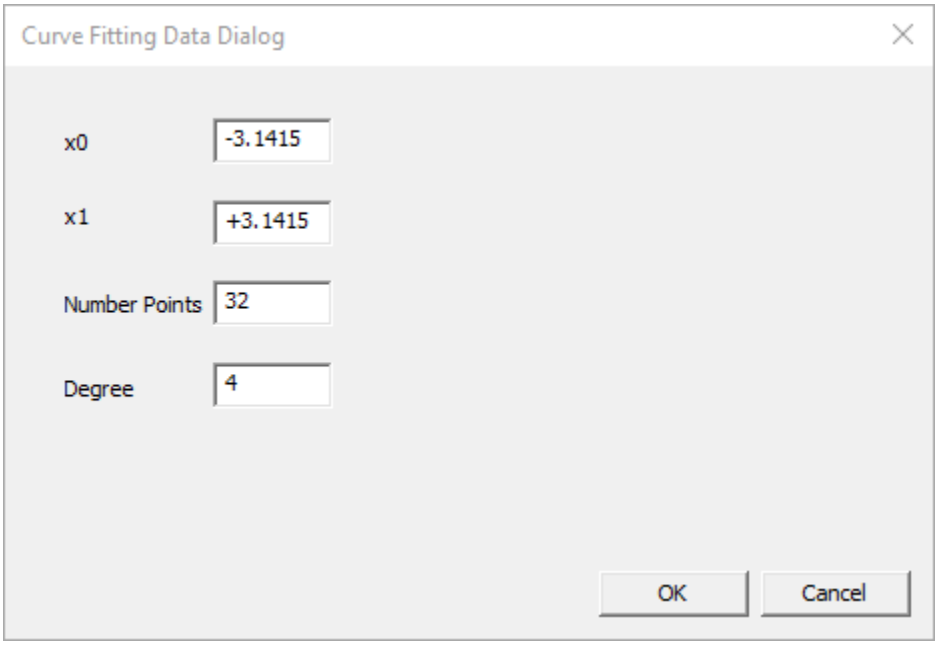
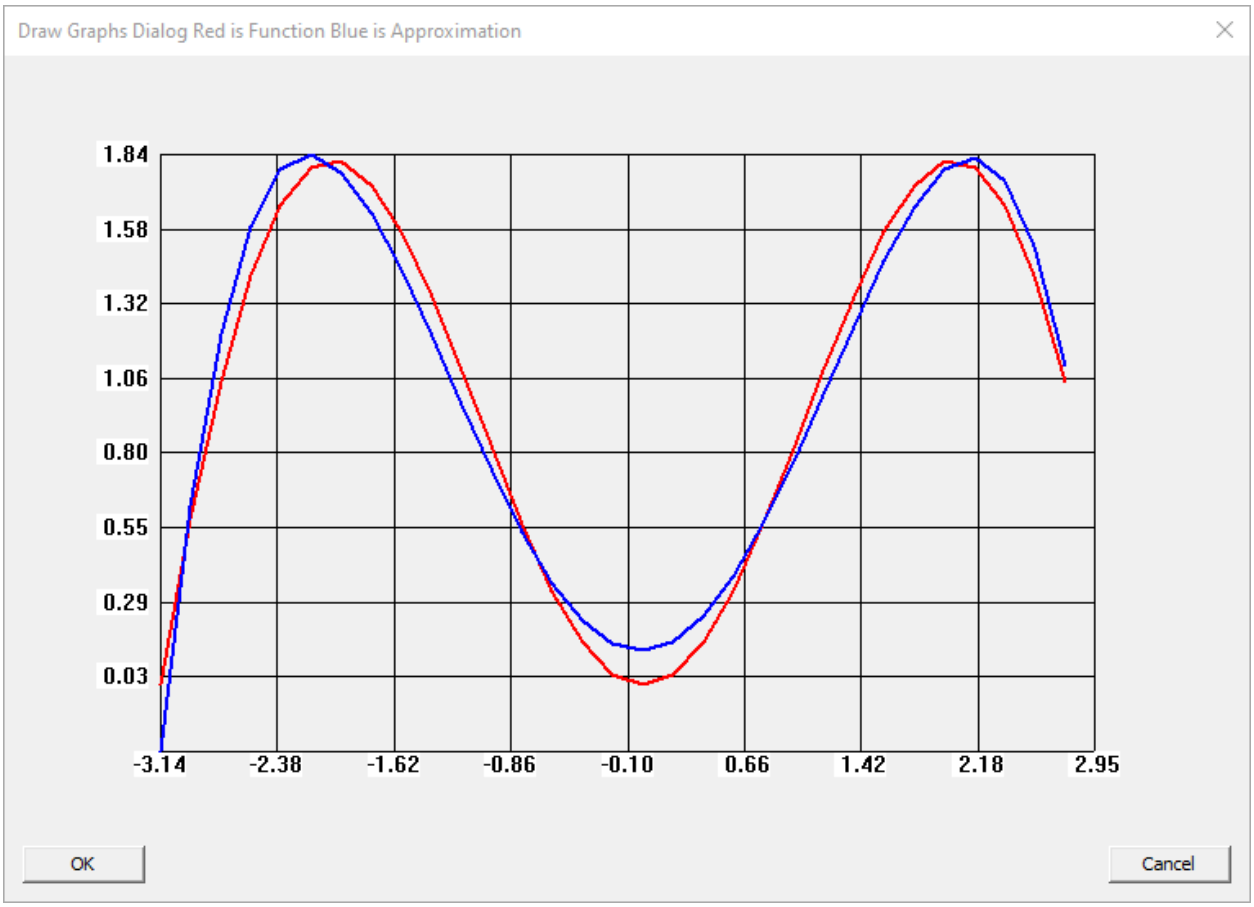
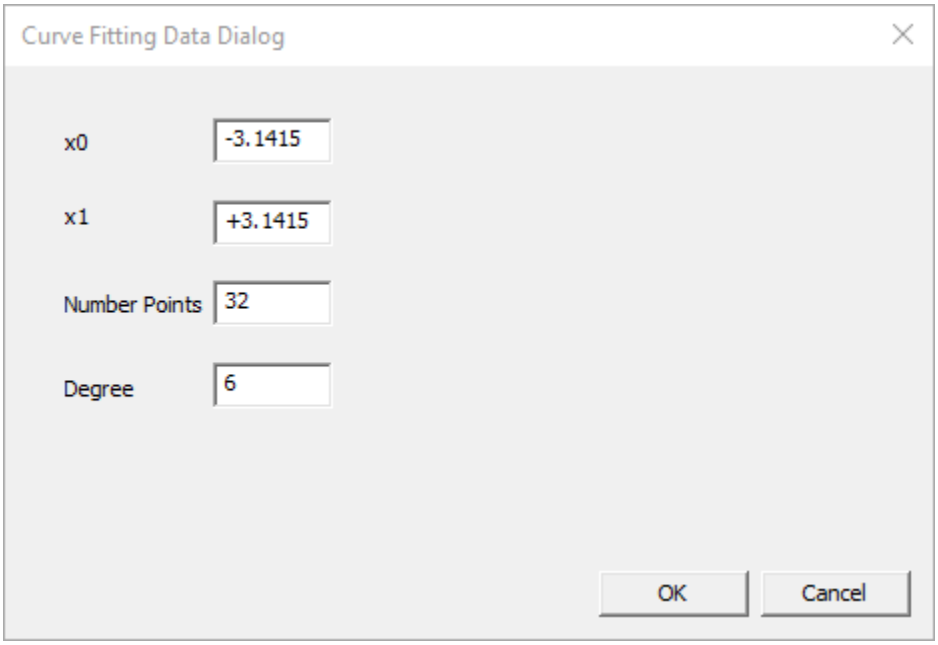
Curve Fitting Using Orthogonal Polynomials © Wednesday, December 18, 2024, by James Pate Williams, Jr.

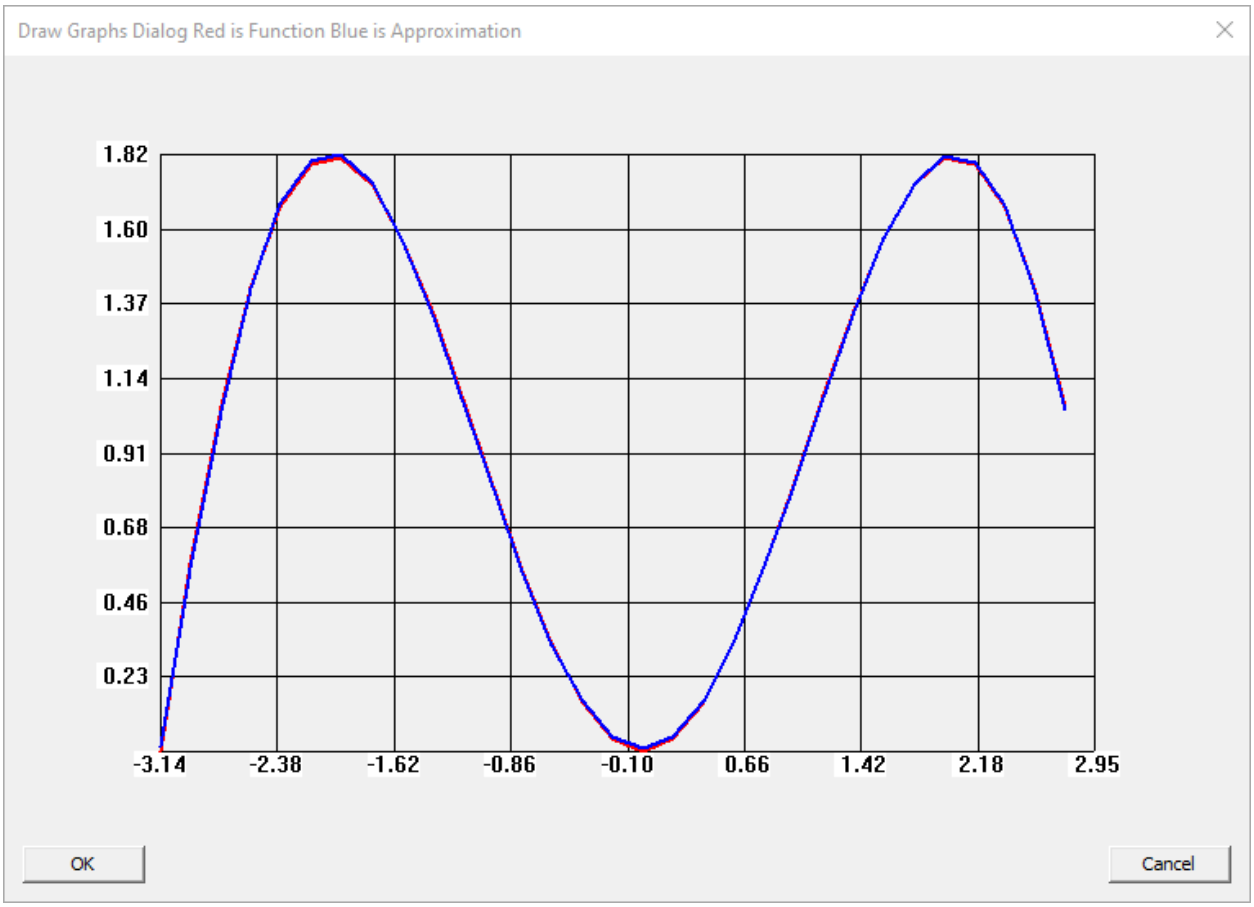
The first function is:

$$f(x) = x \sin(x) \, \forall x \in \{-3.1415, +3.1415\}$$



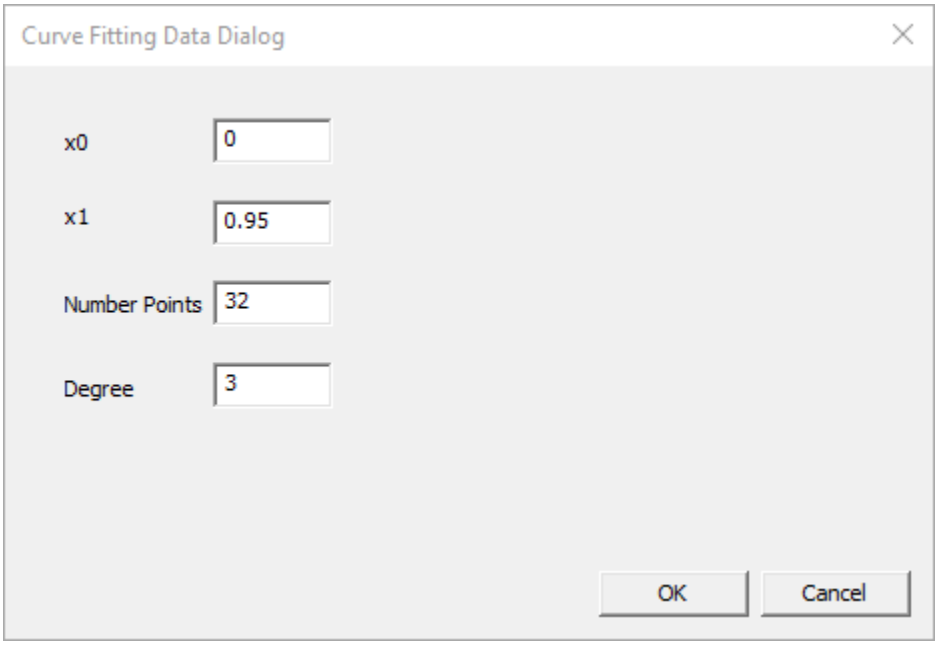

Draw Graphs Dialog Red is Function Blue is Approximation
1.84
1.58
1.32
1.06
0.80
0.55
0.29
0.03
-3.14
-2.38
-1.62
-0.86
-0.10
0.66
1.42
2.18
2.95
OK
Cancel

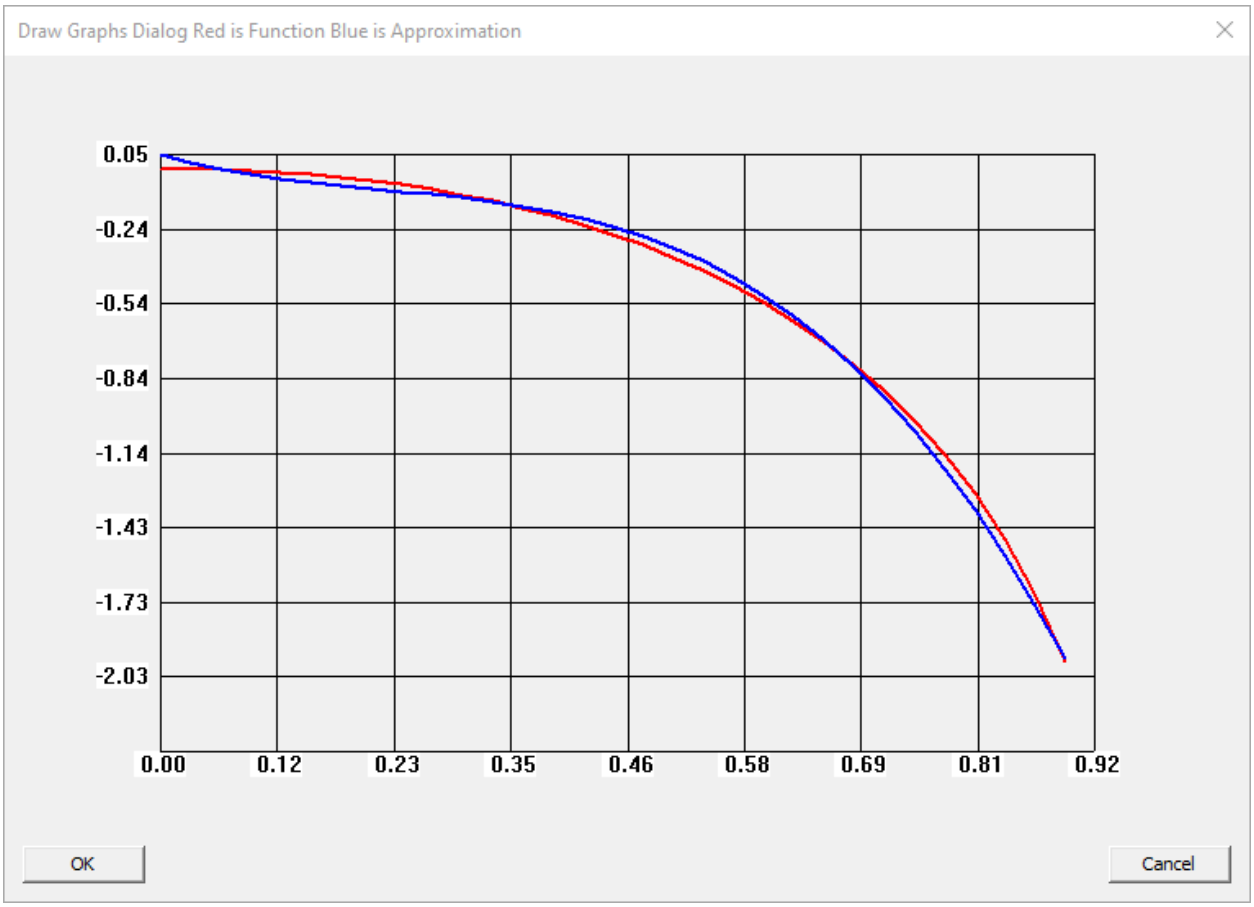

Curve Fitting Data Dialog
x0
-3.1415
x1
+3.1415
Number Points
32
Degree
6
OK
Cancel

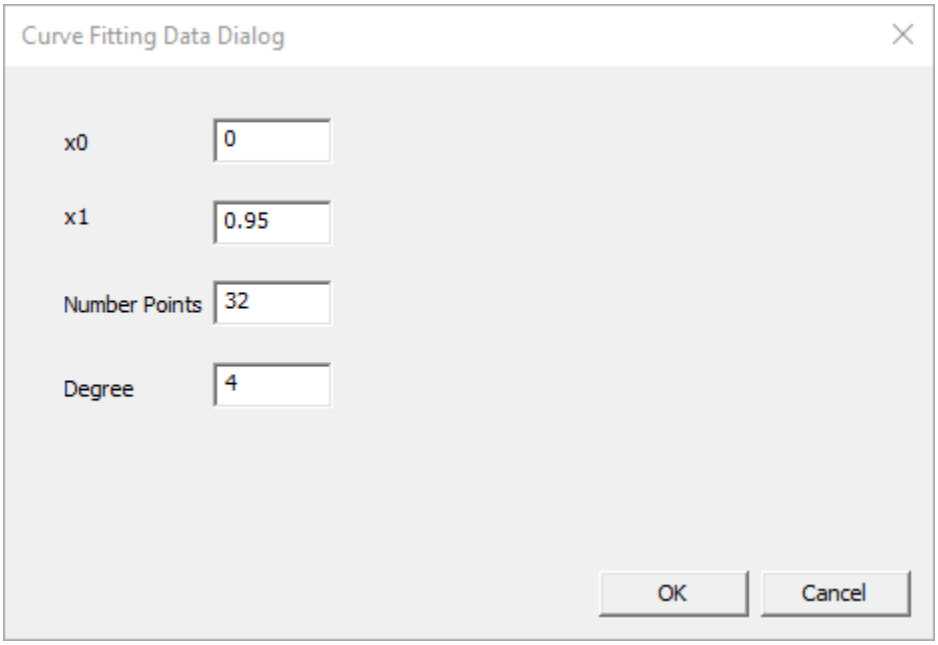


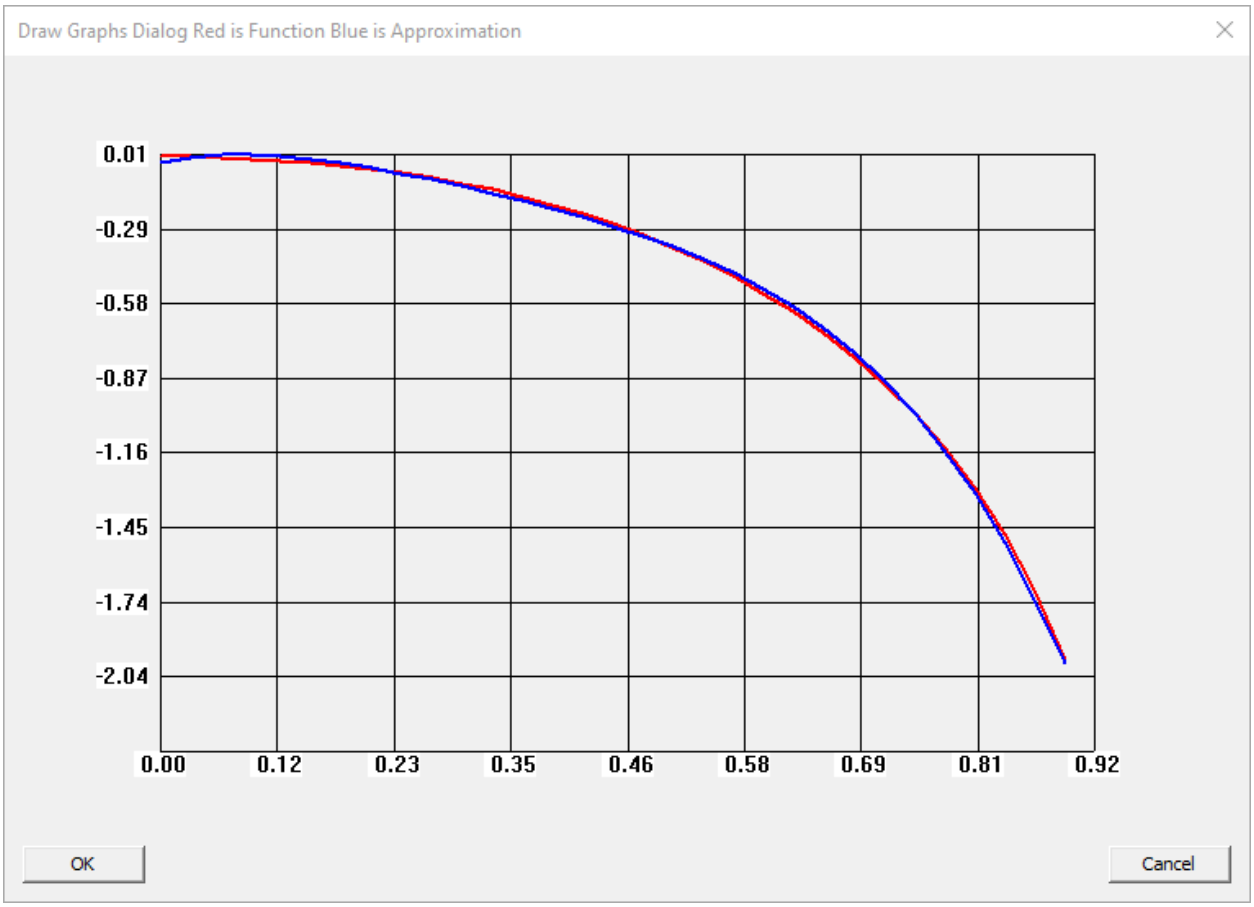
The next function is:

$$f(x) = x \ln x \, \forall x \in \{0.0, 0.95\}$$

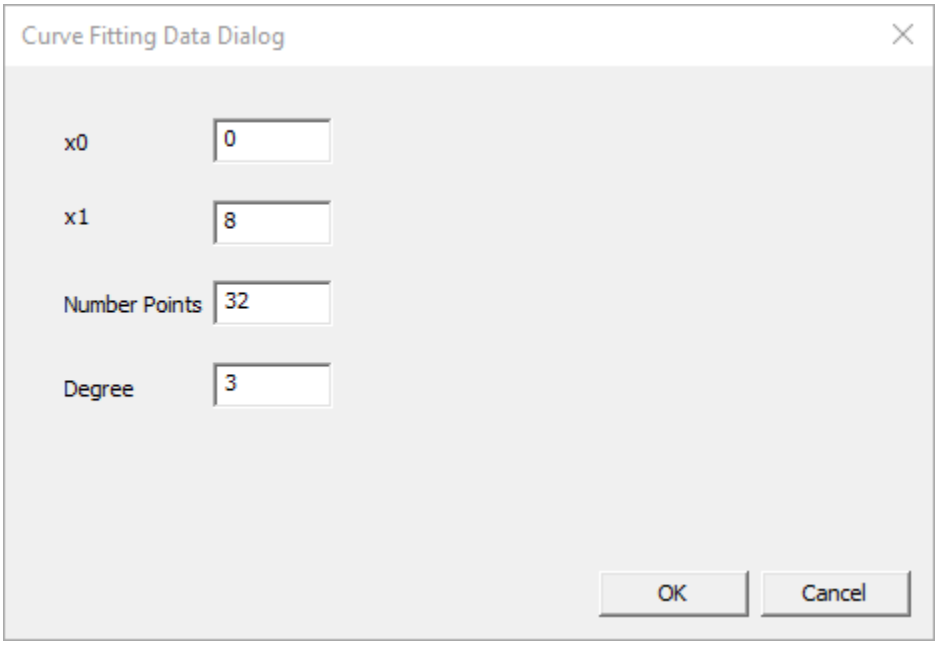


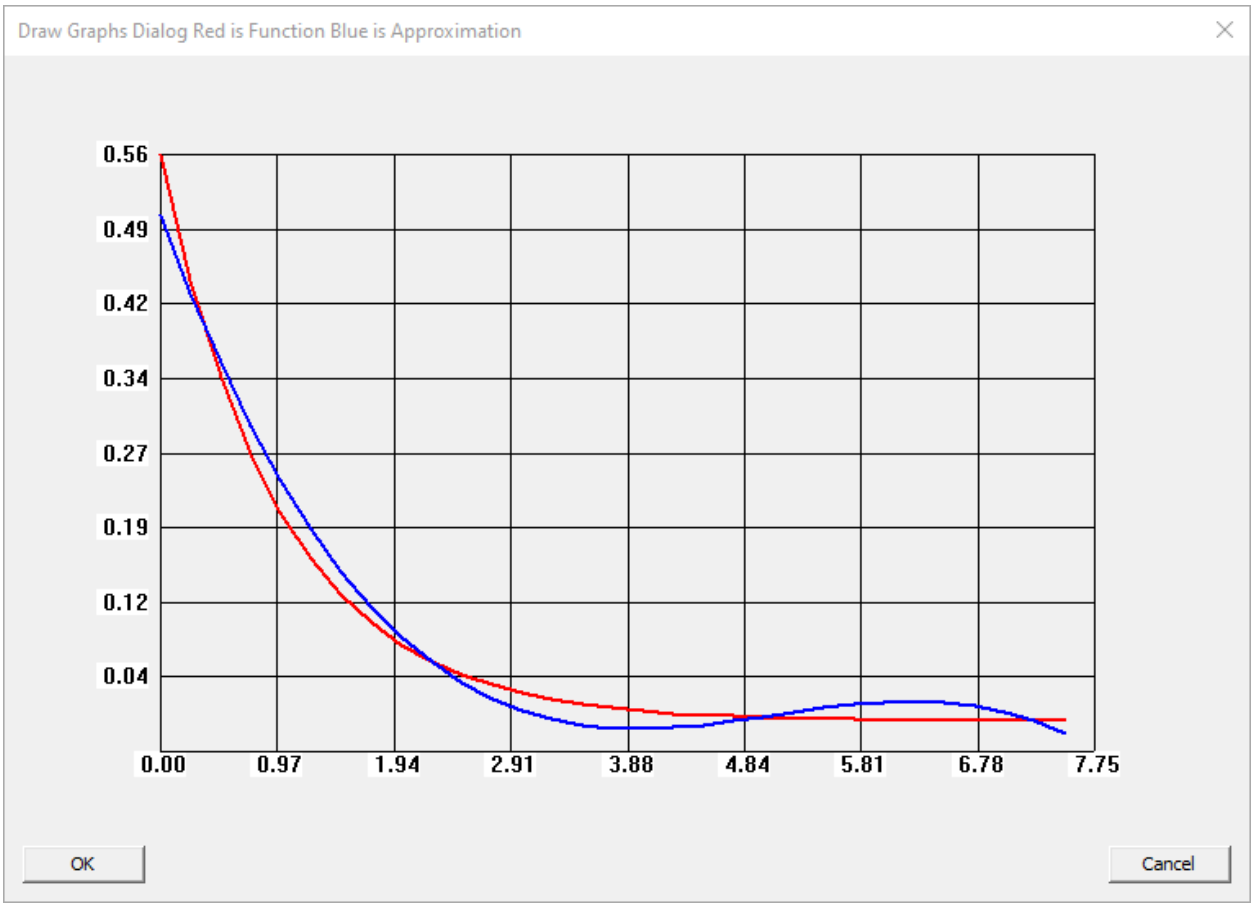

Draw Graphs Dialog Red is Function Blue is Approximation
0.05
-0.24
-0.54
-0.84
-1.14
-1.43
-1.73
-2.03
0.00
0.12
0.23
0.35
0.46
0.58
0.69
0.81
0.92
OK
Cancel

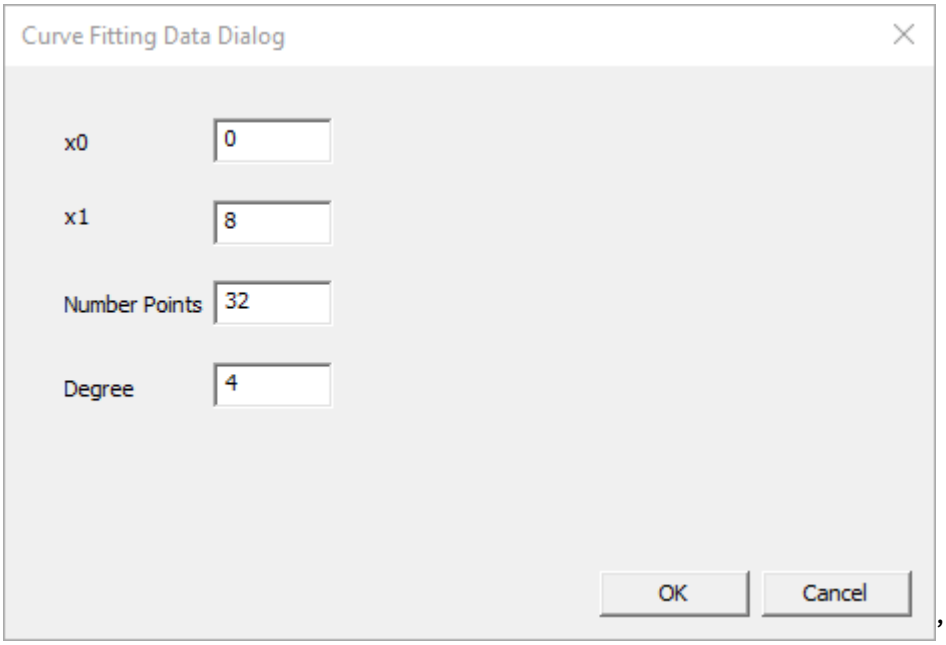

Curve Fitting Data Dialog
x0
0
x1
0.95
Number Points
32
Degree
4
OK
Cancel

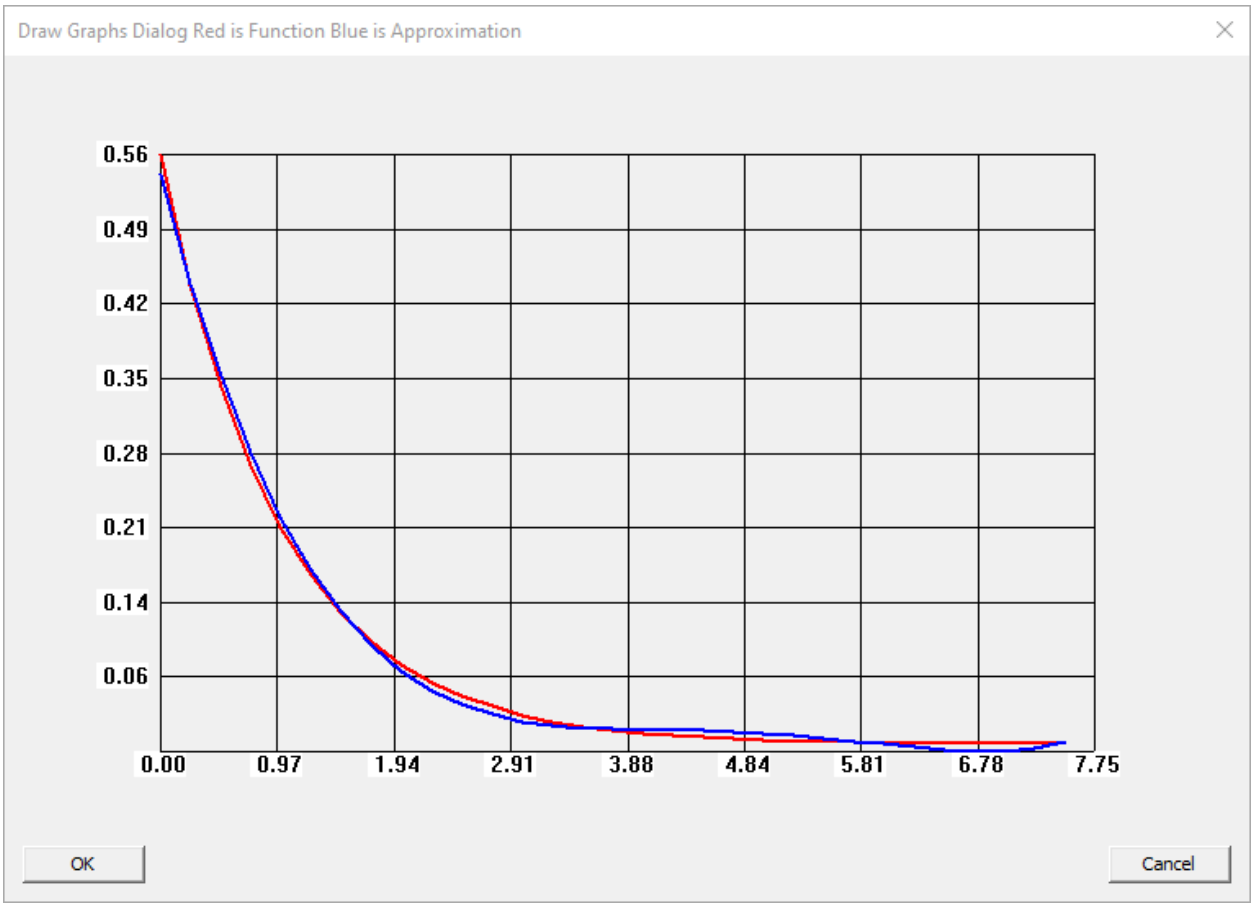


Next is the fitting to a 1s-Slater type atomic orbital:

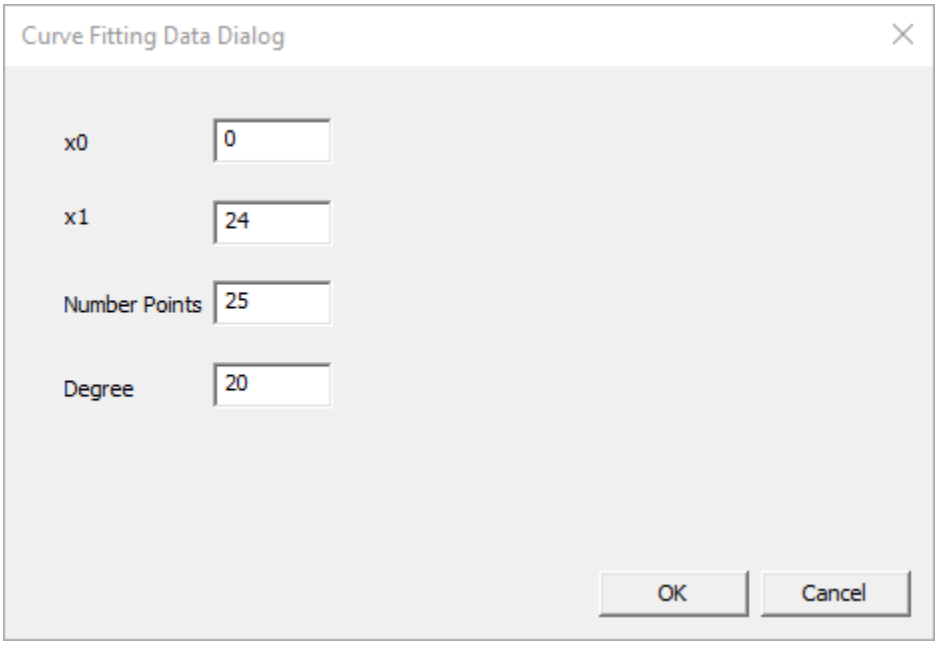


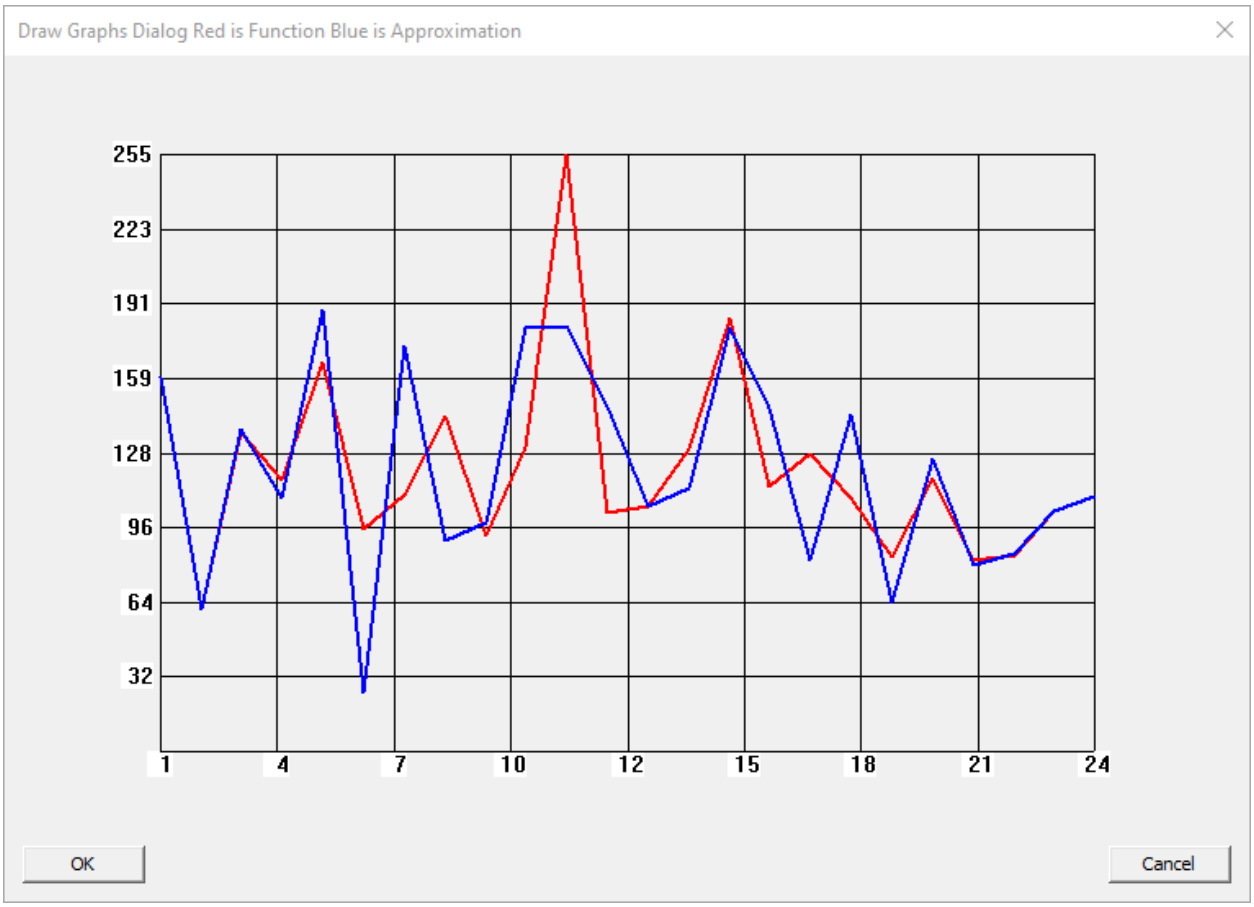

Draw Graphs Dialog Red is Function Blue is Approximation
0.56
0.49
0.42
0.34
0.27
0.19
0.12
0.04
0.00
0.97
1.94
2.91
3.88
4.84
5.81
6.78
7.75
OK
Cancel

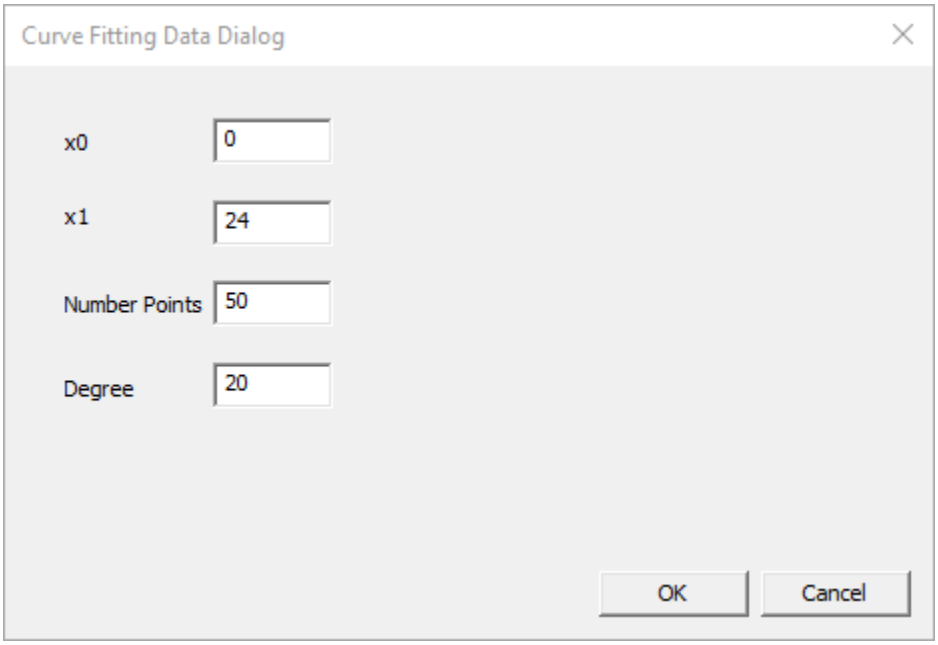

Curve Fitting Data Dialog
x0
0
x1
8
Number Points
32
Degree
4
OK
Cancel

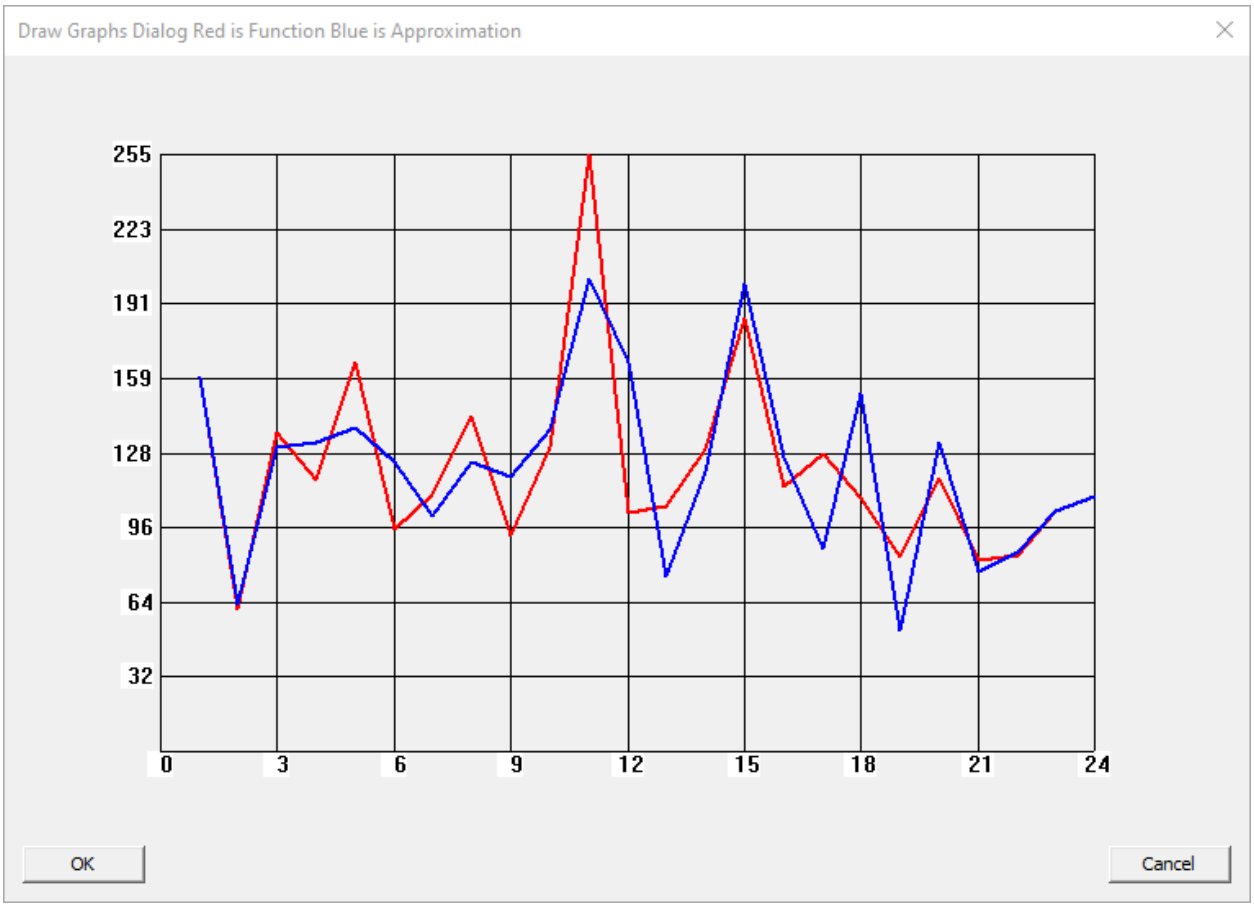


Last we fit church attendance data for the First United Methodist Church of LaGrange, Georgia, Morning Glory contemporary service in 2009.




Draw Graphs Dialog Red is Function Blue is Approximation
255
223
191
159
128
96
64
32
1
4
7
10
12
15
18
21
24
OK
Cancel


Curve Fitting Data Dialog
x0
0
x1
24
Number Points
50
Degree
20
OK
Cancel


Draw Graphs Dialog Red is Function Blue is Approximation
255
223
191
159
128
96
64
32
0
3
6
9
12
15
18
21
24
OK
Cancel