Assignment 1 - Introduction and Bisection Method

1. What is the bisection method in numerical analysis?
2. How does the bisection method work to find the root of an equation?
3. What is the convergence rate of the bisection method?
4. Find a root of the equation cos(x) - x^2 = 0 using the bisection method and stop when the absolute error is less than 0.0001.
5. Use the bisection method to find a root of the equation x^3 + 2x - 2 = 0 and stop when the relative error is less than 0.1%.
6. Use the bisection method to find a root of the equation x^4 - 4x^3 + 4x^2 - 2x + 1 = 0 correct upto 4 decimal places.
7. Use the bisection method to find a root of the equation sin(x) - x/2 = 0 correct upto 3 decimal places.
8. Find a solution to the equation ln(x^2 - 3x + 2) = ln(x - 1) using the bisection method, correct upto 4 decimal places.
9. Find a solution to the equation ln(3x - 5) - ln(x - 1) = 1 using the bisection method, correct upto 3 decimal places.
10. State Intermediate value theorem. Write an algorithm to solve the equations using the bisection method.