Assignment #1

Due Monday, 12 September at the start of class

Read subsections 1.1, 1.3, 1.4, and 1.5 of the text[1]. Then do the following exercises:

Page 12, exercise 1.

Page 12, exercise 8.

Page 12, exercise 9.

Page 12, exercise 11ad.

Page 13, exercise 12bc.

Page 13, exercise 13bc.

Page 13, exercise 14.

Page 13, exercise 20.

Page 13, exercise 21.

Page 14, exercise 29.

> The answers to the next two problems are numbers. You can check your work on such problems by using something like *Wolfram alpha* online, but you will get no credit for doing so. In fact, because we are in the business of *understanding* black boxes, and not using them, you will only get credit for explaining how you used basic operations (e.g. $+$, $-$, $\times$, $\div$, $\exp()$, $\sin()$, and so on) to arrive at your approximations. Feel free to write programs using these elementary operations; in such case include the program with your solutions. Otherwise, use a minimal scientific calculator to do elementary operations when needed. In any case, explain the steps by which you get your numbers.

P1. Solve $x^2 = e^{-x}$. Find *all* solutions numerically. Solve accurate to 4 digits, and explain why you believe you have four digits.

P2. Numerically approximate the integral

$$\int_{-1}^{1} \frac{1}{2 + \cos x}\, dx.$$

Again, compute the answer accurate to 4 digits, and explain why you believe you have four digits.

Page 33, exercise 1.

Page 33, exercise 7.

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[1]J. Epperson, *An Introduction to Numerical Methods and Analysis*, rev. ed., 2007.