Numerical Analysis, Spring 2023
Homework 3 due March 13th

Please show your work. Whenever appropriate, also hand in your MATLAB codes and outputs. (Recall: use the MATLAB function *diary* to save your command window output.)

- Given the function $f(x) = 1/x$, use the nodes $x_0 = 2$, $x_1 = 2.75$, and $x_2 = 4$ to find the Lagrange polynomial of degree two to approximate f. Use this polynomial to approximate $f(1/3)$.

  CS/MTH 464 students: Determine the error for the Lagrange polynomial at any x and then determine the maximum possible error when the polynamial is used to approximate f in the interval $[2, 4]$.

- Use appropriate Lagrange interpolating polynomials of degrees one, two, and three to approximate $f(8.4)$ if $f(8.1) = 16.94410$, $f(8.3) = 17.56492$, $f(8.6) = 18.50515$, $f(8.7) = 18.82091$. Write down the polynomials by hand, and use any software (MATLAB, Mathematica, etc.) to evaluate their values at $x = 8.4$. (Make sure to report both the polynomials you build and their numerical values approximating $f(8.4)$.)

- Other exercises are from Chapter 8 (Section 8.8): 1, 3, and 4(a).

  Note: in Exercise 1(a) you could use any covered method to fit a polynomial of degree 5.

- *CS/MTH 464 students: additionally, do exercise 2 from Section 8.8.*