MATH 5610
HOMEWORK #2, DUE TUE SEP 20

Note: Sample Matlab code for the programming part of this assignment (especially for the formatting) is available in the class website.

1. B&F 2.1.6 c,d (Bisection method in Matlab)
2. B&F 2.2.19. Additionally show that the iteration can be obtained by applying Newton's method to a certain polynomial.
3. B&F 2.3.6 a,b and 2.3.8 a,b (Newton's method and Secant method)
4. K&C 3.4.12 Let p be a positive number. What is the value of the following expression?

$$x = \sqrt{p + \sqrt{p + \sqrt{p + \cdots}}}$$

   Note that this can be interpreted as meaning $x = \lim_{n \to \infty} x_n$, where $x_1 = \sqrt{p}$, $x_2 = \sqrt{p + \sqrt{p}}$, etc...

   (**Hint**: You only need to find the fixed point of a certain function. It is not necessary to show that the function is a contraction.)
5. K&C 3.4.25 Prove that the function F defined by $F(x) = 4x(1-x)$ maps the interval $[0, 1]$ into itself and is not a contraction. Prove that it has a fixed point. Why does this not contradict the Contractive Mapping Theorem?
6. B&F 2.4.12 (Proof of theorem 2.12)