

Math 151A

HW #1, due Friday, January 12

- Reading: sections 1.1, 1.3, 1.4 and the matlab code given below (compare with algorithm 2.1. from the textbook, page 47).

- Problems from section 2.1: #1 (with a hand calculator), #2(a) (with a hand calculator), #7(ab), #12, #15 (for the longer calculations, you can use one of the codes posted on the class webpage).

#1 Use the Bisection method to find p_3 for $f(x) = \sqrt{x} - \cos x$ on $[0, 1]$.

#2(a) Let $f(x) = 3(x + 1)(x - \frac{1}{2})(x - 1)$. Use the Bisection method on the following intervals to find p_3 :

(a) $[-2, 1.5]$

#7

(a) Sketch the graphs of $y = x$ and $y = 2 \sin x$.

(b) Use the Bisection method to find an approximation to within 10^{-5} to the first positive value of x with $x = 2 \sin x$.

#12 Find an approximation to $\sqrt{3}$ correct to within 10^{-4} using the Bisection Algorithm (hint: consider $f(x) = x^2 - 3$).

#15 Find a bound for the number of iterations needed to achieve an approximation with accuracy 10^{-4} to the solution of $x^3 - x - 1 = 0$ lying in the interval $[1, 2]$. Find an approximation to the root with this degree of accuracy.