Homework 1 – Math 104A, Fall 2011
Due on Tuesday, October 4th, 2011

Section 1.1: 1.b, 3.a, 3.d, 4.d, 6 and 13.

Section 1.2: 1, 5, and 12.

Section 1.3: 1, 6, 7, 9, 11, and 16.

Additional problem: Assume that as h approaches zero,

$$F(h) = L + Ch^\alpha + O(h^{\alpha+1})$$

for some $\alpha > 0$. Show that:

$$\frac{2^\alpha F(h) - F(2h)}{2^\alpha - 1} = L + O(h^{\alpha+1})$$

This procedure is called Extrapolation to the limit. What do you think this procedure is good for? Now assume that, as h approaches zero,

$$F(h) = L + C_1 h^2 + C_2 h^3 + O(h^4)$$

Can you obtain an approximation to L of order $O(h^4)$? (*Hint*: Consider $F(h)$, $F(2h)$, and $F(4h)$).