MA104 - Differential Calculus
Homework Assignment 5 - 20 points
Due to Thayer 216 by Tuesday, May 6, 2008 by 1600

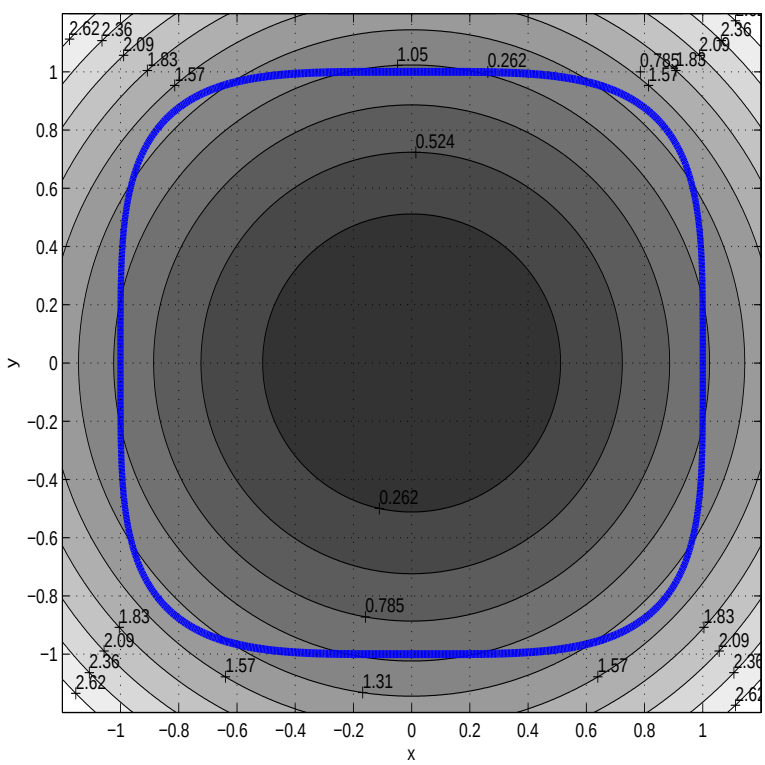
Be sure to show all work to ensure full credit!

1. (10 points) Turn in a complete solution to the "dumpster problem" that we did during PSL 7. This problem is posted on my website, if you lost it.

2. (5 points) Let $f(x, y) = x^2 + y^2$ and $g(x, y) = x^4 + y^4$. Below is a contour plot of the function $f(x, y)$. The bold curve is a graph of $g(x, y) = 1$.

   (a) Use the graph to estimate the points where the extrema occur. Then, plot ∇f and ∇g at these points. (Note: This means you will need to turn in this sheet with your work.)

   (b) Now, use the method of Lagrange multipliers to find the precise maximum and minimum values of $f(x, y)$ subject to the constraint $g(x, y) = 1$. If you use Mathematica to do this, print out your code and comment it or write in your comments/interpretation by hand.



3. (5 points) Complete problem 10 on page 940. (The same Mathematica rules apply as in Problem 2b above.)