Lab Task 1 Root-Finding Algorithms - Newton's Method vs. Secant Method

Problem Statement

1. **Function to solve**:
   Use the following function as a test case:

$$f(x) = x^3 - 4x^2 + x + 6$$

   This function has a root in the interval $[1, 4]$.

2. **Implement**:
   - **Newton's Method**
   - **Secant Method**

   Each method should be implemented as a separate function.

3. **Calculate Error**:
   For each iteration, calculate the error E_n as the absolute difference between the current and previous approximations:

$$E_n = |x_n - x_{n-1}|$$

   Use this error measure to evaluate how quickly each method converges to the root.

4. **Stopping Criteria**:
   - Stop each method when the error E_n is less than a tolerance level $\epsilon = 10^{-6}$.
   - Alternatively, you may stop if the method reaches a maximum of 100 iterations to avoid infinite loops.

Desired Output:

1. Estimated root in both method
2. Error calculated in both method
3. Plot errors found in each iteration for both methods to show how the error minimized in both case.