1. Let $f(x) = \sqrt{1 + x}$.
   A) Write the second Taylor polynomial of $f(x)$ centered at 0.
   B) Give an expression for the error term.
   C) Give a bound for the error term if $|x| < 0.1$.
   D) Use Taylor’s approximation to find $\lim_{x \to 0} \frac{\sqrt{1+x} - 1 - x/2}{x}$.

2. Let $x = 0.5772$ be an approximation of 0.5773.
   A) How many significant digits does $x$ have?
   B) What is the error of $x$?
   C) What is the relative error of $x$?
   D) Write $x$ in the normalized floating-point format.
   E) Find the binary representation of $x$.

3. Consider the equation $x^2 + 2x - 7 = 0$.
   A) Set up the Newton iteration for the equation.
   B) What is the larger root?
   C) Find the rate $C$ of convergence to the larger root.
   D) What is a good interval for the initial guess $x_0$?

4. Consider the equation $x^2 - 5 = 0$ converted to the fixed-point problem $x_{n+1} = x_n - \frac{1}{4}(x_n^2 - 5)$ for $1 \leq x_0 \leq 9/4$.
   A) Justify the choice of the interval $[1, 9/4]$.
   B) Why do the iterations converge?
   C) What is the order of convergence?
   D) Find the rate of convergence.