions: There are 4 questions on this exam each scored out of 8 points for a total of 32 points. You may not use any outside materials(eg. notes or calculators). You have 50 minutes to complete this exam. Remember to fully justify your answers.

Score:

Problem 1. Evaluate the following limits or show that they do not exist.

(a) $\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y}{x+y^2}$

(b) $\lim_{(x,y) \rightarrow (0,0)} \frac{xy}{x^2+y^2}$

Problem 2. Given that $z = f(x^2 + y^2, x^2 - y^2)$.

(a) Compute z_{xy} .

(b) Approximate z at $(x, y) = (1.1, 0.9)$ if $f(2, 0) = 7$, $f_s(2, 0) = 1$, and $f_t(2, 0) = -2$ where $s = x^2 + y^2$ and $t = x^2 - y^2$.

Problem 3. Find and classify the critical points of $f(x, y) = xy - \frac{x^4}{4} - \frac{y^4}{4}$.

Problem 4. Find the maximum and minimum values of $f(x, y) = 4x^2 + 10y^2$ on the disk $x^2 + y^2 \leq 4$.