Homework #4
Math 131 - Spring 2017
DUE on 3/14/17 at 1:30pm (online submission through Catcourses).

NOTE: *Your answers will be graded for correctness as well as comprehensiveness, completeness, and legibility of your solution.*

1. Write a MATLAB function, called `Lagrange_poly` that inputs a set of data points (x; y) =(datx,daty), a set x of numbers at which to interpolate, and outputs the polynomial interpolant, y, evaluated at x using Lagrange polynomial interpolation. Your function header should look something like:

   `function y = Lagrange_poly(x,datx,daty)`

2. Use the code you developed in Problem 1 to interpolate the functions

   (a) $f(x) = e^{-x^2}$

   (b) $f(x) = \dfrac{1}{1 + x^2}$.

   using the data points `datx=-5:1:5`. Interpolate at the points `x=-5:0.001:5`. Plot the results and comment on the error.

3. Write a MATLAB function, called `Newton_poly` that inputs a set of data points (x; y) =(datx,daty), a set x of numbers at which to interpolate, and outputs the polynomial interpolant, y, evaluated at x using Newton polynomial interpolation. Your function header should look something like:

   `function y = Newton_poly(x,datx,daty)`

4. Use the code you developed in Problem 3 to interpolate the function

   $$f(x) = \frac{1}{1 + x^2}$$

   using the data points `datx=-5:1:5`. Interpolate at the points `x=-5:0.001:5`. Plot the results and compare them to what you got in problem 2(b). Explain why you get what you get.