**Interpolation, using Newton’s Polynomial and Piecewise Quadratic Splines**

1. Let  Divide [-1,1] into N intervals using N+1 equal-spaced sample points . Compute function values of these sample point to produce a data set for the interpolation computation.
2. Implement the Newton’s Divided Difference Method to construct an approximation polynomial p(x) for f(x).
3. Try N=4, 12 and 16.
   1. Compute and print out the coefficients of p(x).
   2. Compute error =|f(x)-p(x)| at the middles of the intervals. Find the maximum value of error. Which interval contains the maximum error?
4. As N increase, does p(x) approximate f(x) better around x=0? Does p(x) produce worst interpolation at the two ends of [-1, 1]? Explain the reasons using the theories taught in classes.
5. (optional) Draw the figures of f(x) and p(x).
6. (optional) Using a piecewise quadratic spline S(x) to interpolate f(x).
   1. Create a quadratic polynomial in each interval: 
   2. The general form of 
   3. Where 
   4. However, and h=(2/N), the size of interval.
   5. Evaluate S(x) and draw its graph.
7. (optional) Is S(x) a better approximation of f(x)? Is 