Homework Assignment for Week 10

1. Section 14.6: Problems 1, 9, 13, 19, 25, 33, 39, 45, 63.

   Remark: What problem 63 means is:

   Let $L(x, y) = A(x - x_0) + B(y - y_0) + C$ be a linear function. Show that if $L(x, y)$ satisfies
   $$f(x, y) = L(x, y) + \varepsilon_1(x - x_0) + \varepsilon_2(y - y_0)$$
   (or $f(x, y) = L(x, y) + \varepsilon\sqrt{(x - x_0^2) + (y - y_0)^2}$), where $\lim_{(x,y)\to(x_0,y_0)} \varepsilon, \varepsilon_1, \varepsilon_2 = 0$.

   (In other words, if $z = L(x, y)$ is a tangent plane at $(x_0, y_0, f(x_0, y_0))$.)

   Then we must have
   $$A = f_x(x_0, y_0), \quad B = f_y(x_0, y_0), \quad C = f(x_0, y_0).$$

2. Section 14.7: Problems 1, 19, 39, 51, 55.