Methods of Calculus Math 1225B, 4th Assignment Due Wednesday July 23rd in class

1. Sketch the level curves of $f(x,y) = \sqrt{25 - x^2 - y^2}$ for the values z = 0, 3, 5, and sketch the graph of this function.

2. Let
$$f(x,y) = \frac{x^2 + e^{xy}}{x^2 + y^3} + \sin(xy^2) + x \ln(xy)$$
. Computes
 $a) \frac{\partial f}{\partial x}, \qquad b) \frac{\partial f}{\partial y}, \qquad c) \frac{\partial^2 f}{\partial x \partial y}, \qquad d) \frac{\partial^2 f}{\partial y \partial x}.$

3. By finding the critical points and using the second derivative test, find the relative extrema of the function

$$f(x,y) = x^{2} + y^{3} - 2xy + 7y - 8x + 23.$$

4. Minimize the function

subject to the constraint $f(x,y) = x^2 + y^2 - xy$, subject to the constraint 2x + y - 14 = 0.