Quiz 7, Math 53
July 25, 2008

Solutions of all problems must by accompanied by relevant explanations. Show your work, but not to others.

Problem 1. Find the minimum and the maximum value of the function

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

over the set $x^2 + y^2 \leq 1$.

Problem 2. Calculate the integral

$$\int\int_D (1 + \sqrt{1 - x^2})\, dA$$

where D is the region located inside the circle $x^2 + y^2 - 2y = 0$ and below the line $y = x$.