Homework 8 – APPM 4600 – Cambria Chaney

1. Interpolating the function using the following methods. The first table shows the actual plots.
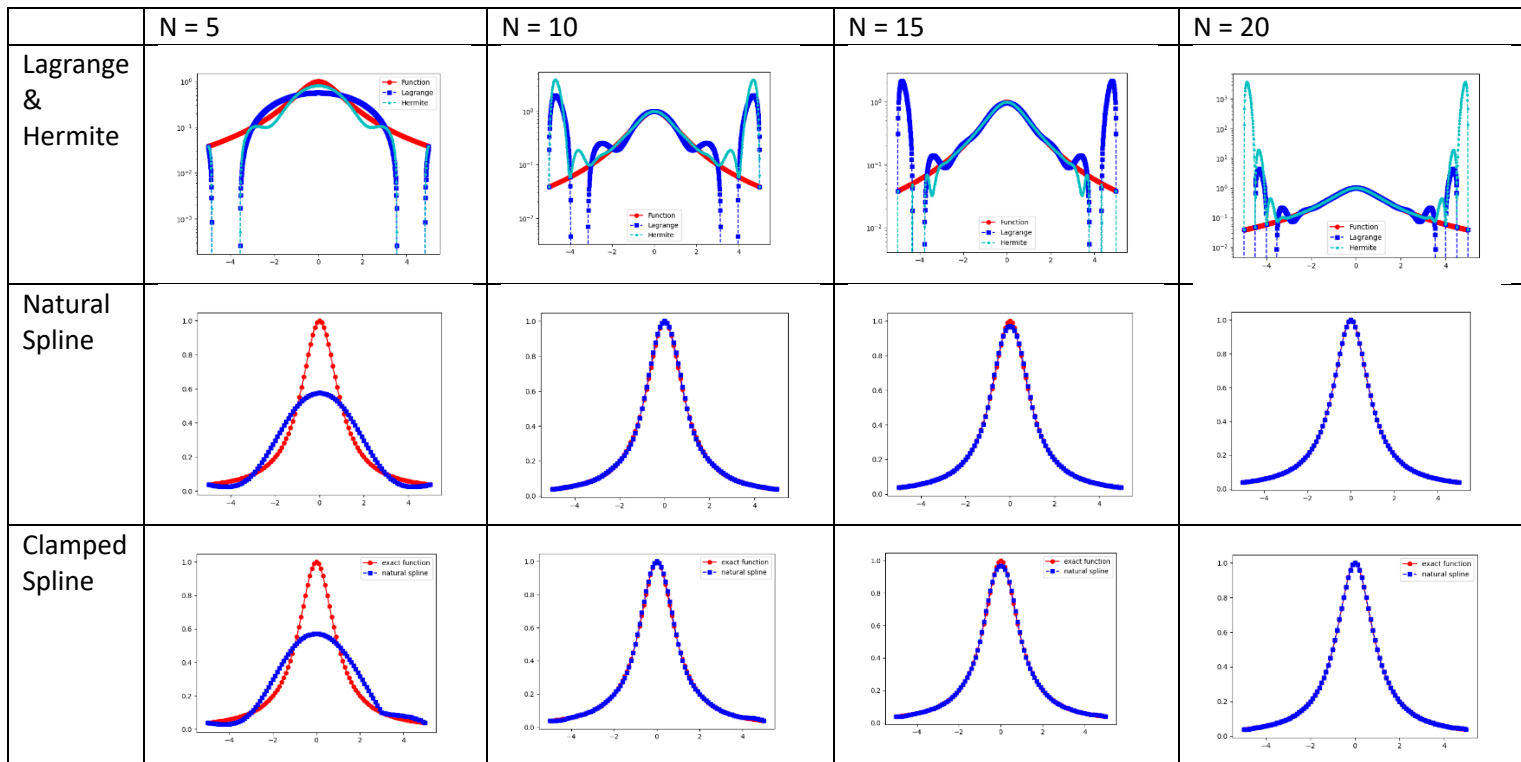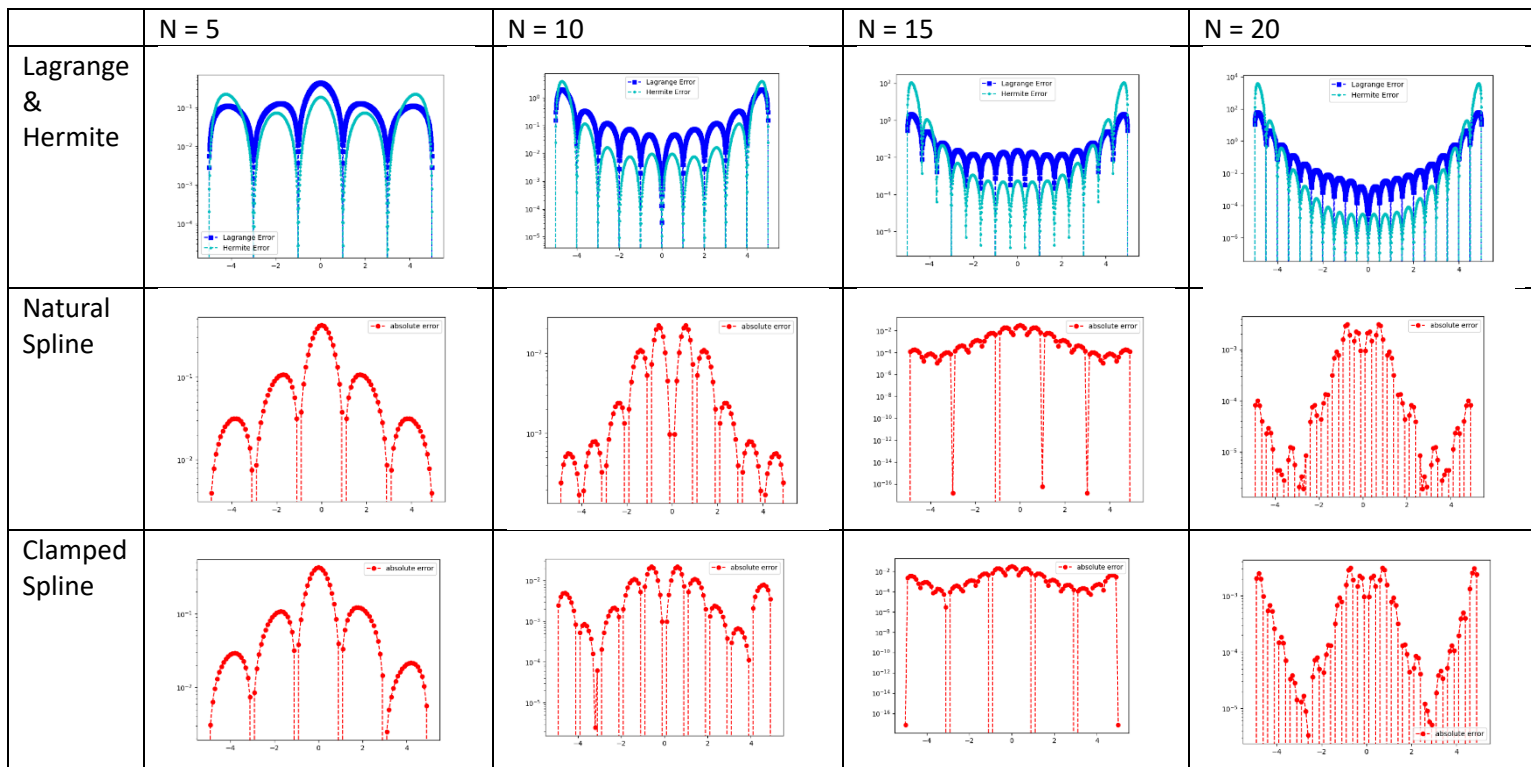
	N = 5	N = 10	N = 15	N = 20
Lagrange & Hermite				
Natural Spline				
Clamped Spline				

Table of the Errors:

	N = 5	N = 10	N = 15	N = 20
Lagrange & Hermite				
Natural Spline				
Clamped Spline				

It appears that the natural and clamped spline methods perform the best, with the clamped spline performing the best because it is more accurate at the end points.

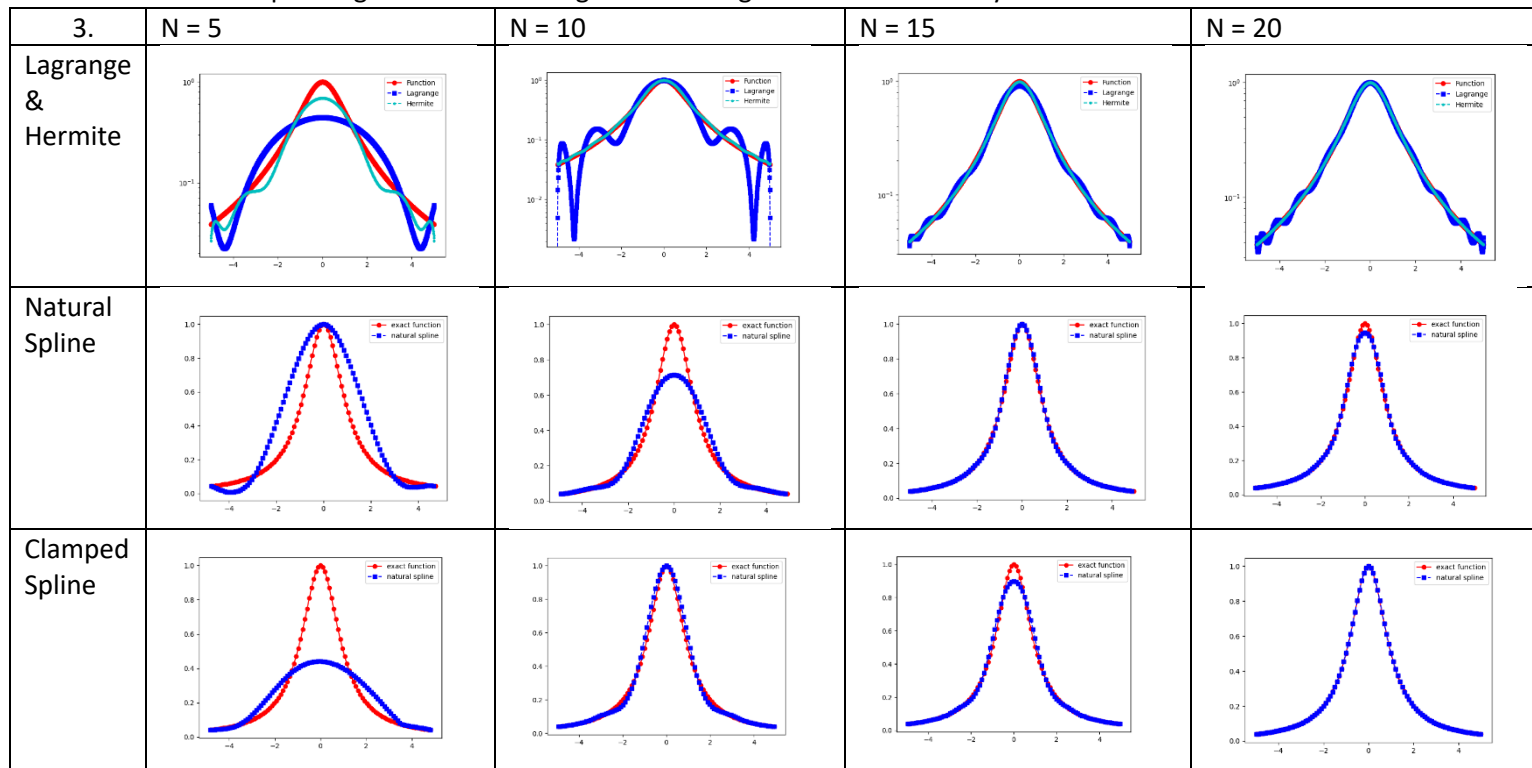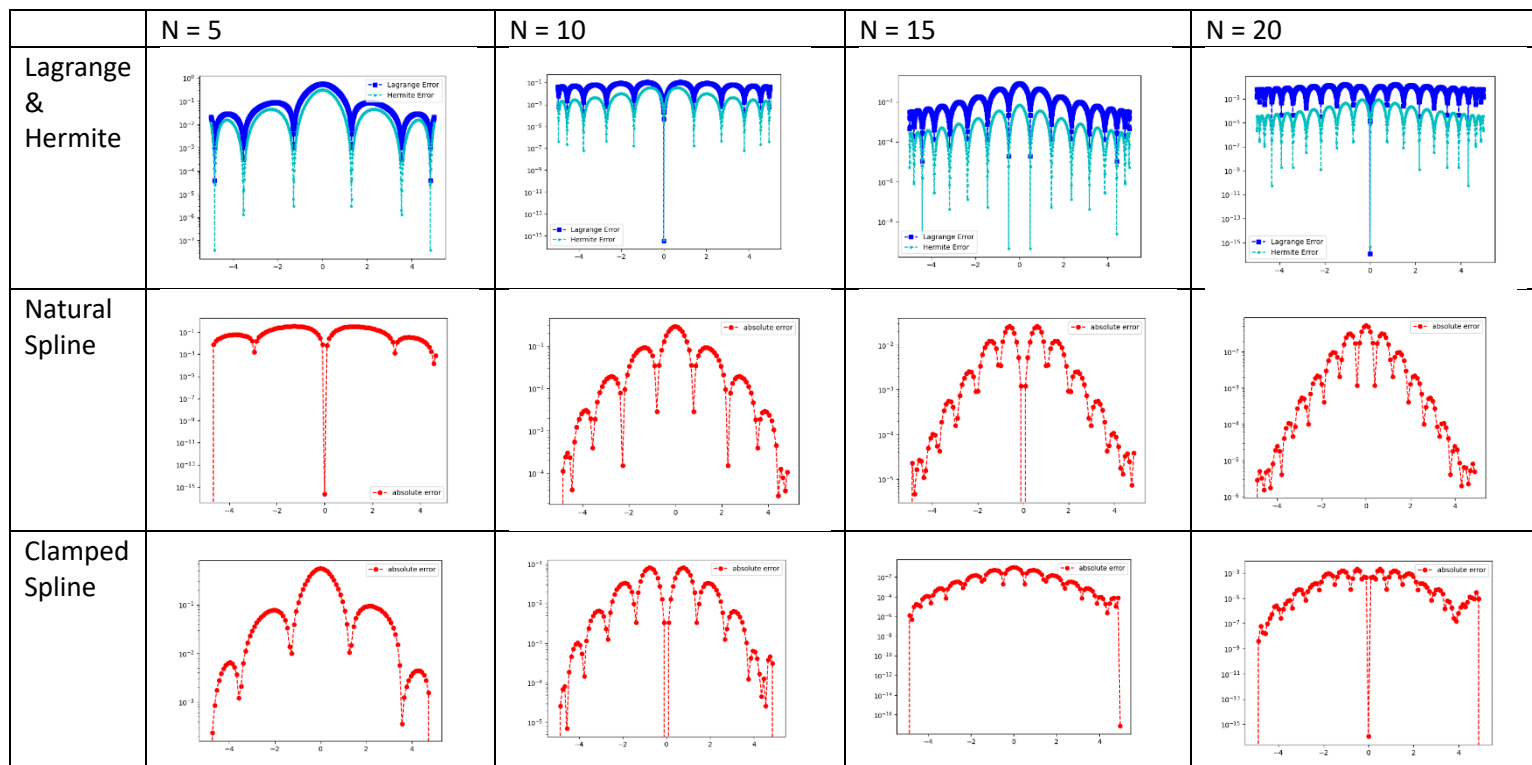2. Interpolating the function using the following methods with Chebyshev Nodes. Actual Plots:

3.	N = 5	N = 10	N = 15	N = 20
Lagrange & Hermite				
Natural Spline				
Clamped Spline				

Table of the Errors:

	N = 5	N = 10	N = 15	N = 20
Lagrange & Hermite				
Natural Spline				
Clamped Spline				

It appears that the natural and clamped splines perform the best, with the clamped spline performing slightly better than the natural spline because it performs better at the end points and calculates a cubic function at each interval. Using the Chebychev nodes, you can see that the endpoints of the Lagrange and Hermite interpolation methods don't diverge near the endpoints as they do with equal spaced nodes. However, for the clamped and natural cubic splines, using Chebychev nodes doesn't appear to have much of an effect on their performance.

3. When approximating a periodic function like sin(10x) on [0, 2pi] using a cubic spline, the end point conditions need to be changed so that the function values at the first and last value in the interval are equal.