LB 220, Sections 001 & 002, Fall 2015
Homework 4 (due 10/9)

Instructions: Please write your solutions to the problems below on a clean piece of paper (not this piece of paper). You will not need more than one page (front and back) to write your answers. Show the steps taken to arrive at each answer. Do not include scratch work, doodles, scribbles, crossed out work, etc.; instead, carefully write your solutions after you have figured out the answers and checked them over.

You may work with other students on homework problems. For this assignment, each student must submit his or her own solution to the first problem. But, for the second problem, you may partner with up to three other students and submit one solution for your group; each student in the group will receive the same score for the second problem.

1. *As with previous homework assignments, this first problem is an exam problem from a previous semester of LB 220.*

   Consider the following function of two variables x and y:

   $$f(x, y) = \frac{\sqrt{2}}{\sqrt{4 - x^2 - 4y^2}}.$$

   Sketch the level curve $f = 1$. Clearly label the axes and the coordinates of the points of intersection of the curve with the axes. Additionally, state what kind of curve this is (e.g. hyperbola). Finally, state the domain and range of f.

2. *As with previous homework assignments, this second problem is more challenging and is designed to strengthen your ability to extend ideas discussed in class and in the textbook to more complex situations.*

   Sketch at least three level curves for each of the following functions. For each function, the level curves should appear on the same graph, each curves should have at least one point's coordinates identified, and each curve should be labeled with the function's value on that curve, e.g. $f = 3$.

   (a) $f(x, y) = |x| + |y|$
   (b) $g(x, y) = \max\{|x|, |y|\}$.