Homework Assignment for Week 08

1. Section 14.2: Problems 43, 48, 51, 57, 67.

2. Section 14.3: Problems 19, 21, 27, 51, 60, 65, 70, 81, 91.

3. Show that if $g(x,y) = \varepsilon_1 \cdot (x - x_0) + \varepsilon_2 \cdot (y - y_0)$ as $(x,y) \to (x_0, y_0)$ then $g(x,y) = \varepsilon \cdot \sqrt{(x-x_0)^2 + (y-y_0)^2}$ and vice versa (the converse). Here $\lim\limits_{(x,y)\to(x_0,y_0)} (\varepsilon_1, \varepsilon_2, \varepsilon) = (0,0,0)$.

   Remark: A brief version of the above statement reads:

   Show that $o(1)\cdot\Delta x + o(1)\cdot\Delta y = o(1)\cdot\sqrt{\Delta x^2 + \Delta y^2}$ where the $o(1)$'s refer to $2D$ limits as $(\Delta x, \Delta y) \to (0,0)$.

   Hint: $\sqrt{\Delta x^2 + \Delta y^2} = \frac{\Delta x}{\sqrt{\Delta x^2+\Delta y^2}}\Delta x + \frac{\Delta y}{\sqrt{\Delta x^2+\Delta y^2}}\Delta y$

4. Section 14.4: Problems 1, 7, 10, 21, 24.

   Remark: Quiz on April 18 covers homework 07 and 08.