

Question 1

Finding the initial guess using Bisection Method

Initial range for Bisection Method [0, 3]: $f(0) = 1.00000$; $f(3) = -0.09133$;

After three iterations of Bisection Method, Initial Guess = 0.37500

Begin Newton-Raphson Method

After step 1: approximate root = 0.57343

After step 2: approximate root = 0.58844

After step 3: approximate root = 0.58853

After step 4: approximate root = 0.58853

Tolerance Limit Reached

Approximate order of convergence $p = 1.99950$

Number of steps required = 4

Question 2

Solving a non-linear system of equations

First Guess = [1 2]

After step #1, guess = [1.06622749 1.9453854]

After step #2, guess = [1.08521342 1.94404757]

After step #3, guess = [1.08609993 1.94368569]

After step #4, guess = [1.08618665 1.9436852]

Tolerance Limit Reached

Approximate solution to the system of equation is $[x,y] = [1.08618665 \ 1.9436852]$