Homework Assignment 2 due by 11:45 PM, October 7, 2019 on MATLAB Grader.
Please save each code as an .m file in case you need to resubmit your code.

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)
   ```

   (a) Use the code you developed to interpolate the functions

   i. $f_1(x) = e^{-x^2}$

   ii. $f_2(x) = \dfrac{1}{1+x^2}$

   using the data points `datx=-3:1:3`. Interpolate at the points `x=-3:0.01:3`. Call $P1$ the Lagrange interpolant of f_1, and $P2$ the Lagrange interpolant of f_2. Repeat the experiment except using the data `datx1=-3:0.5:3`. Call in that case $P3$ and $P4$ the new interpolants. Compare your answer for this problem to what you got previously.
   For each interpolation problem, plot on the same graph the function, the two interpolants, and the data set (use the function `scatter`). Comment the results in your matlab script using `%`.

2. Write a `MATLAB` function, called `Newtons_divided_differences` 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's divided differences. Your function header should look something like:

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

   (a) Use the code you developed to interpolate the functions $f_1(x) = e^{-x^2}$ using the data points `datx=-3:1:3`. Interpolate at the points `x=-3:0.01:3`. Call $P5$ the obtained interpolant. Plot the results and comment on the error.

   (b) Compare your result with the one while interpolating with `Lagrange_poly`. Comment.