

Computer Assignment 1

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Important:- All the relative error vs iteration plots are relative error PERCENTAGE vs number of iterations graphs

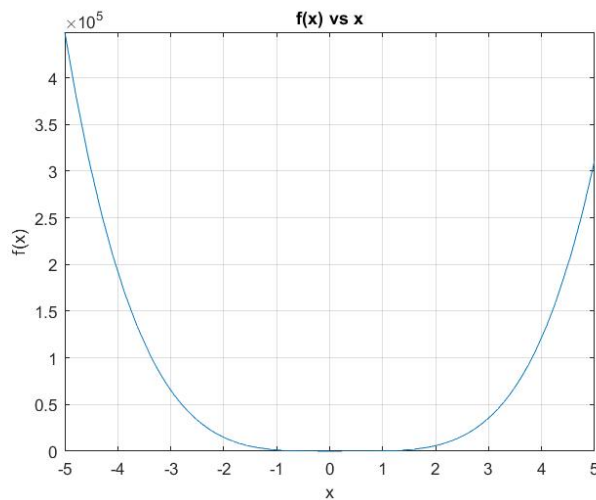
Q1) Test Function: -

$$1) F(X) = 600 * x.^4 - 550 * x.^3 + 200 * x.^2 - 20 * x - 1 = 0$$

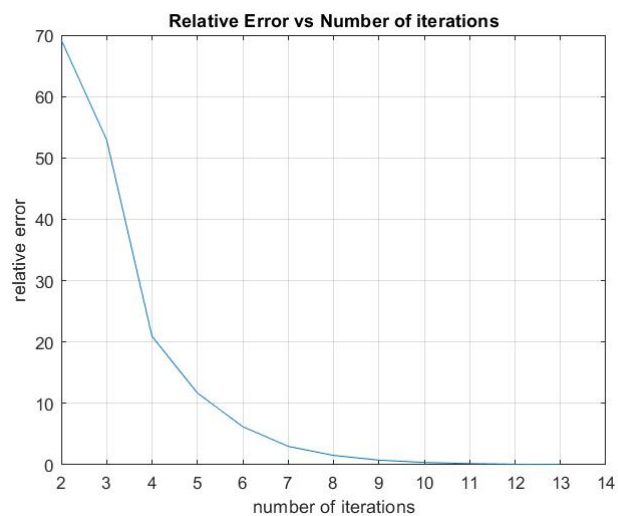
a) Bisection Method: -

Plot: -

F(x) vs x:



Relative approximate error vs iteration number:-

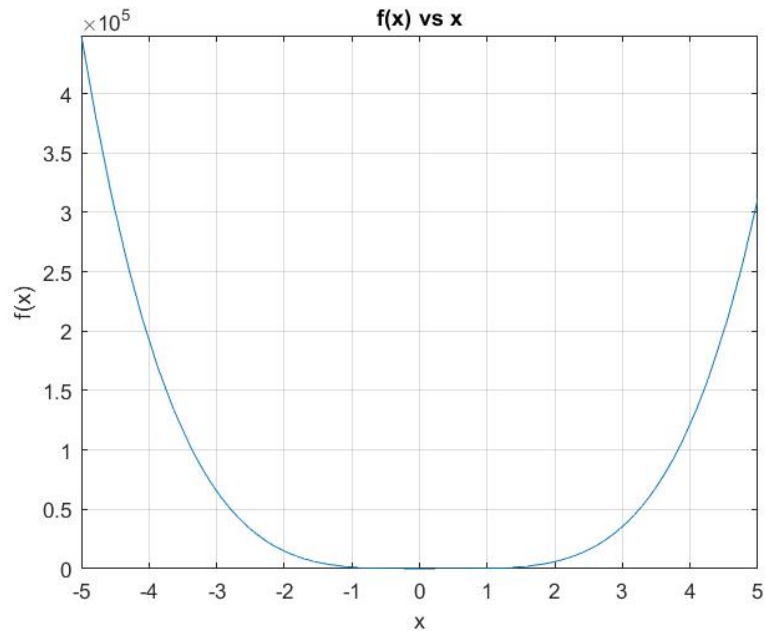


'The required root of the equation is: 0.232385'

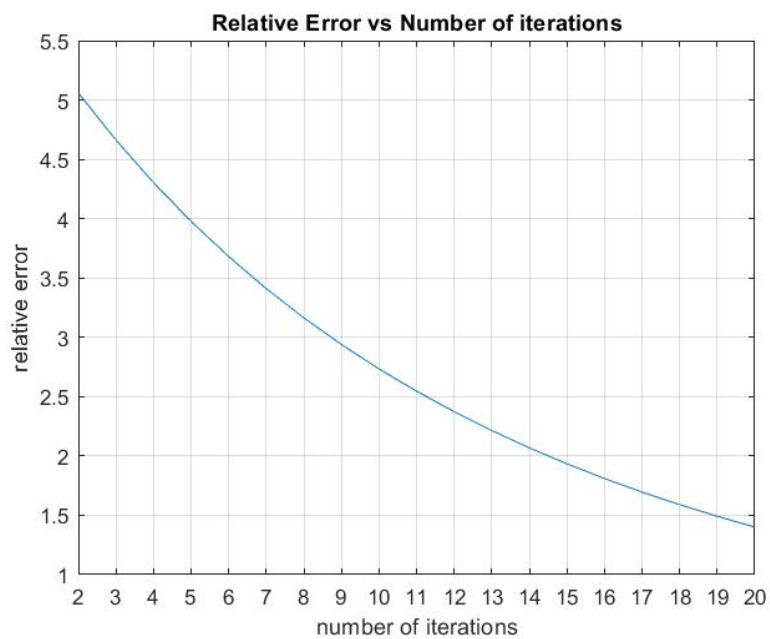
b) False Position Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-

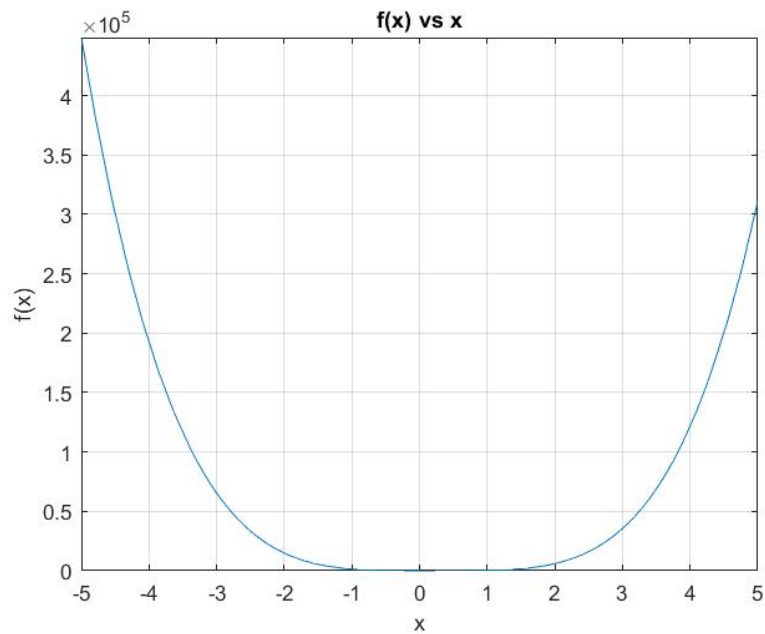


'The required root of the equation is: 0.181460'

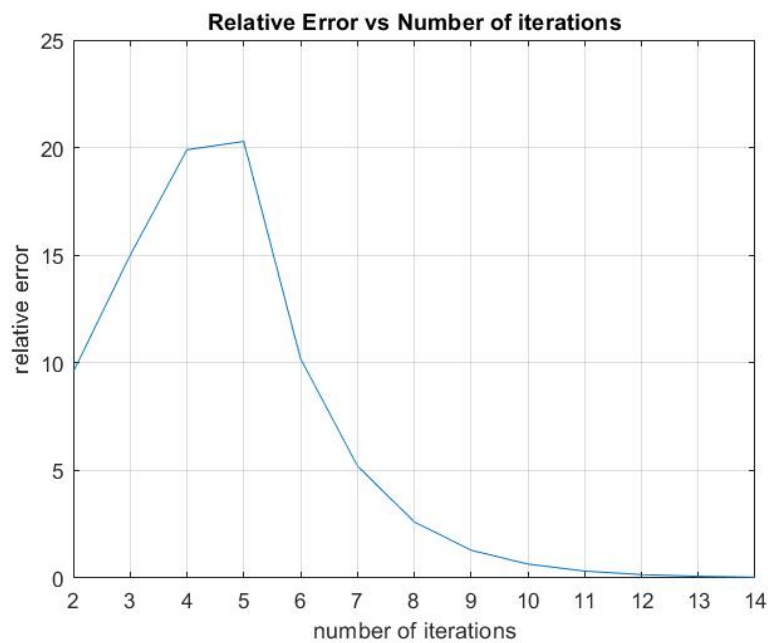
c) Modified False Position Method: -

Plot: -

F(x) vs X:



Relative approximate error vs iteration number:-

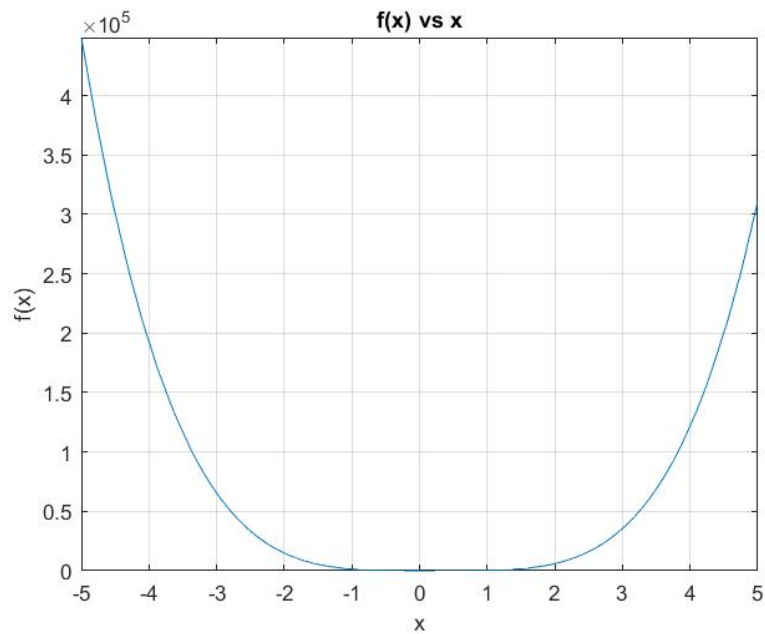


'The required root of the equation is: 0.232384'

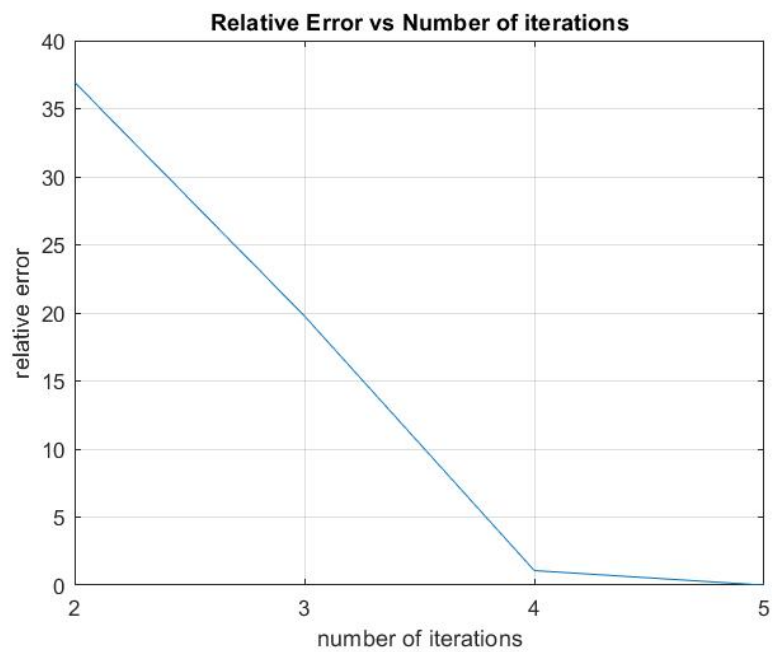
d) Newton Raphson Method: -

Plot: -

F(x) vs X:



Relative approximate error vs iteration number:-

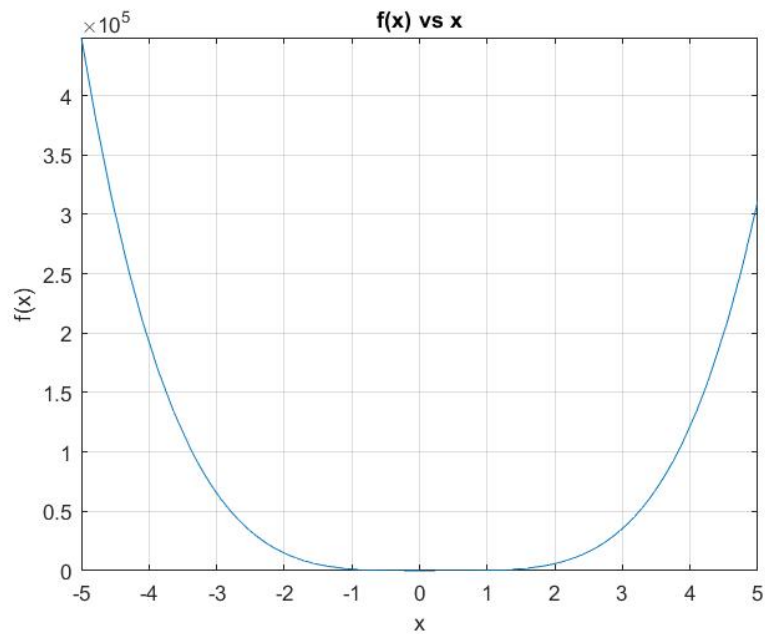


'The required root of the equation is: 0.232353'

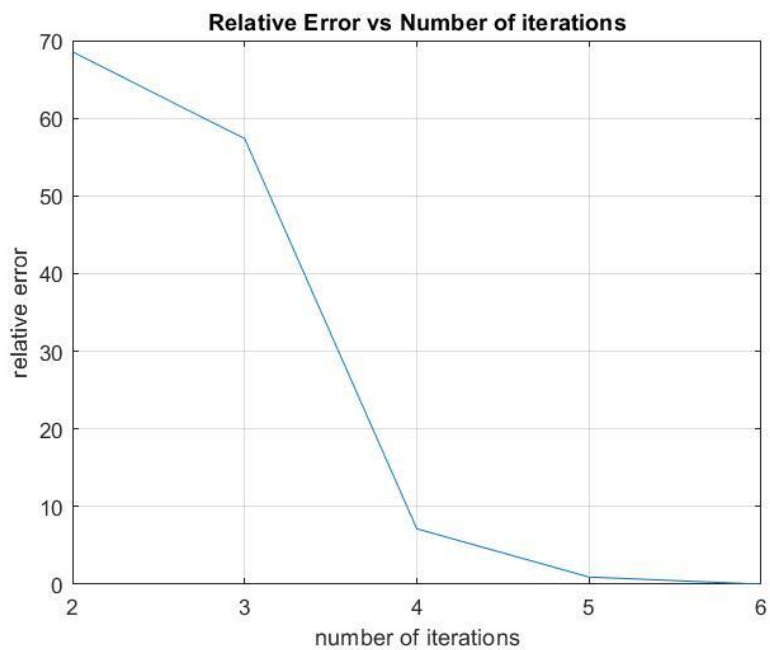
e) Secant Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-



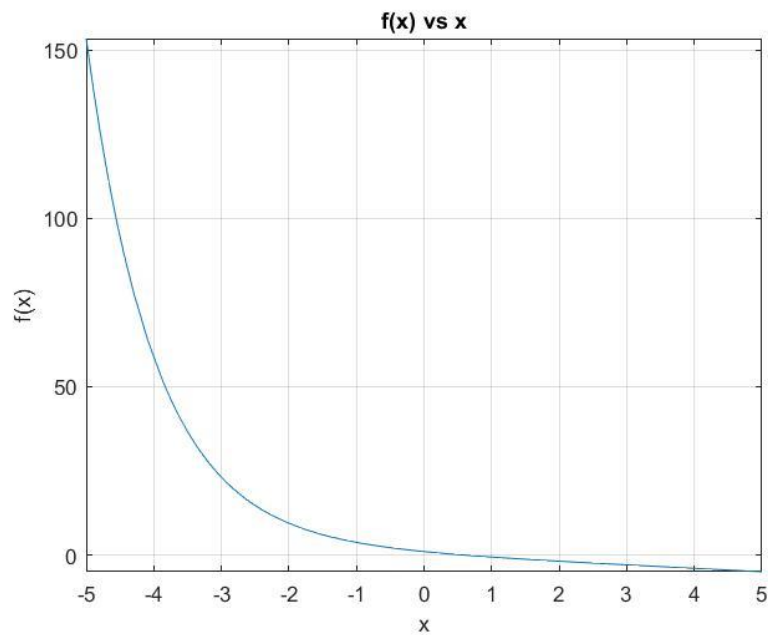
'The required root of the equation is: 0.232353'

Equation 2: - $F(X) = \exp(-x) - x = 0$

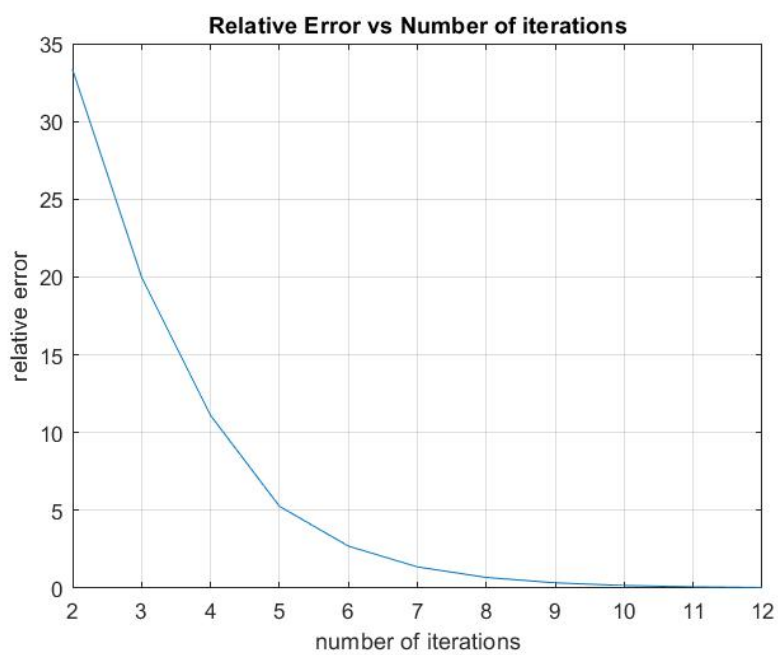
a) Bisection Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-

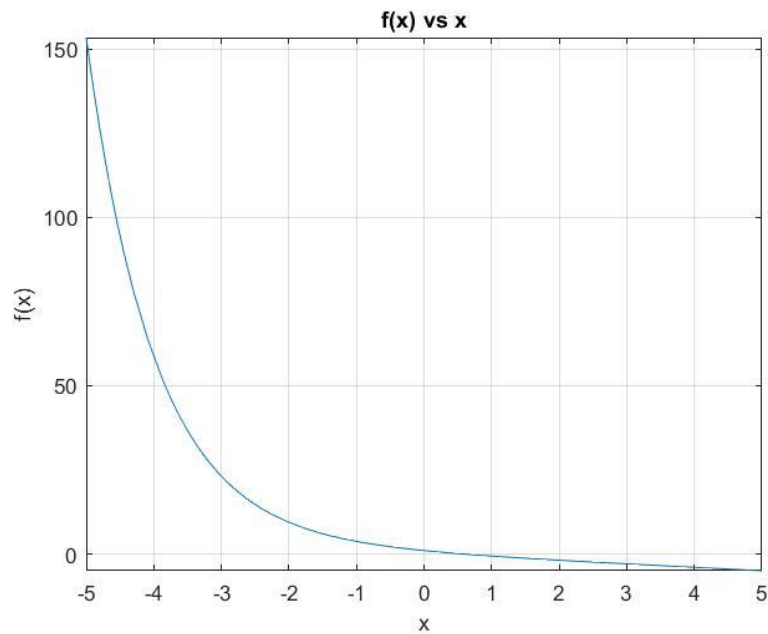


'The required root of the equation is: 0.567139'

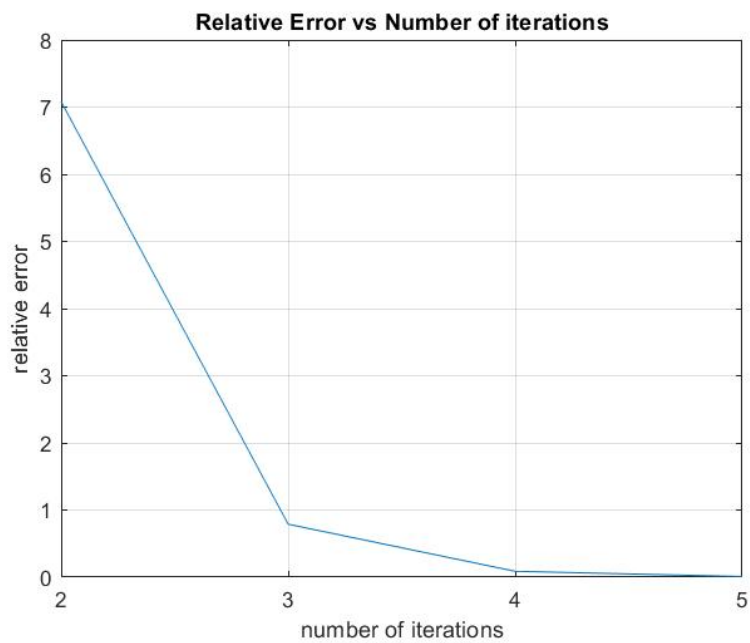
b) False Position Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-

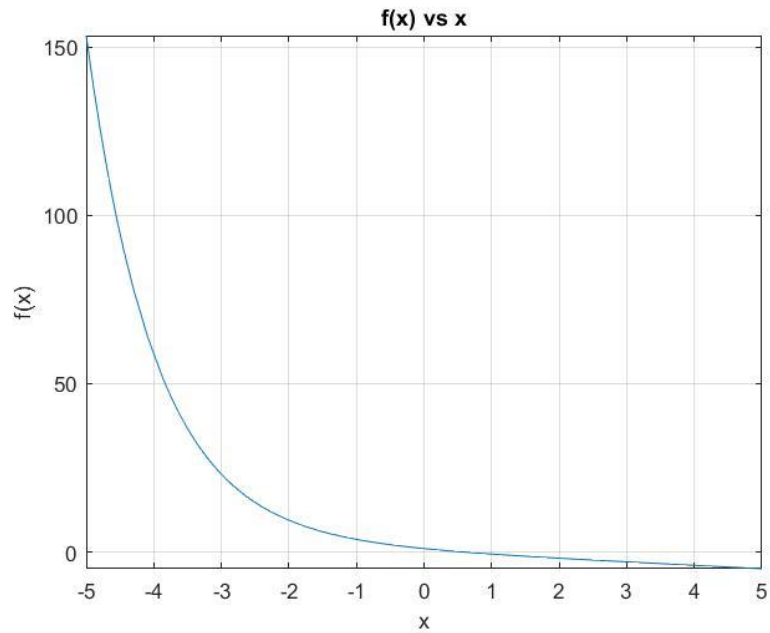


'The required root of the equation is: 0.567150'

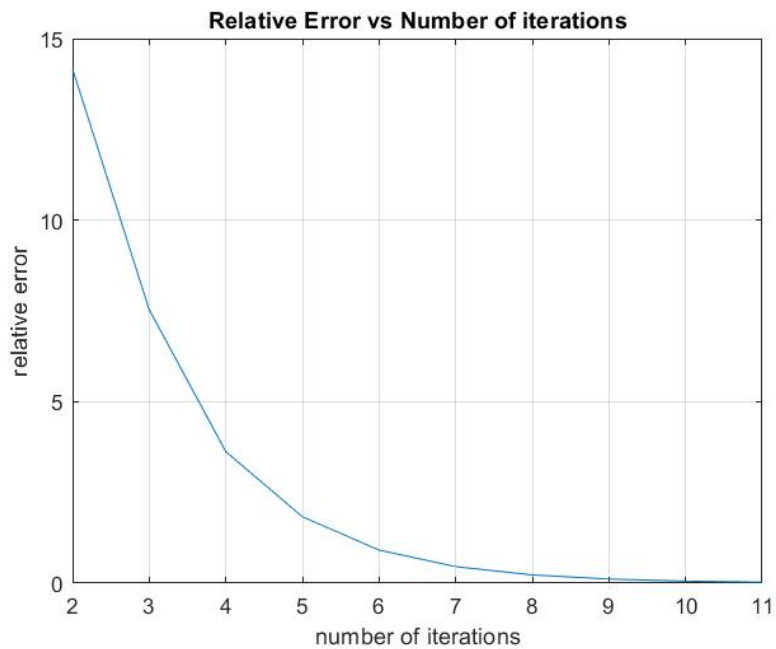
c) Modified False Position Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-

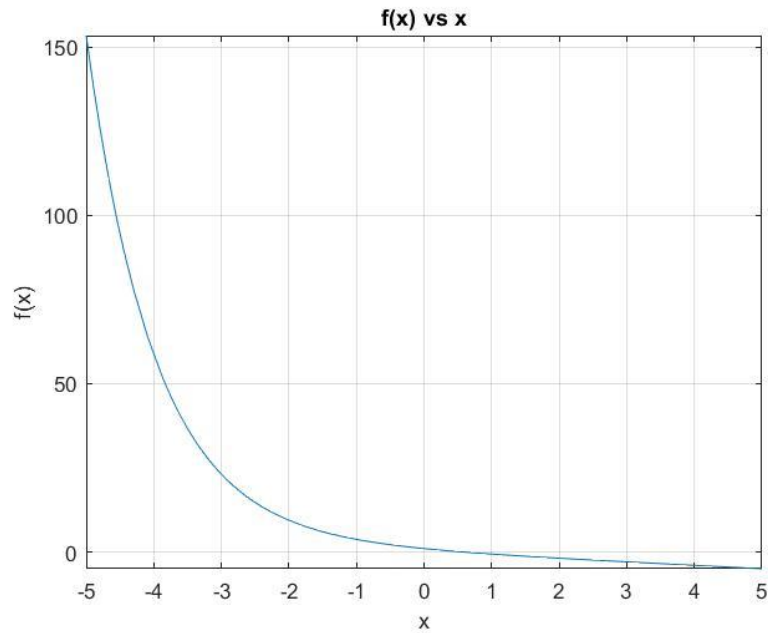


'The required root of the equation is: 0. 567197'

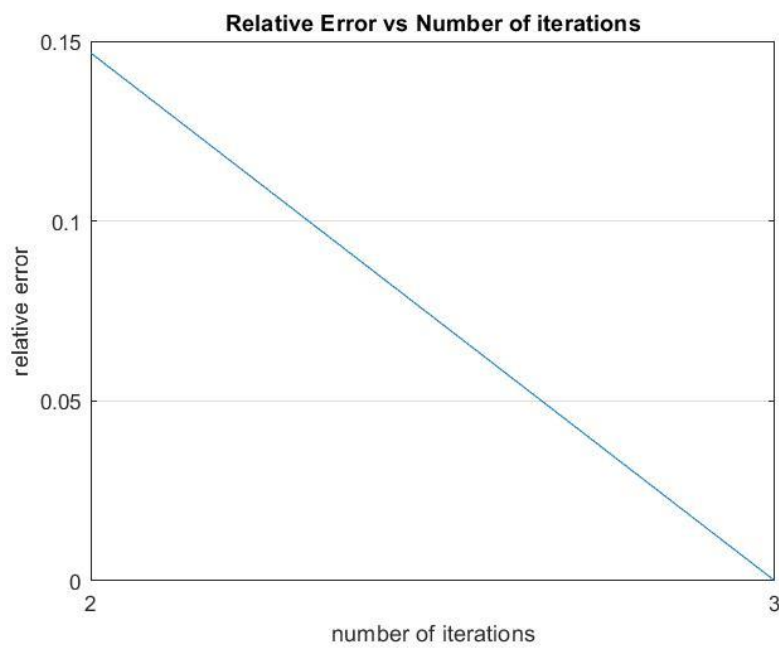
d) Newton Raphson Method: -

Plot: -

F(x) vs X:



Relative approximate error vs iteration number:-

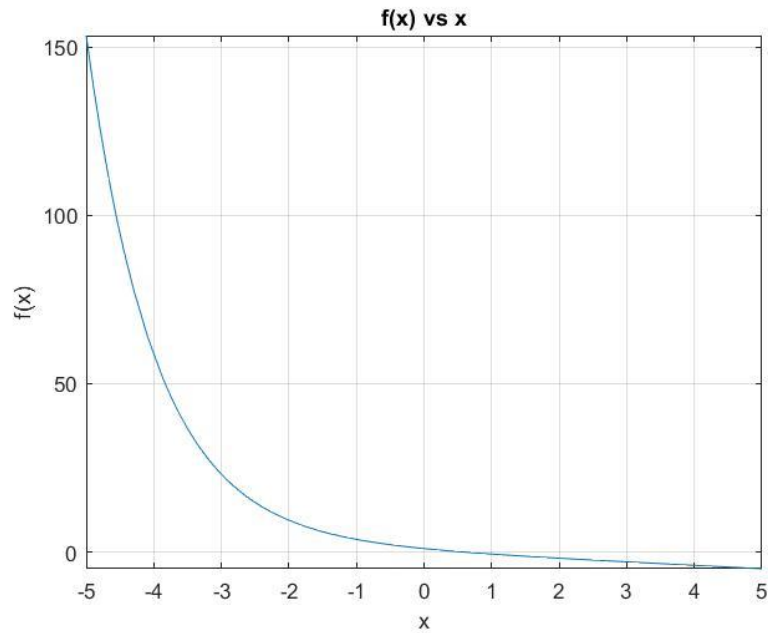


'The required root of the equation is: 0. 567143'

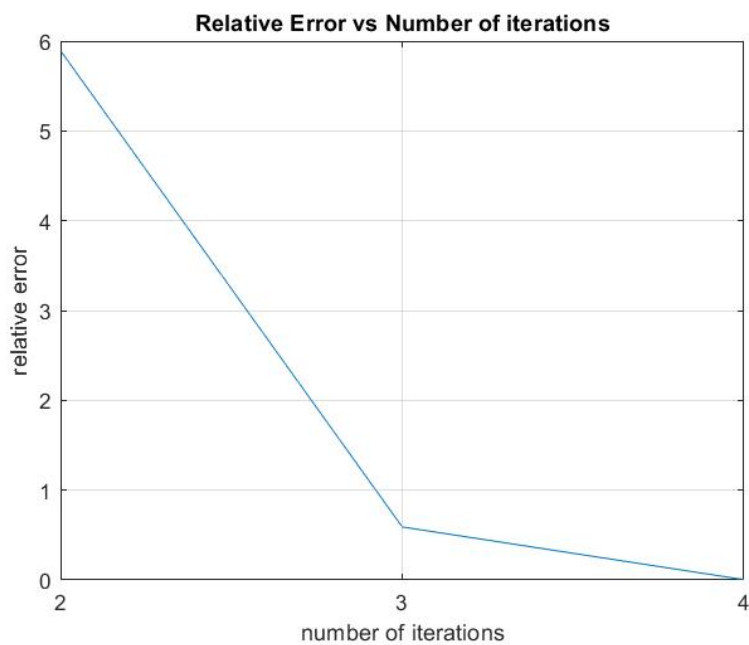
e) Secant Method: -

Plot: -

$F(x)$ vs x :



Relative approximate error vs iteration number:-



'The required root of the equation is: 0. 567143'

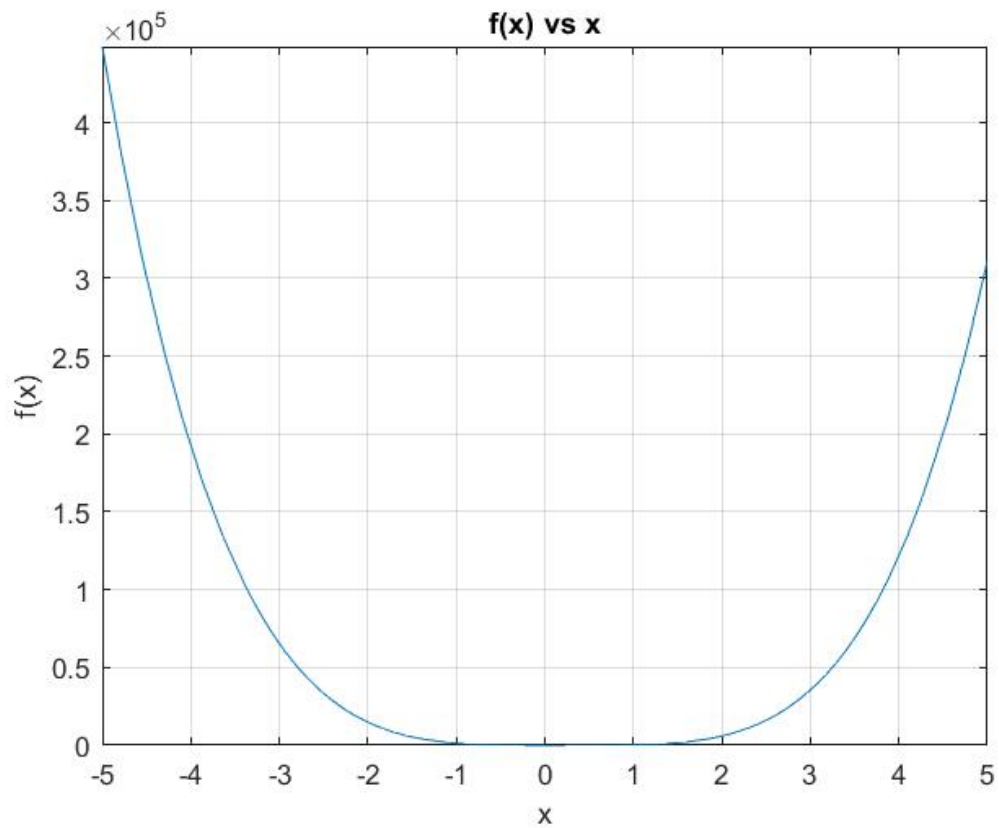
Q2) Test Function: -

$$1) F(X) = 600 * x.^4 - 550 * x.^3 + 200 * x.^2 - 20 * x - 1 = 0$$

a) Muller Method: -

Plot: -

F(x) vs x:

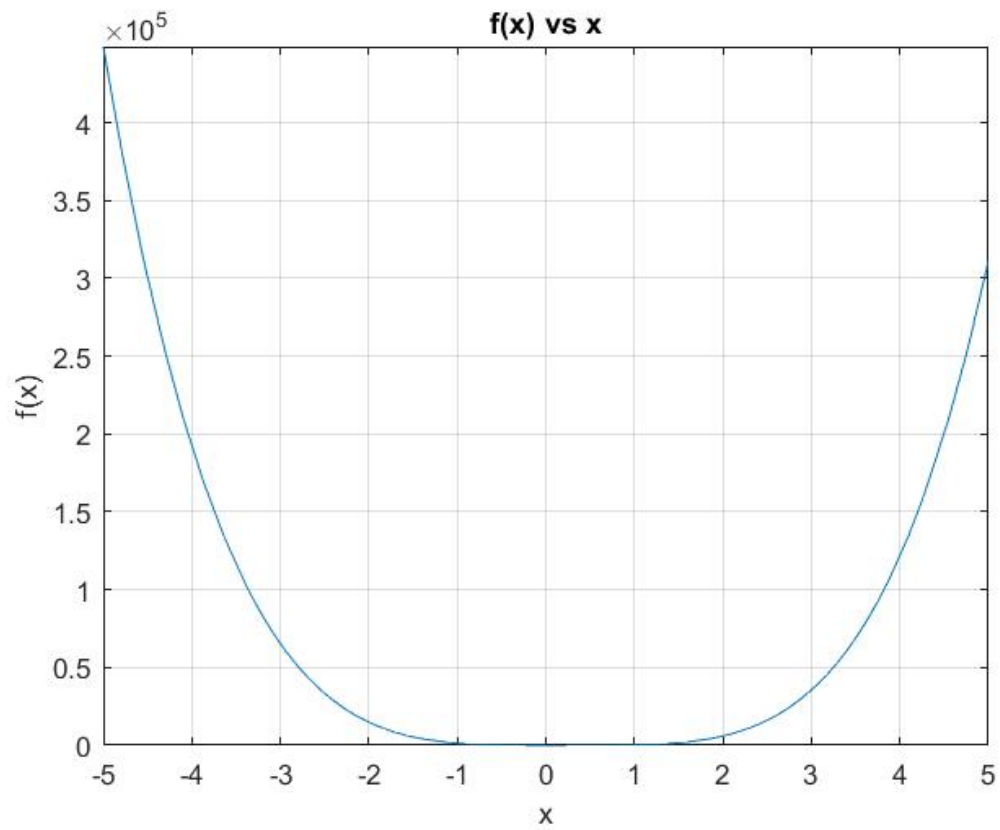


'The required root of the equation is: 0. 232353'

b) Bairstow Method: -

Plot: -

F(x) vs x:



All the roots of the given equation are as follows: -

0.232353+0.000000i

-0.035840+0.000000i

0.360077+0.265492i

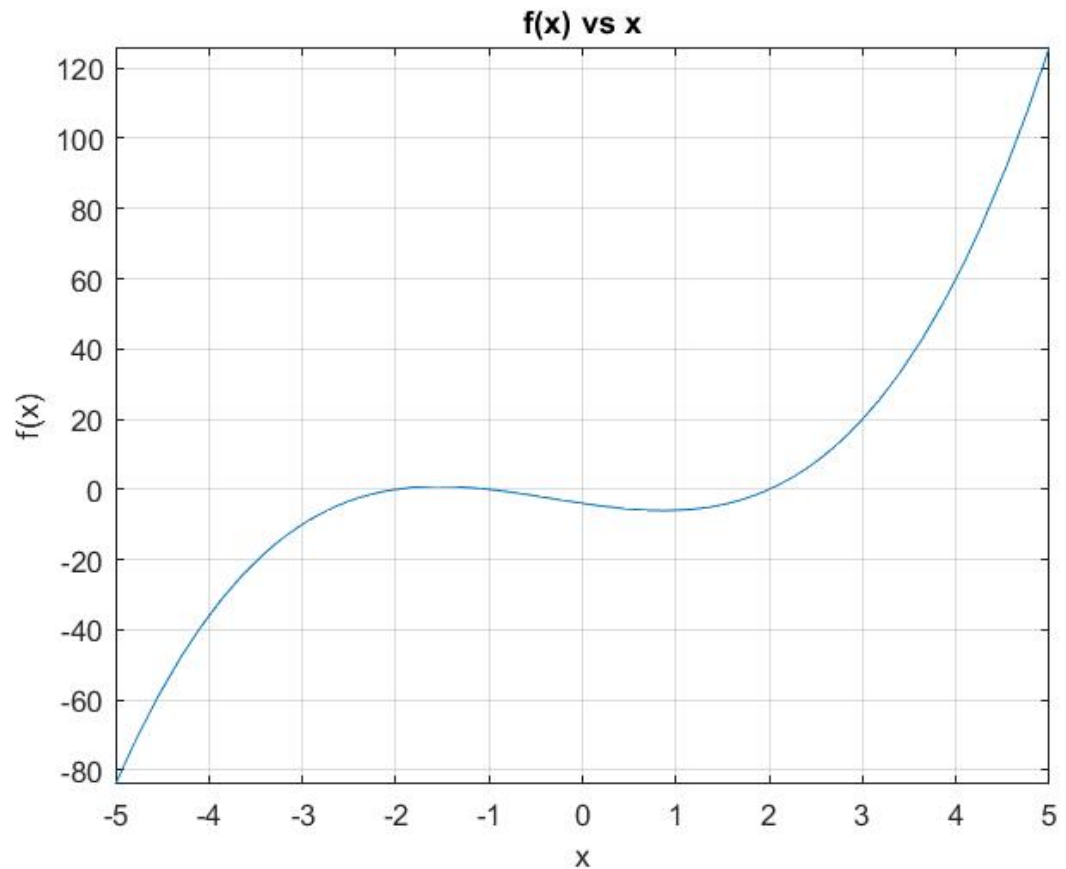
0.360077-0.265492i

Equation 2: - $F(X) = x^3 + x^2 - 4x - 4 = 0$

a) Muller Method: -

Plot: -

F(x) vs x:

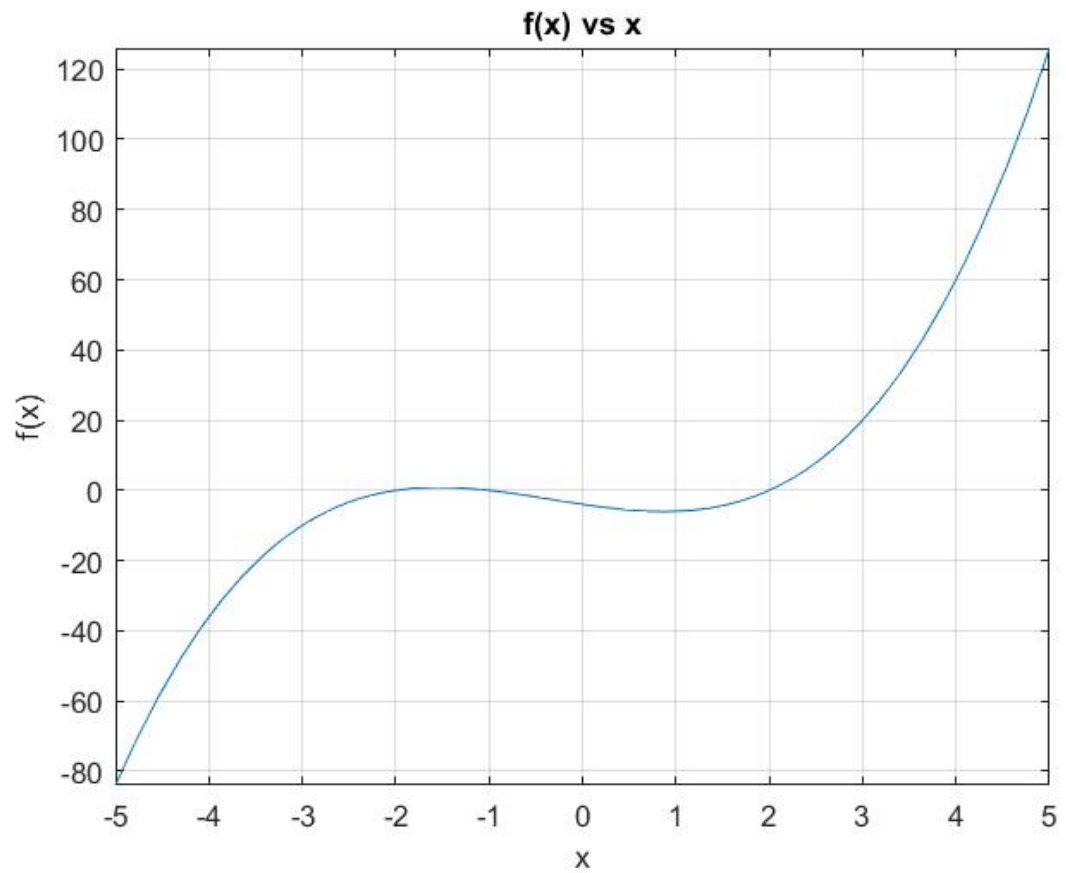


'The required root of the equation is: -1.000000'

b) Bairstow Method:-

Plot:-

F(x) vs x:



All the roots of the given equation are as follows: -

2.000000+0.000000i

-1.000000+0.000000i

-2.000000+0.000000i