

7/2/2022

* Home Work-1:

①
Soln

$f(x)$	y
7	3
8	1
9	1
10	9

$$f(9.8) = \frac{(1.8)(0.8)(-0.2)}{(-1)(-2)(-3)} (3) + \frac{(2.8)(0.8)(-0.2)}{(1)(-1)(-2)} (1)$$

$$+ \frac{(2.8)(1.8)(-0.2)}{(2)(1)(-1)} (1) + \frac{(2.8)(1.8)(0.8)}{(3)(2)(1)} (9)$$

$$= 0.144 - 0.224 + 0.504 + 6.048$$

$$f(9.8) = 6.472$$

②
Soln

x	$f(x)$
3	168
7	120
9	72
10	63

$$f(6) = \frac{(-1)(-3)(-4)}{(-4)(-6)(-7)} (168) + \frac{(3)(-3)(-4)}{(4)(-2)(-3)} (120) \\ + \frac{(3)(-1)(-4)}{(6)(2)(-1)} (72) + \frac{(3)(-1)(-3)}{(7)(3)(1)} (63)$$

$$= 12 + 180 - 72 + 27$$

$$f(6) = 147$$

(3)

x + f(x)

1

4

2

5

7

5

8

4

$$f(6) = \frac{(4)(-1)(-2)}{(-1)(-6)(-7)} (4) + \frac{(5)(-1)(-2)}{(1)(-5)(-6)} (5) \\ + \frac{(5)(4)(-2)}{(6)(5)(-1)} (5) + \frac{(5)(4)(-1)}{(7)(6)(1)} (4)$$

$$= \frac{-16}{21} + \frac{5}{3} + \frac{20}{3} - \frac{40}{21}$$

$$f(6) = 5.66667$$

Solⁿ

(4)

x	f(x)
1	2
2	4
3	8
4	16
7	128

$$\begin{aligned} f(5) &= \frac{(3)(2)(1)(-2)(2)}{(-1)(-2)(-3)(-6)} + \frac{(4)(2)(1)(-2)(4)}{(1)(-1)(-2)(-5)} \\ &+ \frac{(4)(3)(1)(-2)(8)}{(2)(1)(-1)(-4)} + \frac{(4)(3)(2)(-2)(16)}{(3)(2)(1)(-3)} \\ &+ \frac{(4)(3)(2)(1)(128)}{(6)(5)(4)(3)} \end{aligned}$$

$$f(5) = -\frac{2}{3} + \frac{32}{5} - \frac{24}{3} + \frac{128}{3} + \frac{128}{15}$$

$$f(5) \approx 32.934$$

5

x	$f(x)$
10	0.25
20	0.2
14	0.15
16	0.10

$$f(15) = \frac{(-5)(1)(-1)(0.25)}{(-10)(-4)(-6)} + \frac{(5)(1)(-1)(0.2)}{(10)(-6)(-4)} \\ + \frac{(5)(-5)(-1)(0.15)}{(4)(-6)(-2)} + \frac{(6)(-5)(-7)(0.1)}{(6)(-4)(2)}$$

$$f(15) = -\frac{1}{192} - \frac{1}{240} + \frac{1}{16} + \frac{5}{96}$$

$$f(15) = 0.10521$$

HW-2

Sol^y ① $x^3 + x - 1 = 0$

x	y
0.5	-0.315
0.6	-0.184
0.7	0.043

$$x' = \frac{x_1 y_2 - x_2 y_1}{y_2 - y_1}$$

$$= \frac{(0.6)(0.043) - (0.7)(-0.184)}{0.043 - (-0.184)}$$

$$= 0.681$$

$$y' = -0.00317876$$

$$x'' = \frac{(0.681)(0.043) - (0.7)(-0.00317876)}{0.043 - (-0.00317876)}$$

$$= 0.682308$$

$$y'' = -0.0000475$$

$$\text{root} = 0.682308 //$$

Solⁿ

$$(2) \quad x^3 - 2x + 0.5 = 0$$

 x y

0

0.5

0.1

0.301

0.2

0.108

0.3

-0.073

$$x' = \frac{(0.2)(-0.073) - (0.3)(0.108)}{-0.073 - (0.108)}$$

$$= 0.2597$$

$$y' = -0.0018848$$

$$x'' = \frac{(0.2)(-0.0018848) - (0.3)(0.108)}{-0.0018848 - 0.108}$$

$$= 0.25867$$

$$y'' = -0.0000429$$

Root of given equation is 0.2586711

Solⁿ (3) $x^3 + 2x - 20 = 0$

x	y
2	-8
2.1	-6.531
2.2	-4.952
2.3	-3.24
2.4	-1.376
2.5	0.625

$$x' = \frac{(2.4)(0.625) - (2.5)(-1.376)}{0.625 - (-1.376)}$$

$$x' = 2.46876 \Rightarrow y' = -0.015827$$

$$x'' = \frac{(2.46876)(0.625) - (-0.015827)(2.5)}{0.625 - (-0.015827)} = 2.4695$$

$$y'' = -0.00028$$

Root of the equation - 2.4695

Solⁿ (4) $3x - \cos x - 1 = 0$

x	y
0	-2
0.1	-1.699
0.2	-1.399
0.3	-1.099
0.4	-0.799
0.5	-0.499
0.6	-0.199
0.7	0.1

$$x' = \frac{(0.6)(0.1) - (-0.199)(0.7)}{0.1 - (-0.199)} = 0.6645$$

$$y' = -0.00623$$

$$x'' = \frac{(0.6645)(0.1) - (-0.00623)(0.7)}{0.1 - (-0.00623)} = 0.6666$$

$$y'' = -0.00015$$

Root of the equation = 0.6666.

Sol^y (5) $x^3 - 3x - 5 = 0$

x	y
2	-3
2.1	-2.039
2.2	-0.952
2.3	0.267

$$x' = \frac{(2.2)(0.267) - (-0.952)(2.3)}{0.267 - (-0.952)} = 2.2781$$

$$y' = -0.01159$$

$$x'' = \frac{(2.2781)(0.267) - (-0.01159)(2.3)}{0.267 - (-0.01159)} = 2.279$$

$$y'' = -0.0006968$$

∴ Root of the equation is 2.279.

Solⁿ (6) $x \log_{10} x - 1.2 = 0$

x	y
2	-0.5979
2.1	-0.5233
2.2	-0.4467
2.3	-0.3680
2.4	-0.2875
2.5	-0.2052
2.6	-0.1211
2.7	-0.0353
2.8	0.052

$$x' = \frac{(2.7)(0.052) - (-0.0353)(2.8)}{0.052 - (-0.0353)} = 2.7409$$

$$y' = -0.0001839$$

$$x'' = \frac{(2.7409)(0.052) - (-0.0001839)(2.8)}{0.052 - (-0.0001839)} = 2.7406$$

$$y'' = -0.00003145$$

Solⁿ ⑦

$$x^3 - 4x + 1 = 0$$

x

y

0

1

1

-2

2

1

$$x' = \frac{(1)(1) - (2)(2)}{1+2} = 1.667$$

$$y' = -1.037$$

$$x'' = \frac{(1.667)(1) + (2)(1.037)}{1 - (-1.037)} = 1.8365$$

$$y'' = -0.152$$

$$x''' = \frac{(1.8365)(1) - (-0.152)(2)}{1 - (-0.152)}$$

$$y''' = 1.859$$

∴ root is 1.8365 //

Solⁿ (8) $x^3 + 2x^2 - 8 = 0$

x	y
0	-8
1	-5
2	8
1.5	-0.125

$$x' = \frac{(1.5)(8) - (-0.125)(2)}{8 + 0.125} = 1.50769$$

$$y' = -0.02654$$

$$x'' = \frac{(1.50769)(8) - (-0.02654)(2)}{8 - (-0.02654)} = 1.5093$$

$$y'' = -0.005862$$

Hence, the root of eqn is 1.5093 //

Solⁿ ⑨ $x^3 - 9x + 1 = 0$

x	y
0	1
1	-7
2	-9
3	1
2.5	-5.875
2.9	-0.711

$$x' = \frac{(2.9 \times 1) + (-0.711 \times 3)}{1.711}$$

$$x' = 2.9415$$

$$y' = -0.02147$$

$$x'' = \frac{(2.9415)(1) - (-0.02147)(3)}{1.02147}$$

$$= 2.9427$$

$$y'' = -0.0015$$

Hence the root of equation is 2.9427

(10) $x^3 - x - 4 = 0$

x	y
0	-4
1	-4
1.5	-2.125
1.6	-1.504
1.7	-0.787
1.8	0.032
2	2

$$x' = \frac{(0.032)(1.7) + (1.8)(-0.787)}{0.032 + 0.787} = 1.7961$$

$$y' = -0.00199$$

$$x'' = \frac{(1.7961)(0.032) - (-0.00199)(1.8)}{0.032 + 0.00199} = 1.7969$$

$$y'' = -0.0000278$$

Hence, the root of the equation is 1.7969.