Numerical Analysis
Error Analysis

Create a program that computes an approximate value for the derivative of a function using the finite difference formula
$$f'(x) \approx \frac{f(x+h) - f(x)}{h}$$

1. Test the program using $f(x) = tanx$ for $x = 1$

2. Determine the magnitude of the error by comparing the square of the built-in function $secx$ (note: the derivative of $tanx$ is sec^2x.)

3. Plot the magnitude of the error as a function of h for $h = 10^{-k}$, $k = 0, 1, ..., 16$. Use log-scale plot for h and for the magnitude of the error.