Math 366 Homework 7 Due Tuesday, March 17

$\Longrightarrow$ ***Follow the rules for team homework.*** $\Longleftarrow$

1. Computations in this problem are to be done by hand. A calculator may be used to do the arithmetic, if necessary.

   a. Use Lagrange interpolation to compute the polynomial of least degree passing through the points $(-1,1)$, $(1,0)$, $(3,5)$, and $(4,9)$.

   b. Repeat part a using Newton divided differences.

   c. Check that your answers in parts a and b are the same.

   d. What is the interpolated value at 2?

2. Let's interpolate the function $x \ln x$ on the interval $[7.8, 8.9]$ using the nodes 8.0, 8.1, 8.3, 8.6, and 8.7.

   a. Use a computer to find the interpolating polynomial.

   b. What is the best bound for the error obtainable from the error formula of Theorem 4.5? Is the absolute value of the error ever as large as the best bound? Why?

   c. Plot the actual error. Explain the graph.