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Dept.: Mechanical Engineering

4. a.) From the results obtained it can be said that the "Newton Raphson" method was more effective in the solution as it took a fewer number of iterations to converge at the right answer unlike the "Fixed Point Iteration method."

4. b.)

	A	B	C	D
1				
2	x	y'	y	
3	0	-1	1	
4	0.1	-0.7	0.9	
5	0.2	-0.43	0.83	
6	0.3	-0.187	0.787	
7	0.4	0.0317	0.7683	
8	0.5	0.22853	0.77147	
9	0.6	0.405677	0.794323	
10	0.7	0.5651093	0.8348907	
11	0.8	0.70859837	0.89140163	
12	0.9	0.837738533	0.962261467	
13	1	0.95396468	1.04603532	
14	1.1	1.058568212	1.141431788	
15	1.2	1.152711391	1.247288609	
16	1.3	1.237440252	1.362559748	
17	1.4	1.313696226	1.486303774	
18	1.5	1.382326604	1.617673396	

4. c.) i.)

```matlab
commandwindow
clear
clc
close all
format short g
syms rho
rho=13
for i=1:inf
    iter(i+1)=i;
    rho(i+1)=(16.7015*(1-exp(-(10/68.1)*(rho(i)))));
    Ea(i+1)=abs((rho(i+1)-rho(i))/rho(i+1))*100;
    if Ea(i+1)<=1E-11
        break
    end
end
table=[iter' rho' Ea']
```

```
table =

         0           13              0
         1       14.226         8.6165
         2       14.634         2.7868
         3       14.754        0.81472
         4       14.788        0.23044
         5       14.797       0.064552
         6         14.8       0.018033
         7       14.801      0.0050338
         8       14.801      0.0014048
         9       14.801     0.00039204
        10       14.801      0.0001094
        11       14.801       3.053e-05
        12       14.801      8.5198e-06
        13       14.801      2.3775e-06
        14       14.801      6.6347e-07
        15       14.801      1.8515e-07
        16       14.801      5.1667e-08
        17       14.801      1.4418e-08
        18       14.801      4.0235e-09
        19       14.801      1.1228e-09
        20       14.801      3.1334e-10
        21       14.801      8.7443e-11
        22       14.801      2.4387e-11
        23       14.801      6.8169e-12

fx >>
```

4. c.) ii.)

	A	B	C	D	E	F	G	H	I	J
1	SUMMARY OUTPUT									
2										
3	*Regression Statistics*									
4	Multiple R	0.492524054								
5	R Square	0.242579944								
6	Adjusted R Square	-0.89355014								
7	Standard Error	0.188006035								
8	Observations	6								
9										
10	ANOVA									
11		*df*	*SS*	*MS*	*F*	*Significance F*				
12	Regression	3	0.022640795	0.00755	0.21351	0.880523542				
13	Residual	2	0.070692539	0.03535						
14	Total	5	0.093333333							
15										
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*	
17	Intercept	1.62363823	1.769370259	0.91764	0.45568	-5.989347546	9.23662	-5.989347546	9.236624005	
18	X Variable 1	-0.028661562	0.085235162	-0.33626	0.76867	-0.395398866	0.33808	-0.395398866	0.338075742	
19	X Variable 2	-0.016386004	0.024472399	-0.66957	0.57208	-0.12168224	0.08891	-0.12168224	0.088910231	
20	X Variable 3	0.005130751	0.007027445	0.7301	0.54127	-0.025105906	0.03537	-0.025105906	0.035367408	
21										

4. c.) iii.)

F8 fx =1.62363822964517-0.0286615619104321*(B8)-0.0163860041346794*(C8)+0.00513075097989348*(D8)

	A	B	C	D	E	F	G	H
1								
2	x1	x2	x3	x4		x0 (estimated fom least square line)		Difference/Significance
3	0.5	4.5	84	74.8		0.502017027		-0.002017027
4	0.4	3.9	82	34		0.342651332		0.057348668
5	0.3	3.3	74	32.8		0.484779402		-0.184779402
6	0.4	5.2	81	64		0.475699836		-0.075699836
7	0.5	6.1	76	48.9		0.454360111		0.045639889
8	0.7	3.2	74	43.1		0.540492293		0.159507707
9								

4. d.)

	A	B	C	D	E	F	G	H	I	J	K	L
1			r =	0.45								
2												
3	t\z	0.00	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00
4	0.00	0.00	0.02	0.13	0.43	1.02	2.00	3.46	5.49	8.19	11.66	16.00
5	0.01	0.00	0.06	0.21	0.56	1.20	2.21	3.71	5.79	8.54	12.05	16.00
6	0.02	0.00	0.10	0.30	0.69	1.37	2.43	3.97	6.09	8.88	12.25	16.00
7	0.03	0.00	0.14	0.39	0.82	1.54	2.64	4.23	6.39	9.14	12.42	16.00
8	0.04	0.00	0.19	0.47	0.95	1.71	2.86	4.49	6.65	9.38	12.55	16.00
9	0.05	0.00	0.23	0.56	1.08	1.88	3.07	4.73	6.90	9.58	12.67	16.00
10	0.06	0.00	0.27	0.64	1.21	2.06	3.28	4.96	7.13	9.77	12.78	16.00
11	0.07	0.00	0.32	0.73	1.33	2.22	3.48	5.18	7.34	9.93	12.87	16.00
12	0.08	0.00	0.36	0.82	1.46	2.39	3.68	5.39	7.53	10.09	12.96	16.00
13	0.09	0.00	0.40	0.90	1.59	2.55	3.87	5.58	7.72	10.23	13.03	16.00
14	0.10	0.00	0.45	0.99	1.71	2.71	4.05	5.77	7.89	10.36	13.11	16.00

Temperature Distribution