AMSC/CMSC 460: HW #6
Due: Tuesday 3/12/19 (in class)

Please submit the solution to at least one problem in LaTeX.

1. Use the zeros of the Chebyshev polynomial $T_2(x)$ to construct a linear interpolating polynomial for the following functions on the interval $[-1, 1]$:

   (a) $f(x) = e^{-3x}$

   (b) $f(x) = \ln(x + 2)$

2. Repeat both parts of problem (2) using the zeros of $T_3(x)$ to construct quadratic interpolation polynomials at Chebyshev points for the given functions.

3. Use the zeros of the Chebyshev polynomial $T_3(x)$ and transformations of the given interval to construct an interpolating polynomial of degree two for the following functions

   (a) $f(x) = \frac{1}{x}$ on $[-1, 3]$

   (b) $f(x) = (x + 3) \ln x$ on $[2, 3.5]$

4. Let $f(x) = xe^x$ on $[0, 1.5]$. Compute two interpolation polynomials: 1) using four equally-spaced interpolation points 2) using the zeros of the fourth Chebyshev polynomial. Plot the two polynomials and the function $f(x)$ in one figure.