BI8101114
Syed SOBAN Iqbal
2nd Year BSCS

ASSIGNMENT NO:03

QUESTION NO:01

$$f(x) = 2x^3 - 11.7x^2 - 17.7x - 5$$
$$f'(x) = 6x^2 - 23.5x - 17.7$$

x	f(x)	x	f(x)
-10	-2998	5	-136
-9	-2251.4	6	-100.4
-8	-1636.2	7	-16.2
-7	-1140.4	8	128.6
-6	-752	9	346
-5	-459	10	648
-4	-249.4		
-3	-111.2		
-2	-32.4		
-1	-1		
0	-5		
1	-32.4		
2	-71.2		
3	-109.4		
4	-135		

NEWTON RAPHSON

S.NO	x_i	$f(x_i)$	$f'(x_i)$	x_{i+1}
1	7	-16.2	111.8	7.14496161
2	7.14496161	0.7437094214	120.6925263	7.138739595
3	7.138739595	7.138739595	-0.003219681	7.130766356
4	7.138766356	1.91266E-05	120.3109011	7.138766197
5	7.138766197	-1.134896-07	120.3108913	7.130766198

FALSE POSITION METHOD

S.NO	x_l	x_u	fx_l	fx_u	x_m	fx_m	$fx_m * fx_l$
1	7	8	-16.2	128.6	7.111878453	-3.2316 14631	52.3521 5703
2	7.111878	8	-3.231614631	128.6	7.133649153	-0.61847 4215	1.99867 0321
3	7.133649	8	-0.618474215	128.6	7.137745411	-0.1174 20066	0.072621 283
4	7.137796	8	-0.117420066	128.6	7.138568227	-0.0222 5875	0.00261 3624
5	7.138582	8	-0.0222 5875	128.6	7.138731343	-0.0042 18263	9.30933 E-05

Iteration	X_L
1	7
2	1
3	1.25
4	1.25
5	1.3125
6	1.34377
7	1.3593
8	1.35938

QUESTION NO:02

$$f(x) = x^3 + 4x^2 - 10$$

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

x_0	$f(x_0)$
-4	-10
-3	-1
-2	-2
-1	-7
0	-10
1	-5
2	14
3	53
4	118

BISECTION METHOD

Iteration	x_L	x_u	$f(x_L)$	$f(x_u)$	x_m	$f(x_m)$	$f(x_L) * f(x_m)$
1	1	2	-5	14	1.5	2.375	-11.875
2	1	1.5	-5	2.375	1.25	-1.796875	8.984375
3	1.25	1.5	-1.7969	2.375	1.375	0.16210937	-0.29129
4	1.25	1.375	-1.7969	0.16211	1.3125	-0.84838867	1.52444
5	1.3125	1.375	-0.8484	0.16211	1.3125	-0.35098267	0.29776
6	1.34375	1.375	-0.351	0.16211	1.34375	-0.09640884	0.03385
7	1.35938	1.375	-0.0964	0.16211	1.36719	0.03235785	-0.00311
8	1.35938	1.36719	-0.0964	0.03236	1.36328	-0.03214997	0.00309

SECANT METHOD

S.NO	x_0	fx_0	x_1	fx_1	$x_1 - x_0$	$fx_1 * (x_1 - x_0)$	$fx_1 * (x_1 - x_0) / (fx_1 - fx_0)$	x_2	fx_2	$fx_2 * fx_0$
1	1	-5	2	14	1	14	0.736842105	1.263157895	-1.6022744	8.0113719
2	1.26316	-1.6023	2	14	0.736842105	10.31578947	0.661172161	1.338827839	-0.4303647	0.6895624
3	1.33883	-0.4304	2	14	0.661172161	9.256410256	0.641453658	1.358546342	[illegible]	0.0217343
4	1.35855	-0.11	2	14	0.641453658	8.980351214	0.63645256	1.363547744	[illegible]	0.0030541
5	1.36355	-0.0278	2	14	0.63645256	8.910335839	0.635192968	1.364807032	-0.0069034	0.0001939

BISECTION METHOD

S.No.	X_L	X_U	$f(X_L)$	$F(X_U)$	X_m	$f(X_m)$	$f(X_L) * f(X_m)$	Condition
1.	0.5	1.5	-0.351278729	2.481689 07	1	0.718281828	-0.252317128	
2.	0.5	1	-0.351278729	0.718281828	0.75	0.117000017	-0.041099617	0
3.	0.5	0.75	-0.351278729	0.117000017	0.625	-0.131754043	0.046282393	0
4.	0.625	0.75	-0.131754043	0.117000017	0.6875	-0.01126253	0.001483884	0
5.	0.6875	0.75	-0.01126253	0.117000017	0.71875	0.051866773	-0.000584151	0
6.	0.6875	0.71875	-0.01126253	0.051866773	0.703125	0.020055528	-0.000225876	0
7.	0.6875	0.703125	-0.01126253	0.020055528	0.6953125	0.004335331	-0.000048827	1
8.	0.6875	0.6953125	-0.01126253	0.004335331	0.691406 25	-0.003478832	0.000039 18	1

Date

SECANT METHOD

S.No.	X_0	fX_0	X_1	fX_1
1.	0.5	-0.351278729	1.5	2.48168907
2.	0.623996725	-0.133627467	1.5	2.48168907
3.	0.668755398	-0.048193413	1.5	2.48168907
4.	0.684590329	-0.017040691	1.5	2.48168907

	$X_1 - X_0$	$fX_1 * (X_1 - X_0)$	$\{fX_1 * (X_1 - X_0)\} / (fX_1 - fX_0)$
	1	2.48168907	0.876003275
	0.876003275	2.17397753	0.831244602
	0.831244602	2.062890642	0.815409671
	0.815409671	2.023593267	0.809848787

	X_2	fX_2	$fX^2 * fX0$	condition / Error
	0.623996775	-0.133627467	0.061694087	
	0.668755398	-0.048193413	0.006439964	0
	0.684590329	-0.017040691	0.000821249	0
	0.690151213	-0.005982969	0.000101954	1

Newton Raphson Method

$f(x) = e^x - 2$ $\quad$ $f'(x) = e^x$

S.NO.	Xi	f(Xi)	f'(Xi)	Xi+1	Condition/error
1.	0.5	-0.351278729	1.648721271	0.713061319	
2.	0.713061319	0.040227496	2.040227496	0.693344157	0
3.	0.693344157	0.000393992	2.000393992	0.6931472	0
4.	0.6931472	0.000000039	2.000000039	0.693147187	1