Name : Rashik Rahman

ID : 17201012

**SOLVE :**

**Set A Q 2:**

%Author : Rashik Rahman(17201012)

% Question 2, Set A : Use forward divided difference approximation of the first derivative of f(x) = 6e−3x+3 to calculate the

%derivative at x0=2.12, x1, x2 with a step size of 2. Print the FDD result

%and use plot function to display the values of x (i.e. x0, x1, x2) and their corresponding

%values of y by x-axis and y-axis, respectively.

ref = 12;

function FDD(x,i)

delta\_x = 2; % Step size

x2 = x + delta\_x;

%f(x) = 6e^(−3x)+3

y2 = 6\*e^(-3\*x2)+3; % Here y2 is f(x+delta\_x)

y1 = 6\*e^(-3\*x)+3; % Here y1is f(x)

FDD = (y2-y1)/delta\_x;

disp(['The value of FDD is: ', num2str(FDD), ' For X', num2str(i)]);

endfunction

FDD(2.12,0) %Function call of x0

FDD(4.12,1) %Function call of x1

FDD(6.12,2) %Function call of x2

% Plotting x and y

x = 2.12:2:6.12;

y = 6\*e.^(-3\*x)+3;

plot(x,y)

**Set B Q 2:**

% Question 2, Set B : Use Newton-Raphson method to estimate the root of 4x3+7x+3 = e^x. Conduct 3 iterations with an initial guess 3.

%Show the result in a 10×4 matrix that contains 4 columns such as: Iteration No., Root (xi), Absolute relative approximate error (|Ɛa|), and

%No. of significant digits.

ref =12;

f = @(x) (4\*x^3+7\*x+3-e^x);

fprime = @(x) (12\*x^2+7-e^x);

iter = 2;

x\_old = 3;

matrix = zeros(10,4);

matrix(1,1) = 0;

matrix(1,2) = 3;

matrix(1,3) = NaN;

matrix(1,4) = NaN;

while iter<=11

x\_new = x\_old - f(x\_old)/fprime(x\_old);

matrix(iter,1) = iter-1;

matrix(iter,2) = x\_new;

eror = abs((abs(x\_new-x\_old)/x\_new)\*100);

matrix(iter,3) = eror;

sig = 0;

if eror>5

sig=0;

endif

if eror>0.5 && eror<=5

sig=1;

endif

if eror>0.05 && eror<=0.5

sig=2;

endif

if eror>0.005 && eror<=0.05

sig=3;

endif

if eror>0.0005 && eror<=0.005

sig=4;

endif

if eror>0.00005 && eror<=0.0005

sig=5;

endif

if eror>0.000005 && eror<=0.00005

sig=6;

endif

matrix(iter,4) = sig;

x\_old = x\_new;

iter=iter+1;

endwhile

disp(matrix)

**ScreenShots:**

   