MAT 120

Homework 3

Deadline: December 7th, 2024

Problem Statement:
Calculate the first derivative of the following function:

$$f(x) = e^x \sin(x)$$

Steps to Solve:

1. **Step 1:** Calculate the exact derivative at $x = 1.5$.
2. **Step 2:** Calculate the derivative using the Forward Difference Scheme and Backward Difference Scheme at $x = 1.5$, with $h = 0.05$, using the order of h, $O(h)$.
3. **Step 3:** Calculate the derivative using the Forward Difference Scheme, Backward Difference Scheme, and Central Difference Scheme at $x = 1.5$, with $h = 0.05$, using the order of h^2, $O(h^2)$.
4. **Step 4:** Analyze the error in each numerical technique.