Numerical Methods, 2018 Spring

Assignment 1
Due in the class on Mar 22

Note: you should explain how you obtain your solution in your submission. If you use MATLAB or any other software to compute your results, you should provide your code and describe your solving process. This is a good practice for you to explain things in a logical, organized, and concise way! **Please hand in your assignment in the class**.

1. (30%) The function $f(x) = 2 * \sin(x) - \dfrac{e^x}{4} - 1$ is zero for two values near $x = -5$. Please compute both roots, starting with $[-7, -5]$ and $[-5, -3]$, to attain an accuracy of 10^{-5} using the following methods: (a) the bisection method (b) the secant method, and (c) Newton's method.

2. (25%) Use Newton's method on the polynomial $P(x) = (x-2)^3(x-4)^2$ with $x_0 = 3$. Does it converge? To which root? Is convergence quadratic?

3. (30%) Exercise 36 of Chapter 1 in the textbook (page 69)

4. (25%) Exercise 47 of Chapter 1 in the textbook (page 71)