

1. Metode Tabel

Source code :

```
+ Kode + Teks

[ ] # import modul yang akan dibutuhkan untuk perhitungan persamaan
import matplotlib.pyplot as plt
import numpy as np
import math

# Penyelesaian dengan metode tabel
print('Metode Tabel \n')
# deklarasi fungsi f(x) dari persamaan soal kedua yang telah disubstitusi dengan angka nim
def f(x):
    return (2*x**2) - (5*x)

# tulis variabel a, b dan n yang sudah diketahui
a = -1
b = 2
# n = 10
# cara mencari nilai increment >> h = |a - b / n| sehingga bisa dihitung >> | -1 - 2 / 10| = 0.3
h = 0.3

x = a
n = 1
while (x <= b):
    print(n, '.', ' ', round(x,2), '=>', round(f(x),5))
    x += h
    n += 1
```

Running Program:

```
Metode Tabel

1 .   -1 => 7
2 .   -0.7 => 4.48
3 .   -0.4 => 2.32
4 .   -0.1 => 0.52
5 .    0.2 => -0.92
6 .    0.5 => -2.0
7 .    0.8 => -2.72
8 .    1.1 => -3.08
9 .    1.4 => -3.08
10 .   1.7 => -2.72
11 .   2.0 => -2.0
```

2. Metode Biseksi

Source code :

```
print('Metode Biseksi \n')

# deklarasi fungsi f(x)
def f(x):
    return (2*x**2) - (5*x)

# variabel yang sudah diketahui
a = -1
b = 2
```

```

# n = 10
# taksiran nilai presisi
prs1 = 0.000001
prs2 = 0.00000001
i = 0

# looping untuk mencari hasil akar
while True:
    print('iterasi ke-', (i+1))
    # cari nilai c sebagai nilai tengah
    c = (a+b)/2
    # jika fungsi batas atas kali fungsi batas bawah bernilai kurang dari
    0 maka lakukan perulangan dengan nilai batas bawah = nilai c
    if (f(a)*f(c) < 0):
        print('nilai a = ', a)
        print('nilai b = ', b)
        print('nilai c = ', c)
        print('nilai f(a) = ', f(a))
        print('nilai f(b) = ', f(b))
        print('nilai f(c) = ', f(c))
        b = c
        # jika fungsi batas atas kali fungsi batas bawah lebih besar dari 0
        maka nilai batas atas diambil dari nilai c dari iterasi sebelumnya
    else:
        print('nilai a = ', a)
        print('nilai b = ', b)
        print('nilai c = ', c)
        print('nilai f(a) = ', f(a))
        print('nilai f(b) = ', f(b))
        print('nilai f(c) = ', f(c))
        a = c

    i += 1
    print()
    # jika nilai mutlak a - b kurang dari presisi1 atau nilai mutlak fung
    si c kurang dari presisi2 maka hentikan looping
    # kemudian ambil nilai akar dari nilai c di iterasi terakhir
    if(abs(a-b) < prs1 or abs(f(c)) < prs2):
        break

print('Nilai akar = ', c)

```

Running program:

Metode Biseksi

```
iterasi ke- 1  
nilai a = -1  
nilai b = 2  
nilai c = 0.5  
nilai f(a) = 7  
nilai f(b) = -2  
nilai f(c) = -2.0
```

```
iterasi ke- 2  
nilai a = -1  
nilai b = 0.5  
nilai c = -0.25  
nilai f(a) = 7  
nilai f(b) = -2.0  
nilai f(c) = 1.375
```

```
iterasi ke- 3  
nilai a = -0.25  
nilai b = 0.5  
nilai c = 0.125  
nilai f(a) = 1.375  
nilai f(b) = -2.0  
nilai f(c) = -0.59375
```

```
iterasi ke- 4  
nilai a = -0.25  
nilai b = 0.125  
nilai c = -0.0625  
nilai f(a) = 1.375  
nilai f(b) = -0.59375  
nilai f(c) = 0.3203125
```

```
iterasi ke- 5  
nilai a = -0.0625  
nilai b = 0.125  
nilai c = 0.03125  
nilai f(a) = 0.3203125  
nilai f(b) = -0.59375  
nilai f(c) = -0.154296875
```

```
iterasi ke- 6  
nilai a = -0.0625  
nilai b = 0.03125  
nilai c = -0.015625  
nilai f(a) = 0.3203125  
nilai f(b) = -0.154296875  
nilai f(c) = 0.07861328125
```

```
iterasi ke- 7  
nilai a = -0.015625  
nilai b = 0.03125  
nilai c = 0.0078125  
nilai f(a) = 0.07861328125  
nilai f(b) = -0.154296875
```

nilai $f(c)$ = -0.0389404296875

iterasi ke- 8

nilai a = -0.015625

nilai b = 0.0078125

nilai c = -0.00390625

nilai $f(a)$ = 0.07861328125

nilai $f(b)$ = -0.0389404296875

nilai $f(c)$ = 0.019561767578125

iterasi ke- 9

nilai a = -0.00390625

nilai b = 0.0078125

nilai c = 0.001953125

nilai $f(a)$ = 0.019561767578125

nilai $f(b)$ = -0.0389404296875

nilai $f(c)$ = -0.00975799560546875

iterasi ke- 10

nilai a = -0.00390625

nilai b = 0.001953125

nilai c = -0.0009765625

nilai $f(a)$ = 0.019561767578125

nilai $f(b)$ = -0.00975799560546875

nilai $f(c)$ = 0.0048847198486328125

iterasi ke- 11

nilai a = -0.0009765625

nilai b = 0.001953125

nilai c = 0.00048828125

nilai $f(a)$ = 0.0048847198486328125

nilai $f(b)$ = -0.00975799560546875

nilai $f(c)$ = -0.002440929412841797

iterasi ke- 12

nilai a = -0.0009765625

nilai b = 0.00048828125

nilai c = -0.000244140625

nilai $f(a)$ = 0.0048847198486328125

nilai $f(b)$ = -0.002440929412841797

nilai $f(c)$ = 0.0012208223342895508

iterasi ke- 13

nilai a = -0.000244140625

nilai b = 0.00048828125

nilai c = 0.0001220703125

nilai $f(a)$ = 0.0012208223342895508

nilai $f(b)$ = -0.002440929412841797

nilai $f(c)$ = -0.0006103217601776123

iterasi ke- 14

nilai a = -0.000244140625

nilai b = 0.0001220703125

nilai c = -6.103515625e-05

nilai $f(a)$ = 0.0012208223342895508

nilai $f(b)$ = -0.0006103217601776123

nilai $f(c)$ = 0.0003051832318305969

```
iterasi ke- 15
nilai a = -6.103515625e-05
nilai b = 0.0001220703125
nilai c = 3.0517578125e-05
nilai f(a) = 0.0003051832318305969
nilai f(b) = -0.0006103217601776123
nilai f(c) = -0.00015258602797985077
```

```
iterasi ke- 16
nilai a = -6.103515625e-05
nilai b = 3.0517578125e-05
nilai c = -1.52587890625e-05
nilai f(a) = 0.0003051832318305969
nilai f(b) = -0.00015258602797985077
nilai f(c) = 7.629441097378731e-05
```

```
iterasi ke- 17
nilai a = -1.52587890625e-05
nilai b = 3.0517578125e-05
nilai c = 7.62939453125e-06
nilai f(a) = 7.629441097378731e-05
nilai f(b) = -0.00015258602797985077
nilai f(c) = -3.814685624092817e-05
```

```
iterasi ke- 18
nilai a = -1.52587890625e-05
nilai b = 7.62939453125e-06
nilai c = -3.814697265625e-06
nilai f(a) = 7.629441097378731e-05
nilai f(b) = -3.814685624092817e-05
nilai f(c) = 1.9073515431955457e-05
```

```
iterasi ke- 19
nilai a = -3.814697265625e-06
nilai b = 7.62939453125e-06
nilai c = 1.9073486328125e-06
nilai f(a) = 1.9073515431955457e-05
nilai f(b) = -3.814685624092817e-05
nilai f(c) = -9.536735888104886e-06
```

```
iterasi ke- 20
nilai a = -3.814697265625e-06
nilai b = 1.9073486328125e-06
nilai c = -9.5367431640625e-07
nilai f(a) = 1.9073515431955457e-05
nilai f(b) = -9.536735888104886e-06
nilai f(c) = 4.7683734010206535e-06
```

```
iterasi ke- 21
nilai a = -9.5367431640625e-07
nilai b = 1.9073486328125e-06
nilai c = 4.76837158203125e-07
nilai f(a) = 4.7683734010206535e-06
nilai f(b) = -9.536735888104886e-06
nilai f(c) = -2.384185336268274e-06
```

```
iterasi ke- 22
nilai a = -9.5367431640625e-07
```

```
nilai b = 4.76837158203125e-07
nilai c = -2.384185791015625e-07
nilai f(a) = 4.7683734010206535e-06
nilai f(b) = -2.384185336268274e-06
nilai f(c) = 1.1920930091946502e-06
```

```
Nilai akar = -2.384185791015625e-07
```

3. Metode Regula-Falsi

Source code:

```
print('Metode Regula-falsi \n')

# deklarasi fungsi f(x)
def f(x):
    return (2*x**2) - (5*x)

# variabel yang sudah diketahui
a = -1
b = 2
# n = 10
# taksiran nilai presisi
prs1 = 0.000001
prs2 = 0.00000001
i = 0

while True:
    print('Iterasi ke-', (i+1))
    # rumus regula falsi
    c = b - (f(b)*(b-a)/(f(b) - f(a)))
    # jika nilai mutlak f(c) kurang dari nilai presisi2 maka a = c dan b
    = c lalu hentikan
    if (abs(f(c)) < prs2):
        a = c
        b = c
        break
    else:
        if (f(a)*f(c) < 0):
            print('a = ', a)
            print('b = ', b)
            print('c = ', c)
            print('f(a) = ', f(a))
            print('f(b) = ', f(b))
            print('f(c) = ', f(c))
            b = c
        else:
            print('a = ', a)
            print('b = ', b)
            print('c = ', c)
            print('f(a) = ', f(a))
```

```

        print('f(b) = ',f(b))
        print('f(c) = ',f(c))
        a = c
    i += 1
    print()
    # jika nilai mutlak a - b kurang dari presisi satu maka berhenti dan
    ambil nilai c terakhir sebagai nilai akar
    if(abs(a-b) < prs1):
        break

print('Nilai Akar = ', c)

```

Running Program:

Metode Regula-falsi

```

Iterasi ke- 1
a = -1
b = 2
c = 1.3333333333333335
f(a) = 7
f(b) = -2
f(c) = -3.1111111111111116

```

```

Iterasi ke- 2
a = -1
b = 1.3333333333333335
c = 0.6153846153846153
f(a) = 7
f(b) = -3.1111111111111116
f(c) = -2.3195266272189348

```

```

Iterasi ke- 3
a = -1
b = 0.6153846153846153
c = 0.2133333333333332
f(a) = 7
f(b) = -2.3195266272189348
f(c) = -0.97564444444444439

```

```

Iterasi ke- 4
a = -1
b = 0.2133333333333332
c = 0.06490872210953344
f(a) = 7
f(b) = -0.97564444444444439
f(c) = -0.31611732613588195

```

```

Iterasi ke- 5
a = -1
b = 0.06490872210953344
c = 0.018895777974608785
f(a) = 7
f(b) = -0.31611732613588195
f(c) = -0.0937647890225125

```

```
Iterasi ke- 6
a = -1
b = 0.018895777974608785
c = 0.005428098893176704
f(a) = 7
f(b) = -0.0937647890225125
f(c) = -0.02708156595069531
```

```
Iterasi ke- 7
a = -1
b = 0.005428098893176704
c = 0.0015532943796227167
f(a) = 7
f(b) = -0.02708156595069531
f(c) = -0.0077616464512540485
```

```
Iterasi ke- 8
a = -1
b = 0.0015532943796227167
c = 0.0004439954386406099
f(a) = 7
f(b) = -0.0077616464512540485
f(c) = -0.002219582929303982
```

```
Iterasi ke- 9
a = -1
b = 0.0004439954386406099
c = 0.00012687193405732088
f(a) = 7
f(b) = -0.002219582929303982
f(c) = -0.0006343274773113014
```

```
Iterasi ke- 10
a = -1
b = 0.00012687193405732088
c = 3.625043806300242e-05
f(a) = 7
f(b) = -0.0006343274773113014
f(c) = -0.00018124956212649257
```

```
Iterasi ke- 11
a = -1
b = 3.625043806300242e-05
c = 1.0357375292112551e-05
f(a) = 7
f(b) = -0.00018124956212649257
f(c) = -5.1786661910116875e-05
```

```
Iterasi ke- 12
a = -1
b = 1.0357375292112551e-05
c = 2.9592588406476994e-06
f(a) = 7
f(b) = -5.1786661910116875e-05
f(c) = -1.4796276688812726e-05
```

```
Iterasi ke- 13
```



```
a = -1
b = 2.9592588406476994e-06
c = 8.455032407744686e-07
f(a) = 7
f(b) = -1.4796276688812726e-05
f(c) = -4.227514774120883e-06
```

```
Iterasi ke- 14
a = -1
b = 8.455032407744686e-07
c = 2.415724128642075e-07
f(a) = 7
f(b) = -4.227514774120883e-06
f(c) = -1.2078619476065764e-06
```

```
Iterasi ke- 15
a = -1
b = 2.415724128642075e-07
c = 6.902069415362943e-08
f(a) = 7
f(b) = -1.2078619476065764e-06
f(c) = -3.451034612404347e-07
```

```
Iterasi ke- 16
a = -1
b = 6.902069415362943e-08
c = 1.972019871849465e-08
f(a) = 7
f(b) = -3.451034612404347e-07
f(c) = -9.860099281470077e-08
```

```
Iterasi ke- 17
a = -1
b = 1.972019871849465e-08
c = 5.6343425227442865e-09
f(a) = 7
f(b) = -9.860099281470077e-08
f(c) = -2.81717125502298e-08
```

```
Iterasi ke- 18
Nilai Akar = 1.6098121519470058e-09
```

4. Grafik Fungsi

Source Code:

```
print('Grafik Fungsi \n')

def f(x):
    return (2*x**2) - (5*x)

x = np.linspace(-1,2,10000)

y = f(x)
```

```

# use set_position
ax = plt.gca()
ax.spines['top'].set_color('none')
ax.spines['left'].set_position('zero')
ax.spines['right'].set_color('none')
ax.spines['bottom'].set_position('zero')

# depict illustration
plt.xlim(-1, 2)

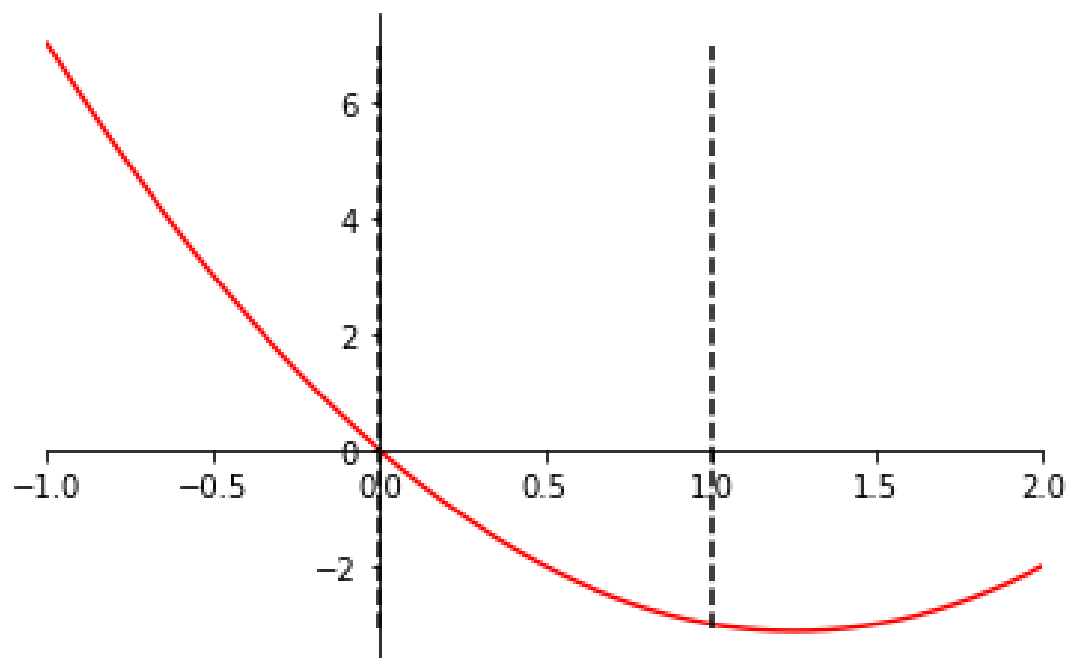
# plot the function
plt.plot(x,y, 'r')

# show the plot
plt.axvline(x=0, color='k', linestyle='--', ymin=0.05, ymax=0.95)
plt.axvline(x=1, color='k', linestyle='--', ymin=0.05, ymax=0.95)
plt.show()

```

Running Program:

Grafik Fungsi



Gambar grafik lebih jelas :

