Assignment 5 - Computational Mathematics
Week 7

Instructions

For each problem, please include:
- Source code with comments explaining all important steps.
- A screenshot of the program output and explanation.
- Provide graphs or tables where applicable to visualize results.
- Provide detailed explanations for your approaches and results.
Save your answers as a PDF report and submit it to the Moodle.

Task 1: Newton's Forward Interpolation Formula.
Problem:
Given the data: x=[0,1,2,3,4] y=[1, 2.7, 5.8 ,10.4 ,16.5]
Estimate f(2.5) using Newton's Forward Interpolation Formula.

Task 2: Newton's Backward Interpolation Formula.
Problem:
Given the data: x=[3,4,5,6,7] y=[2.2 , 3.5, 5.1, 7.3, 10.0]
Estimate f(5.5) using Newton's Backward Interpolation Formula.

Task 3: Central Difference Interpolation Formula.
Problem:
For the data points: x=[10,12,14,16,18] y=[100,144,196,256,324]

Estimate f(13) using the Central Difference Interpolation Formula.

Task 4: Lagrange's Interpolation Formula.
Problem:
Given the unevenly spaced data: x=[2,5,8,10] y=[1.4,2.3,3.8,4.6]
Estimate f(6) using Lagrange's Interpolation Formula.

Task 5: Newton's Divided Difference Formula.
Problem:
For the data points: x=[0,2,5,8] y=[4,8,14,25]
Estimate f(3) using Newton's Divided Difference Formula.

Task 6: Cubic Spline Interpolation.
Problem:
For the data: x=[1,2,3,4,5] y=[2.3,3.1,4.9,6.5,8.1]
Use Cubic Spline Interpolation to estimate f(2.5) and f(4.3).

Required to all tasks:
1. Graphs for visualizing interpolation results.
2. A detailed write-up explaining the approach and results for each task.