

Name: \_\_\_\_\_

Score: \_\_\_\_\_ /15

## WORKSHEET 2 - CHAPTER 14 (DUE TUES, FEB 24)

Math 2110Q – Spring 2015  
Professor Hohn

You must show all of your work to receive full credit!

1. Sketch both a contour map (graph of level curves) and the graph of the function

$$f(x, y) = 9x^2 + 9y^2.$$

Pick at least three  $k$  values for your contour map (like  $k = 36, 81, 144$ ).

2. The temperature at a point  $(x, y)$  on a flat metal plate is given by  $T(x, y) = 60/(1 + x^2 + y^2)$ , where  $T$  is measured in  $^{\circ}\text{C}$  and  $x, y$  in meters. Find the rate of change of temperature with respect to distance at the point  $(2, 1)$  in (a) the  $x$ -direction and (b) the  $y$ -direction.

3. Let  $z = \ln(e^x + e^y)$ . Verify that the function is a solution of the differential equation

$$\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 1.$$

4. A visitor from planet Zorg tells you that there is a function  $f$  whose partial derivatives are  $f_x(x, y) = x + 4y$  and  $f_y(x, y) = 3x - y$ . Should you believe the visitor? Why or why not?

5. Find  $u_{xy}$  and  $u_{yx}$  where  $u = \ln(x + 2y)$ .