Read BF Chapter 2.1, 2.2

Exercises

Chapter 2.1  # 7, 15

Chapter 2.2  # 1, 2, 8, 11a, 16, 17, 19

MATLAB/Octave

1. The Lambert W function is the function $y = W(x)$ so that $W(x)e^{W(x)} = x$. Write a function `wbisect(x)` that computes $W(x)$ using the bisection method for any $x > 0$. (If you want to check your work, matlab has the function `lambertw` built in.)

2. Consider the function $f(x) = \sin(2\pi x) + e^{-x}$. Suppose we are interested in locating the zero of this function near $x = 0.5$ using functional iteration of $g(x) = x + f(x)$.
   
   (a) Print of graph of $g(x)$ on the interval $0 \leq x \leq 3$. Use $x_0 = 0.5$ and draw on your graph the functional iteration $x_{n+1} = g(x_n)$ three times. Does it look like the resulting sequence will converge? If so, will it converge to the root near $x = 0.5$?
   
   (b) Notice that $f(x)$ has the same zeros as $cf(x)$ for any constant $c \neq 0$. Find the root near $x = 0.5$ using functional iteration with an appropriate choice of $c$. 