

①

Reet Kejriwal - FY-B

Roll no: 51

NMA - Assignment 1

HW-1

$$1) \quad y = ? , x = 9.5, x_1 = 9, y_1 = 1, x_2 = 10, y_2 = 9$$

$$y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1} \right) (x - x_1)$$

$$\therefore y - 1 = \left(\frac{9 - 1}{10 - 9} \right) (9.5 - 9)$$

$$\therefore y = 5$$

$$2) \quad x = 6, y = ? , x_1 = 3, y_1 = 168, x_2 = 7, y_2 = 120$$

$$y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1} \right) (x - x_1)$$

$$\therefore y - 168 = \left(\frac{120 - 168}{7 - 3} \right) (6 - 3)$$

$$\therefore y = 132$$

$$3) \quad x = 6, y = ? , x_1 = 2, y_1 = 5, x_2 = 7, y_2 = 5$$

$$y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1} \right) (x - x_1)$$

$$\therefore y - 5 = \left(\frac{5 - 5}{7 - 2} \right) (6 - 2)$$

$$\therefore y = 5$$

$$4) \quad y = ? , x = 5, x_1 = 4, x_2 = 7, y_1 = 16, y_2 = 128$$

$$\therefore y - 16 = \left(\frac{128 - 16}{7 - 4} \right) (5 - 4)$$

$$\therefore y = \frac{160}{3}$$

$$\therefore y = 53.33$$

②

5) $x=15, y=?; x_1=14, x_2=16, y_1=0.15, y_2=0.10$

$$y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1} \right) (x - x_1)$$

$$\therefore y - 0.15 = \left(\frac{0.10 - 0.15}{16 - 14} \right) (15 - 14)$$

$$\therefore y = 0.125$$

Ex-2

1) $x^3 + x - 1 = 0, a = 0.5, b = 1$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	0.5	1	-0.375	1	0.75	0.171875
2	0.5	0.171875	-0.375	-0.823	0.3359375	-0.626
3	0.3359375 0.336	0.171875	-0.626	-0.823	0.25390625	-0.72972
4	0.25390625	0.171875	-0.72972	-0.823	0.212890625	-0.77746
5	0.212890625	0.171875			0.1924	

$\therefore$ Root is $c = 0.1924$

2) $x^3 - 2x + 0.5 = 0, a = 0, b = 1$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	0	1	0.5	-0.5	0.5	-0.375
2	0.5	1	-0.375	-0.5	0.75	-0.578125
3	0.75	1	-0.578125	-0.5	0.875	-0.58
4	0.875	1	-0.58	-0.5	0.9375	-0.551
5	0.9375	1			0.96875	

$\therefore$ Root is $c = 0.96875$

③

3) $x^2 + 2x - 20 = 0$, $a = 2$, $b = 20$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	2	20	-12	-8	11	-10.4375
2	2.25	20	-10.4375	-8	11.125	-9.609
3	2.375	20	-9.609	-8	11.25	-9.1835
4	2.4375	20	-9.1835	-8	11.375	-8.9677
5	2.46875	20			11.4375	

Root is $c = 2.484375$

4) Trigo not in syllabus

5) $x^3 - 3x - 5 = 0$, $a = 2$, $b = 2.5$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	2	2.5	-3	3.125	2.25	-0.359375
2	2.25	2.5	-0.359375	3.125	2.375	1.27148
3	2.25	2.375	-0.359375	1.27148	2.3125	0.428955
4	2.25	2.3125	-0.359375	0.428955	2.28125	0.28106
5	2.25	2.28125	-0.359375	0	2.265625	

Root is $c = 2.265625$

6) $x \log x - 1.2 = 0$, $a = 2$, $b = 3$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	2	3	-0.5979	0.2313	2.5	-0.2051
2	2.5	3	-0.2051	0.2313	2.75	8.16×10^{-3}
3	2.5	2.75	-0.2051	8.16×10^{-3}	2.625	-0.9978
4	2.625	2.75	-0.9978	8.16×10^{-3}	2.6875	-0.04612
5	2.6875	2.75			2.71875	

Root is $c = 2.71875$

7)

$$f(x) = x^3 - 4x + 1$$

$$f(0) = 1$$

$$f(1) = -2$$

Root lies b/w 0 & 1

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	0	1	1	-2	0.5	-0.875
2	0.5	1	-0.875	-2	0.75	-1.5781
3	0.75	1	-1.5781	-2	0.875	-1.83
4	0.875	1	-1.83	-2	0.9375	-1.92
5	0.9375	1			0.96875	

Root is $c = 0.96875$

8)

$$f(x) = x^3 + 2x^2 - 8$$

$$f(0) = -8$$

$$f(1) = -5$$

$$f(2) = 8$$

Root lies b/w 1 & 2

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	1	2	-5	8	1.5	-0.125
2	1.5	2	-0.125	8	1.75	3.484
3	1.5	1.75	-0.125	3.484	1.625	1.5722
4	1.5	1.625	-0.125	1.5722	1.5625	0.6975
5	1.5	1.5625			1.53125	

Root is $c = 1.53125$

5

9) $f(x) = x^3 - 9x + 1$

$f(0) = 1$ $\therefore$ Root lies b/w 0 & 1

$f(1) = -7$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	0	1	1	-7	0.5	-3.375
2	0.5	1	-3.375	-7	0.75	-5.328
3	0.75	1	-5.328	-7	0.875	-6.205
4	0.875	1	-6.205	-7	0.9375	-6.613
5	0.9375	1			0.96875	

Root is $c = 0.96875$

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

$f(0) = -4$

$f(1) = -4$ $\therefore$ Root lies b/w 1 & 2

$f(2) = 2$

	a	b	f(a)	f(b)	$c = \frac{a+b}{2}$	f(c)
1	1	2	-4	2	1.5	-2.125
2	1.5	2	-2.125	2	1.75	-0.3906
3	1.75	2	-0.3906	2	1.875	0.7167
4	1.75	1.875	-0.3906	0.7167	1.8125	0.1418
5	1.75	1.8125			1.78125	

Root is $c = 1.78125$