Using the Newton formulation, write a program in the form

$$y_{lookup} = \mathbf{table}(x, y, x_{lookup})$$

that works as a "table-lookup" device. That is, **table** creates internally a polynomial that interpolates points (x_i, y_i) given in the data base of vectors x and y. It then looks up the corresponding values y_{lookup} at any specified locations x_{lookup}.

1. Use your program to plot the graphs of polynomials of degrees 5, 10, 15, 20, respectively, that interpolate the function
$$y(x) = \frac{1}{1 + 25x^2}$$
at evenly space points over the interval $[-1, 1]$.

2. MATLAB has a command **interp1** that does the local polynomial interpolation. (Note that the degree of the polynomial is usually low and fixed.) Compare results from using **interp1** and your **table**.

(Note: MATLAB has another command **polyfit** that does polynomial fitting based on the idea of least squares. However, when the degree of the polynomial and the number of data to be fitted are exactly the same, the least square fitting becomes interpolation. The problem is that **polyfit** construct the polynomial by using our first approach, i.e., solving a linear system, which we do not recommend. You may use this **polyfit** to check your answers in this project, but I still want you to write your own program **table** by using the Newton formulation.)