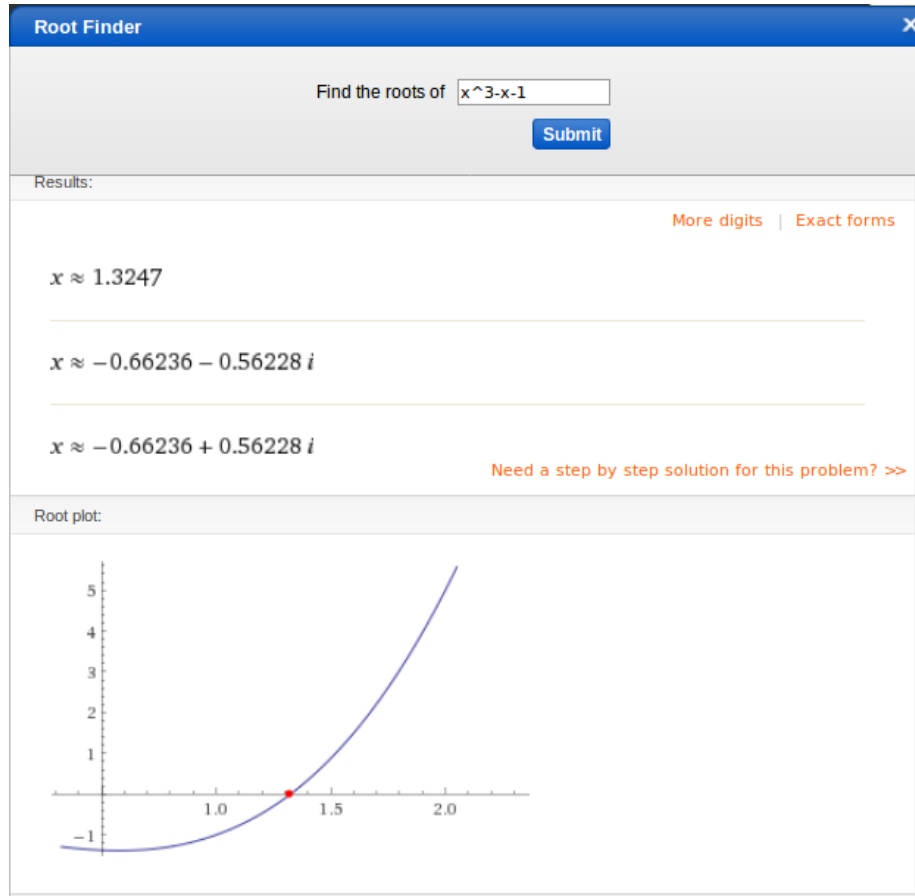


1. Örnek: $x^3 - x - 1$ & Epsilon: 0.01 & Max Iteration: 20

POLİNOM:



Kaynak: <http://www.wolframalpha.com/widgets/view.jsp?id=a7d8ae4569120b5bec12e7b6e9648b86>

1.a. Newton Raphson(1) - $X_0 = 3$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: 0
a3: 1
a2: 0
a1: -1
a0: -1
Your polynomial is: 0*x^4 + 1*x^3 + 0*x^2 + -1*x^1 + -1
Enter the epsilon value: 0.01
Enter the maximum iteration: 20
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 2
Please enter the x0 value to estimate the root of the polynomial: 3
1.. xN: 3.000000 yN: 23.000000
2.. xN: 2.712500 yN: 16.245143
3.. xN: 2.436564 yN: 11.028942
4.. xN: 2.176426 yN: 7.132939
5.. xN: 1.938091 yN: 4.341755
6.. xN: 1.729748 yN: 2.445709
7.. xN: 1.561385 yN: 1.245151
8.. xN: 1.441884 yN: 0.555836
9.. xN: 1.372345 yN: 0.212236
10.. xN: 1.340920 yN: 0.070145
11.. xN: 1.329667 yN: 0.021203

Newton Raphson Method used successfully.

Computed root is Xi:1.326164 and f(Xi): 0.006174
```

1.b.Newton Raphson(2) - $X_0 = -10$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: 0
a3: 1
a2: 0
a1: -1
a0: -1
Your polynomial is:  $0*x^4 + 1*x^3 + 0*x^2 + -1*x^1 + -1$ 
Enter the epsilon value: 0.01
Enter the maximum iteration: 20
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 2
Please enter the x0 value to estimate the root of the polynomial: -10
1.. xN: -10.000000 yN: -991.000000
2.. xN: -10.330223 yN: -1093.044186
3.. xN: -10.660635 yN: -1201.911497
4.. xN: -10.991220 yN: -1317.824160
5.. xN: -11.321962 yN: -1441.004404
6.. xN: -11.652849 yN: -1571.674456
7.. xN: -11.983868 yN: -1710.056543
8.. xN: -12.315010 yN: -1856.372892
9.. xN: -12.646265 yN: -2010.845728
10.. xN: -12.977624 yN: -2173.697278
11.. xN: -13.309080 yN: -2345.149765
12.. xN: -13.640626 yN: -2525.425415
13.. xN: -13.972256 yN: -2714.746453
14.. xN: -14.303963 yN: -2913.335102
15.. xN: -14.635744 yN: -3121.413588
16.. xN: -14.967592 yN: -3339.204135
17.. xN: -15.299504 yN: -3566.928965
18.. xN: -15.631475 yN: -3804.810303
19.. xN: -15.963503 yN: -4053.070372
20.. xN: -16.295583 yN: -4311.931396

Newton Raphson Method used successfully.
Program reached the maximum number of iteration.

Computed root is Xi:-16.627712 and f(Xi): -4581.615599
```

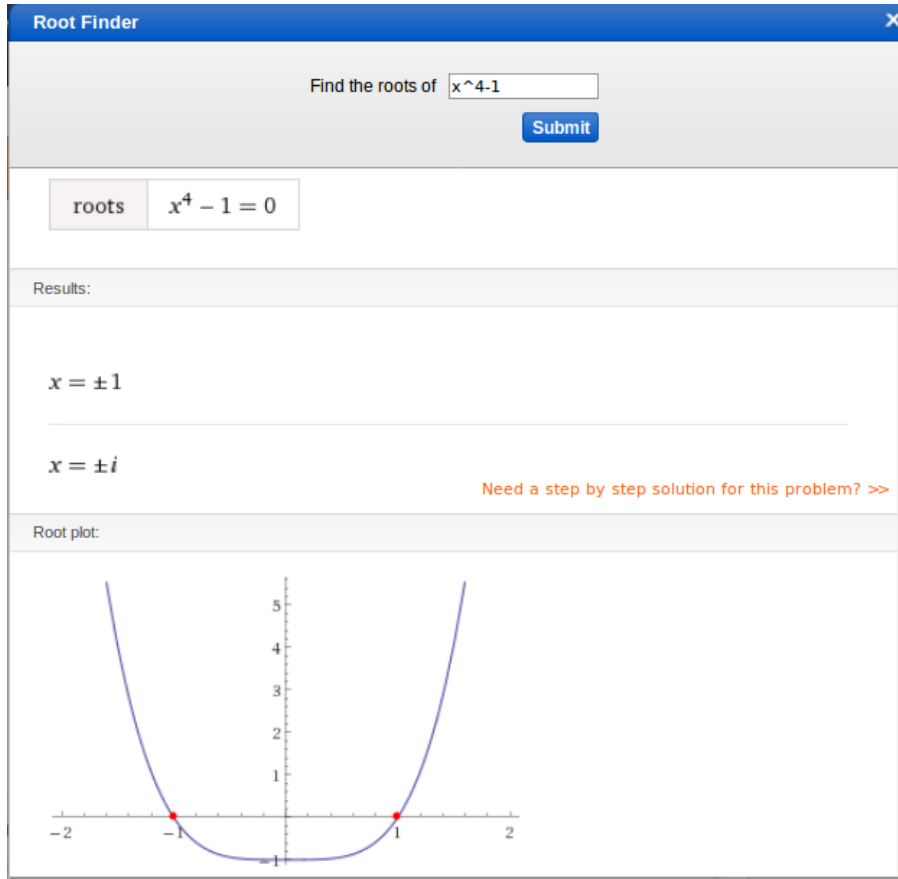
1.c.Regula Falsi - $x_L = -3$, $x_R = 3$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: 0
a3: 1
a2: 0
a1: -1
a0: -1
Your polynomial is:  $0*x^4 + 1*x^3 + 0*x^2 + -1*x^1 + -1$ 
Enter the epsilon value: 0.01
Enter the maximum iteration: 20
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 1
Estimate xLeft and xRight as initial values.
(yRight = P(xRight) and yLeft = P(xLeft) signs must be opposite)
xLeft: -3
xRight: 3
1.. xM:0.125000 yM:-1.123047 xL:0.125000 yL:-1.123047 xR:3.000000 yR:23.000000
2.. xM:0.258845 yM:-1.241503 xL:0.258845 yL:-1.241503 xR:3.000000 yR:23.000000
3.. xM:0.399231 yM:-1.335599 xL:0.399231 yL:-1.335599 xR:3.000000 yR:23.000000
4.. xM:0.541968 yM:-1.382776 xL:0.541968 yL:-1.382776 xR:3.000000 yR:23.000000
5.. xM:0.681365 yM:-1.365035 xL:0.681365 yL:-1.365035 xR:3.000000 yR:23.000000
6.. xM:0.811265 yM:-1.277330 xL:0.811265 yL:-1.277330 xR:3.000000 yR:23.000000
7.. xM:0.926424 yM:-1.131310 xL:0.926424 yL:-1.131310 xR:3.000000 yR:23.000000
8.. xM:1.023636 yM:-0.951039 xL:1.023636 yL:-0.951039 xR:3.000000 yR:23.000000
9.. xM:1.102113 yM:-0.763429 xL:1.102113 yL:-0.763429 xR:3.000000 yR:23.000000
10.. xM:1.163085 yM:-0.589703 xL:1.163085 yL:-0.589703 xR:3.000000 yR:23.000000
11.. xM:1.209004 yM:-0.441813 xL:1.209004 yL:-0.441813 xR:3.000000 yR:23.000000
12.. xM:1.242760 yM:-0.323377 xL:1.242760 yL:-0.323377 xR:3.000000 yR:23.000000
13.. xM:1.267124 yM:-0.232627 xL:1.267124 yL:-0.232627 xR:3.000000 yR:23.000000
14.. xM:1.284475 yM:-0.165251 xL:1.284475 yL:-0.165251 xR:3.000000 yR:23.000000
15.. xM:1.296713 yM:-0.116337 xL:1.296713 yL:-0.116337 xR:3.000000 yR:23.000000
16.. xM:1.305285 yM:-0.081382 xL:1.305285 yL:-0.081382 xR:3.000000 yR:23.000000
17.. xM:1.311260 yM:-0.056675 xL:1.311260 yL:-0.056675 xR:3.000000 yR:23.000000
18.. xM:1.315411 yM:-0.039346 xL:1.315411 yL:-0.039346 xR:3.000000 yR:23.000000
19.. xM:1.318288 yM:-0.027257 xL:1.318288 yL:-0.027257 xR:3.000000 yR:23.000000
20.. xM:1.320279 yM:-0.018853 xL:1.320279 yL:-0.018853 xR:3.000000 yR:23.000000
Regula Falsi Method used successfully.
Program reached the maximum number of iteration.

Root is approximately Xi: 1.320279 and f(Xi): -0.018853 between -3.00 and 3.00
```

2. Örnek: $x^4 - 1$ & Epsilon: 0.05 & Max Iteration: 20

POLİNOM:



Kaynak: <http://www.wolframalpha.com/widgets/view.jsp?id=a7d8ae4569120b5bec12e7b6e9648b86>

2.a. Newton Raphson- $X_0 = 100$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: 1
a3: 0
a2: 0
a1: 0
a0: -1
Your polynomial is: 1*x^4 + 0*x^3 + 0*x^2 + 0*x^1 + -1
Enter the epsilon value: 0.05
Enter the maximum iteration: 20
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 2
Please enter the x0 value to estimate the root of the polynomial: 100
1.. xN: 100.000000 yN: 99999999.000000
2.. xN: 75.000000 yN: 31640624.421875
3.. xN: 56.250001 yN: 10011291.059265
4.. xN: 42.187502 yN: 3167634.800002
5.. xN: 31.640630 yN: 1002259.186719
6.. xN: 23.730480 yN: 317120.809079
7.. xN: 17.797879 yN: 100338.744280
8.. xN: 13.348454 yN: 31747.544091
9.. xN: 10.011445 yN: 10044.859660
10.. xN: 7.508833 yN: 3177.994679
11.. xN: 5.632215 yN: 1005.275727
12.. xN: 4.225561 yN: 317.814014
13.. xN: 3.172484 yN: 100.297284
14.. xN: 2.387193 yN: 31.475056
15.. xN: 1.808772 yN: 9.703725
16.. xN: 1.398825 yN: 2.828720
17.. xN: 1.140456 yN: 0.691667
18.. xN: 1.023883 yN: 0.099008
```

Newton Raphson Method used successfully.

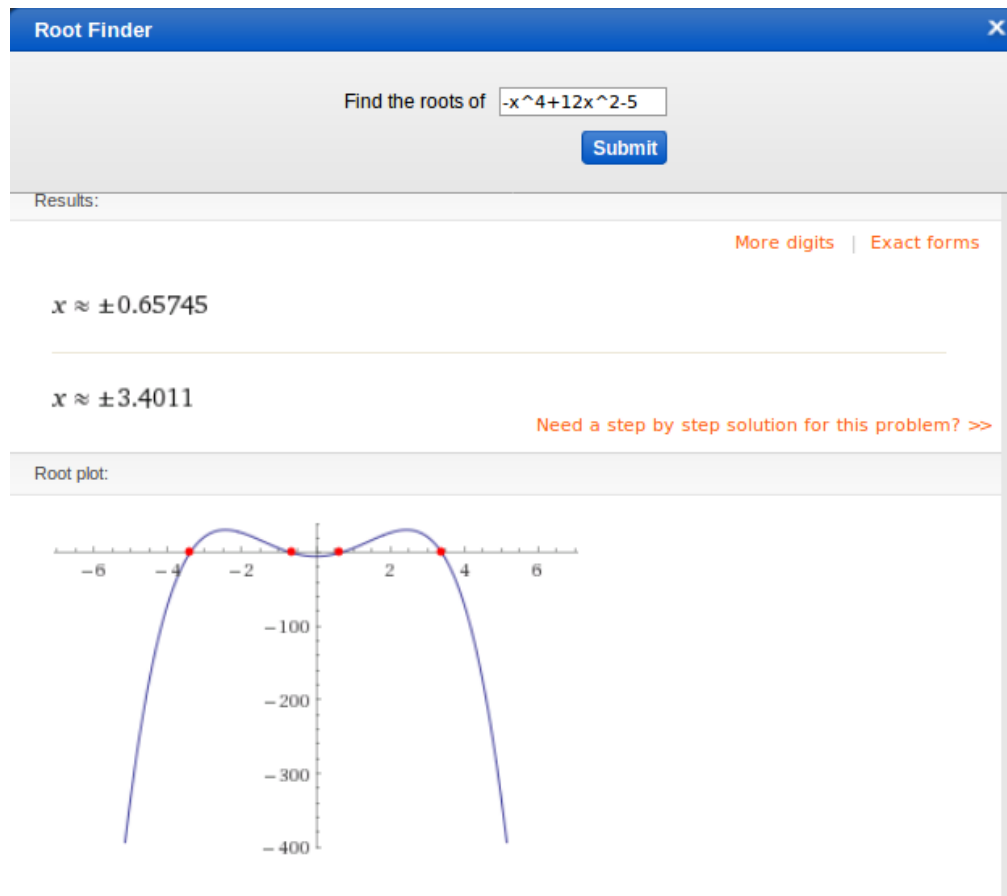
Computed root is $X_i: 1.000823$ and $f(X_i): 0.003295$

2.b.Regula Falsi - $x_L = -2.385$, $x_R = 0.385$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: 1
a3: 0
a2: 0
a1: 0
a0: -1
Your polynomial is: 1*x^4 + 0*x^3 + 0*x^2 + 0*x^1 + -1
Enter the epsilon value: 0.05
Enter the maximum iteration: 20
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 1
Estimate xLeft and xRight as initial values.
(yRight = P(xRight) and yLeft = P(xLeft) signs must be opposite)
xLeft: -2.385
xRight: 0.385
1.. xM:0.301214 yM:-0.991768 xL:-2.385000 yL:31.355904 xR:0.301214 yR:-0.991768
2.. xM:0.218855 yM:-0.997706 xL:-2.385000 yL:31.355904 xR:0.218855 yR:-0.997706
3.. xM:0.138559 yM:-0.999631 xL:-2.385000 yL:31.355904 xR:0.138559 yR:-0.999631
4.. xM:0.060593 yM:-0.999987 xL:-2.385000 yL:31.355904 xR:0.060593 yR:-0.999987
5.. xM:-0.014990 yM:-1.000000 xL:-2.385000 yL:31.355904 xR:-0.014990 yR:-1.000000
6.. xM:-0.088238 yM:-0.999939 xL:-2.385000 yL:31.355904 xR:-0.088238 yR:-0.999939
7.. xM:-0.159219 yM:-0.999357 xL:-2.385000 yL:31.355904 xR:-0.159219 yR:-0.999357
8.. xM:-0.227966 yM:-0.997299 xL:-2.385000 yL:31.355904 xR:-0.227966 yR:-0.997299
9.. xM:-0.294458 yM:-0.992482 xL:-2.385000 yL:31.355904 xR:-0.294458 yR:-0.992482
10.. xM:-0.358598 yM:-0.983464 xL:-2.385000 yL:31.355904 xR:-0.358598 yR:-0.983464
11.. xM:-0.420222 yM:-0.968817 xL:-2.385000 yL:31.355904 xR:-0.420222 yR:-0.968817
12.. xM:-0.479109 yM:-0.947309 xL:-2.385000 yL:31.355904 xR:-0.479109 yR:-0.947309
13.. xM:-0.535000 yM:-0.918075 xL:-2.385000 yL:31.355904 xR:-0.535000 yR:-0.918075
14.. xM:-0.587626 yM:-0.880765 xL:-2.385000 yL:31.355904 xR:-0.587626 yR:-0.880765
15.. xM:-0.636734 yM:-0.835627 xL:-2.385000 yL:31.355904 xR:-0.636734 yR:-0.835627
16.. xM:-0.682115 yM:-0.783514 xL:-2.385000 yL:31.355904 xR:-0.682115 yR:-0.783514
17.. xM:-0.723629 yM:-0.725802 xL:-2.385000 yL:31.355904 xR:-0.723629 yR:-0.725802
18.. xM:-0.761215 yM:-0.664240 xL:-2.385000 yL:31.355904 xR:-0.761215 yR:-0.664240
19.. xM:-0.794900 yM:-0.600746 xL:-2.385000 yL:31.355904 xR:-0.794900 yR:-0.600746
20.. xM:-0.824792 yM:-0.537218 xL:-2.385000 yL:31.355904 xR:-0.824792 yR:-0.537218
Regula Falsi Method used successfully.
Program reached the maximum number of iteration.

Root is approximately Xi: -0.824792 and f(Xi): -0.537218 between -2.38 and 0.39
```

3. Örnek: $-x^4 + 12x^2 - 5$ & Epsilon: 0.5 & Max Iteration: 10 POLINOM:



Kaynak: <http://www.wolframalpha.com/widgets/view.jsp?id=a7d8ae4569120b5bec12e7b6e9648b86>

3.a. Newton Raphson(1) - $X_0 = -2$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: -1
a3: 0
a2: 12
a1: 0
a0: -5
Your polynomial is: -1*x^4 + 0*x^3 + 12*x^2 + 0*x^1 + -5
Enter the epsilon value: 0.05
Enter the maximum iteration: 10
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 2
Please enter the x0 value to estimate the root of the polynomial: -2
1.. xN: -2.000000 yN: 27.000000
2.. xN: -0.312500 yN: -3.837662
3.. xN: -0.832654 yN: 2.839075
4.. xN: -0.672024 yN: 0.215431

Newton Raphson Method used successfully.

Computed root is Xi:-0.657579 and f(Xi): 0.001946
```


3.b. Newton Raphson(2) - $X_0 = -110$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: -1
a3: 0
a2: 12
a1: 0
a0: -5
Your polynomial is: -1*x^4 + 0*x^3 + 12*x^2 + 0*x^1 + -5
Enter the epsilon value: 0.05
Enter the maximum iteration: 10
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 2
Please enter the x0 value to estimate the root of the polynomial: -110
1.. xN: -110.000000 yN: -146264805.000000
2.. xN: -82.513642 yN: -46273990.859423
3.. xN: -61.903424 yN: -14638504.673873
4.. xN: -46.451832 yN: -4630094.820155
5.. xN: -34.871243 yN: -1464077.718971
6.. xN: -26.196631 yN: -462727.429685
7.. xN: -19.705168 yN: -146117.424460
8.. xN: -14.856027 yN: -46065.747554
9.. xN: -11.245419 yN: -14479.478524
10.. xN: -8.573173 yN: -4525.154969

Newton Raphson Method used successfully.
Program reached the maximum number of iteration.

Computed root is Xi:-6.618237 and f(Xi): -1397.919862
```

3.c. Regula Falsi - $x_L = 2.65$, $x_R = 4$ için ÇIKTI:

```
spaced@spaced-Lenovo-ideapad-310-15IKB:~/Desktop$ ./a.out
Enter the coefficients of quartic polynomial.
a4: -1
a3: 0
a2: 12
a1: 0
a0: -5
Your polynomial is: -1*x^4 + 0*x^3 + 12*x^2 + 0*x^1 + -5
Enter the epsilon value: 0.05
Enter the maximum iteration: 10
1. Find root with Regula Falsi Method.
2. Find root with Newton Raphson Method.
Enter your choice (1 or 2): 1
Estimate xLeft and xRight as initial values.
(yRight = P(xRight) and yLeft = P(xLeft) signs must be opposite)
xLeft: 2.65
xRight: 4
1.. xM:3.058658 yM:19.741358 xL:3.058658 yL:19.741358 xR:4.000000 yR:-69.000000
2.. xM:3.268069 yM:9.095049 xL:3.268069 yL:9.095049 xR:4.000000 yR:-69.000000
3.. xM:3.353310 yM:3.493228 xL:3.353310 yL:3.493228 xR:4.000000 yR:-69.000000
4.. xM:3.384472 yM:1.246764 xL:3.384472 yL:1.246764 xR:4.000000 yR:-69.000000
5.. xM:3.395397 yM:0.433254 xL:3.395397 yL:0.433254 xR:4.000000 yR:-69.000000
6.. xM:3.399170 yM:0.149157 xL:3.399170 yL:0.149157 xR:4.000000 yR:-69.000000
7.. xM:3.400466 yM:0.051185 xL:3.400466 yL:0.051185 xR:4.000000 yR:-69.000000
8.. xM:3.400910 yM:0.017545 xL:3.400910 yL:0.017545 xR:4.000000 yR:-69.000000
Regula Falsi Method used successfully.

Root is approximately Xi: 3.400910 and f(Xi): 0.017545 between 2.65 and 4.00
```