CSE2202: Numerical Methods Lab
Online: 2 Section: A2
Time: 40 Minutes Total: 10

Set A

Problem Statement: Determine the real root of the equation: $f(x) = x^3 - x - 3$ using Newton Raphson Method. Employ initial guess of $x_0 = 3$ and iterate until the two consecutive approximate roots are correct upto 4 decimal places.

Tasks:

1. Write a program using Newton Raphson method to locate the approximate root of the function $f(x) = x^3 - x - 3$ with initial guess $x_0 = 3$.
2. Iterate until two consecutive approximate roots are correct upto 4 decimal places.
3. Use Horner's method to evaluate the function.
4. Use appropriate math function for your code.
5. Print the following table that show the values of approximate root x, $f(x)$, and $f'(x)$

Sample Input/output:

```
   ENTER THE TOTAL NO. OF POWER:::: 3
    x^0::-3
    x^1::-1
    x^2::0
    x^3::1
    THE POLYNOMIAL IS :::  1x^3+ 0x^2 -1x^1 -3x^0
    INTIAL X1---->3

************************************
   ITERATION    X1    FX1    F'X1
************************************
```

Set B

Problem Statement: Determine the real root of the equation: $f(x)$ = $x^3 - x - 3$ using Secant Method. Employ initial guess of $x_0 = 1 \; and \; x_1 = 3$ and iterate until the two consecutive approximate roots are correct upto 4 decimal places.

Tasks:

1. Write a program using Secant method to locate the approximate root of the function $f(x)$ = $x^3 - x - 3$ with initial guesses $x_0 = 1 \; and \; x_1 = 3$.
2. Iterate until two consecutive approximate roots are correct upto 4 decimal places.
3. Use Horner's method to evaluate the function.
4. Use appropriate math function for your code.
5. Print the following table that show the values of approximate root x_0, x_1, x_2, $f(x_0), f(x_1)$ and $f(x_2)$

Sample Input/output

```
ENTER THE TOTAL NO. OF POWER:::: 3
     x^0::-3
     x^1::-1
     x^2::0
     x^3::1
     THE POLYNOMIAL IS :::  1x^3+ 0x^2 -1x^1 -3x^0
     INTIAL X1---->3
            X0---->1
_____________________________________________________________________________

   Iteration   x1         x2          x3          f(x1)        f(x2)
_____________________________________________________________________________
```

Set C

Problem Statement: Determine the real root of the equation: $f(x) = x^3 - x - 3$ using Fixed Point iteration. Employ initial guess of $x_0 = 1$ and iterate until the two consecutive approximate roots are correct upto 4 decimal places.

Tasks:

1. Write a program using Fixed Point Iteration to locate the approximate root of the function $f(x) = x^3 - x - 3$ with initial guesses $x_0 = 1$.
2. Iterate until two consecutive approximate roots are correct upto 4 decimal places.
3. Use Horner's method to evaluate the function.
4. Use appropriate math function for your code.
5. Take maximum number of iterations, if maximum number is reached then stop and print not converge.
6. Check whether function $g(x)$ converge to the root or not. If converge then print the following table that show the values of approximate root $x_0, x_1, and\ x_2$

Sample Input/output

```
ENTER THE TOTAL NO. OF POWER:::: 3
     x^0::-3
     x^1::-1
     x^2::0
     x^3::1
     THE POLYNOMIAL IS :::  1x^3+ 0x^2 -1x^1 -3x^0
     INTIAL: X0---->1
Enter the function g(x)
```

Iteration x1 x2
