

Assignment - 1 / Algebra

Homework - 1

Question 1.

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

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

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

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

$$\boxed{f(9.8) = 6.472}$$

Question 2

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

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

$$+ \frac{(3)(-1)(-3)}{(7)(3)(1)} (63)$$

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

$$f(6) = 147$$

Question 3:

X	f(x)
1	4
2	5
7	5
8	4

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

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

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

$$f(6) = 5.66667$$

Question 4.

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

$$f(5) = \frac{(3)(2)(1)(-2)(2)}{(-1)(-2)(-3)(-6)} + \frac{(4)(2)(1)(-2)(4)}{(1)(-1)(-2)(-5)}$$

$$+ \frac{(4)(3)(1)(-2)(8)}{(2)(1)(-1)(-4)} + \frac{(4)(3)(2)(-2)(16)}{(3)(2)(1)(-3)}$$

$$+ \frac{(4)(3)(2)(1)(128)}{(6)(5)(4)(3)}$$

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

$$f(5) = 32.934$$

Question 5.

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

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

$$+ \frac{(-5)(-5)(-1)(0.15)}{(4)(-6)(-2)} + \frac{(-6)(-5)(-7)(0.1)}{(6)(-4)(2)}$$

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

$$f(15) = 0.10521$$

Homework-2

① $x^3 + x - 1 = 0$

x	y
0.5	-0.315
0.6	-0.184
0.7	0.043

$$x' = \frac{x_1 y_2 - x_2 y_1}{y_2 - y_1} = \frac{(0.6)(0.043) - (0.7)(-0.184)}{0.043 - (-0.184)}$$

$$= 0.681$$

$$y' = -0.00377876$$

$$x'' = \frac{(0.681)(0.043) - (0.7)(-0.00377876)}{0.043 - (-0.00377876)}$$

$$= 0.682308$$

$$y'' = -0.0000475$$

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

Question 2.

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 the equation = 0.25867.

Question 5-

$$x^3 - 3x - 5 = 0$$

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

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

$$y' = -0.01159$$

$$x'' = 2.279$$

$$y'' = -0.0000968$$

$$\text{root} = 2.279$$

Question 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

$$x' = 2.7404$$

$$y' = -0.0001839$$

$$x'' = 2.7406$$

$$y'' = -0.00003145$$

$$\text{root} = 2.7406$$

Question 7.

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

x	y
0	1
1	-2
2	1

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

$$y' = -1.037$$

$$x'' = 1.8365$$

$$y'' = -0.152$$

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

$$y''' = 1.858$$

root is 1.8365

Question 8

$$x^3 + 2x^2 - 8 = 0$$

x	y
0	-8
1	-5
2	8

$$1.5 \quad \therefore -0.125$$

$$x' = 1.50769$$

$$y' = -0.02654$$

$$x'' = 1.5093$$

$$y'' = -0.005862$$

root is 1.5093