



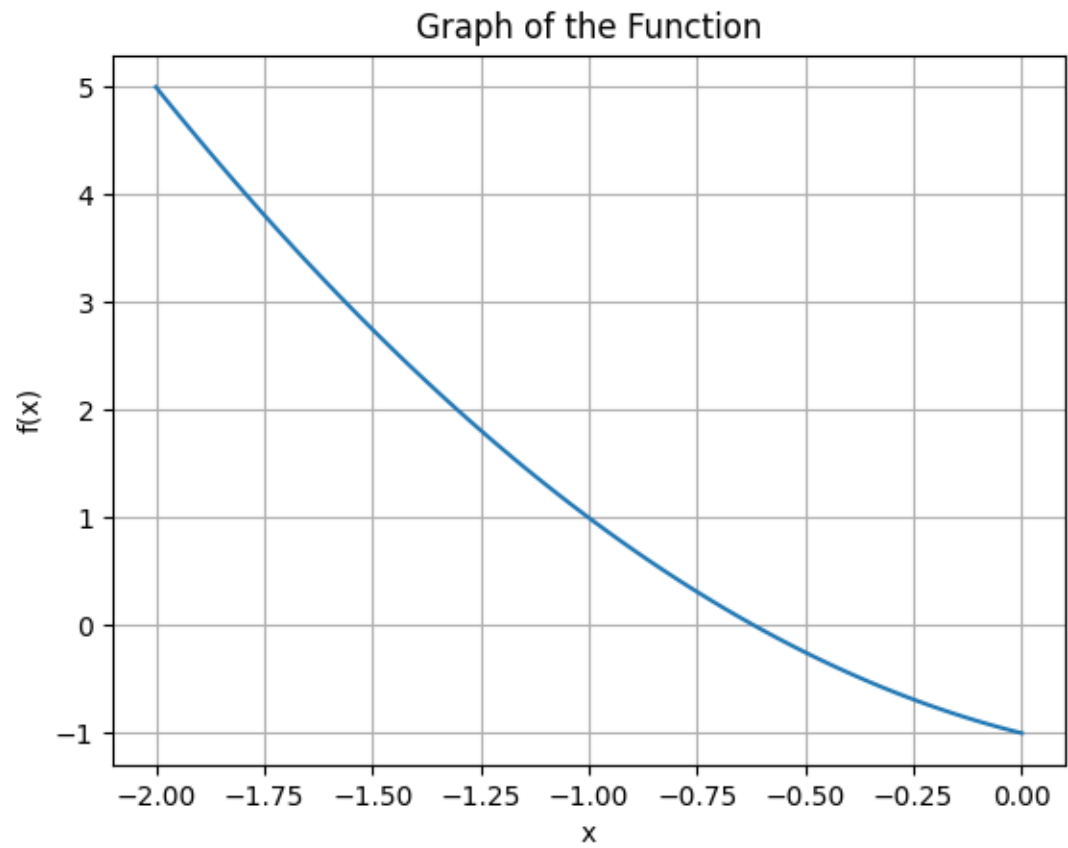
Math's Coursework

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Section : L4CG20
Module : Computational Mathematics (4MM013)
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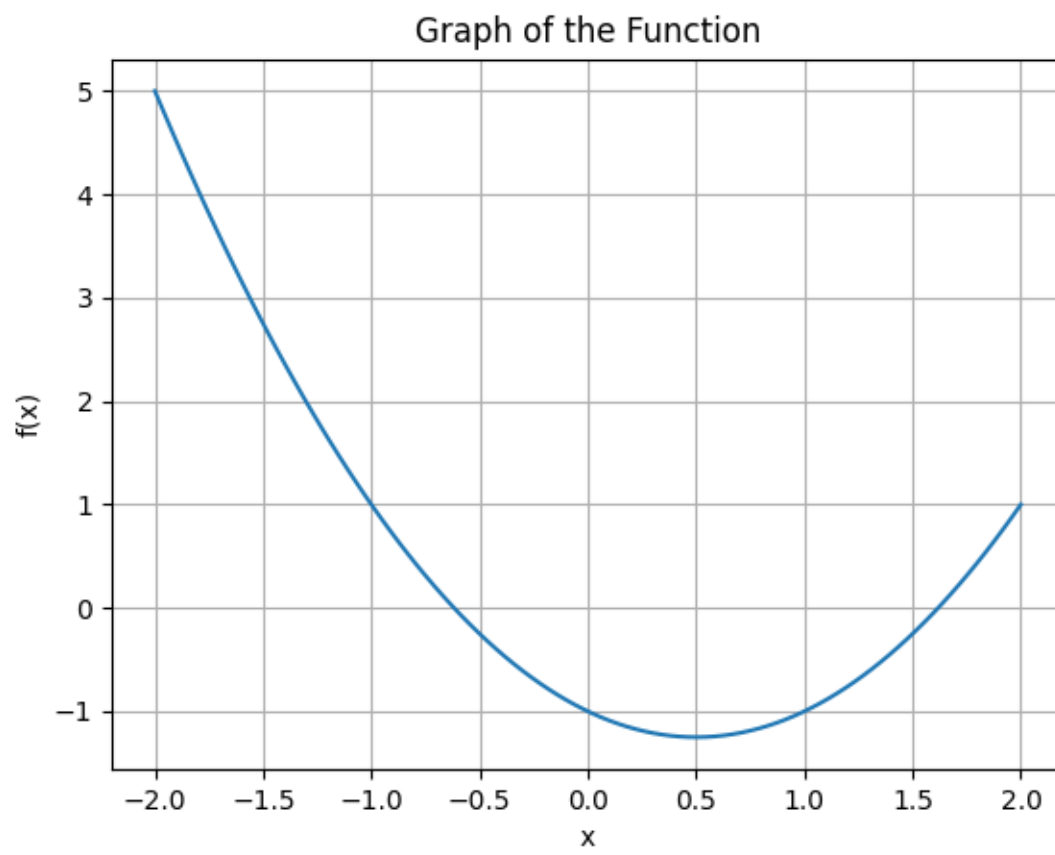
Task 1

For Function 1			
Bisection Method		Newton's Method	
$[a, b]$; #iterations; Root1	$[a, b]$; #iterations; Root2	x_0 ; #iterations; Root1	x_0 ; #iterations; Root2
$[-2, 0]$; 100; -0.6180	$[0, 2]$; 100; 1.6180	-1; 100; -0.6180	1; 100; 1.6180
SciPy Method			
x_0 ; Root1	x_0 ; Root2		
1; -0.6180	1; 1.6180		

Bisection Method Graph:

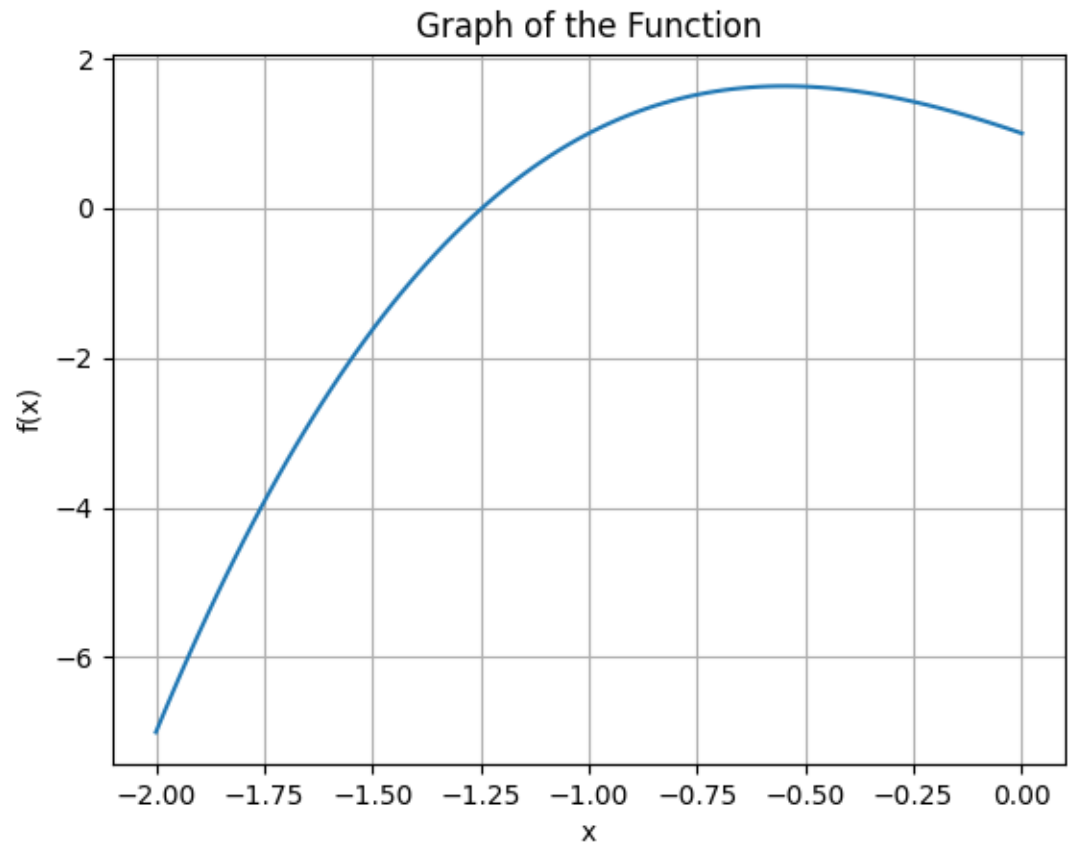


Newton Method Graph:

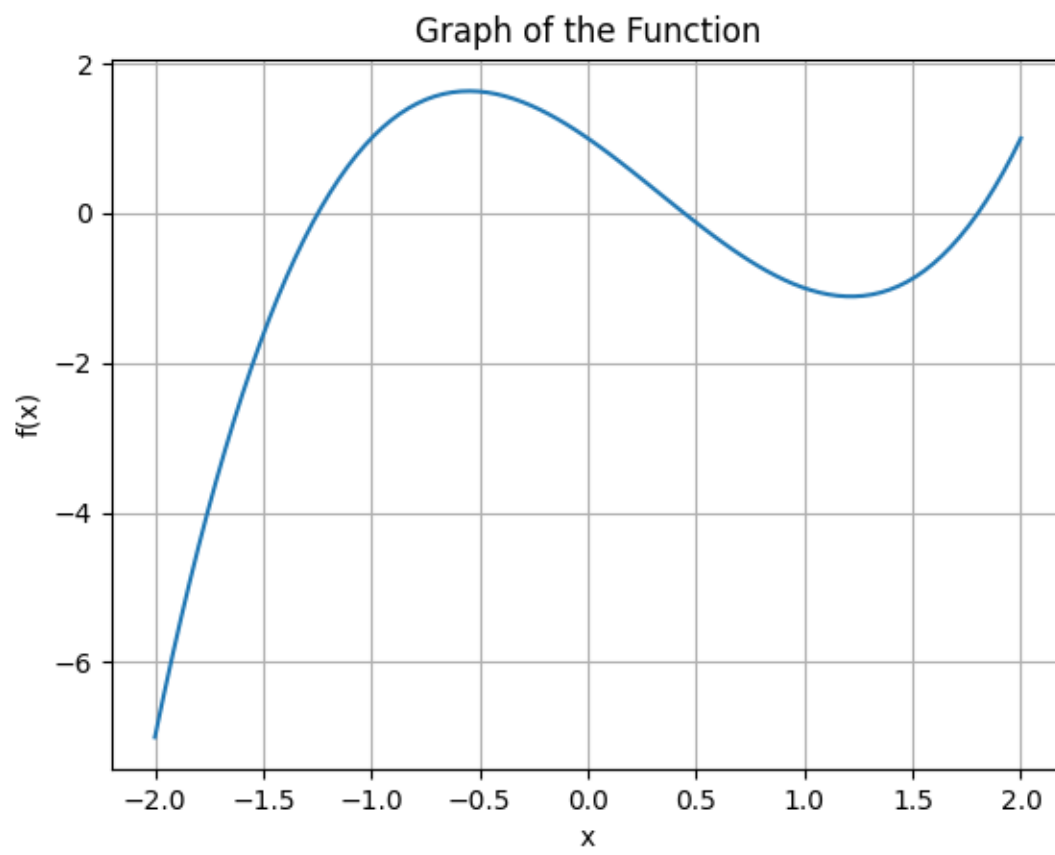


For Function 2					
Bisection Method			Newton's Method		
[a, b]; #iterations; Root1	[a, b]; #iterations; Root2	[a, b]; #iterations; Root3	x0; #iterations; Root1	x0; #iterations; Root2	x0; #iterations; Root3
[-1, 1]; 100; 0.4450	[-2,2]; 100; -1.2469	[-3,3]; 100; -1.2469	1; 100; 0.4450	-1; 100; -1.2469	-2; 100; -1.2469
	SciPy Method				
x0; Root1		x0; Root2		x0; Root3	
1; 0.4450		-1; -1.2469		-2; -1.2469	

Bisection Method:



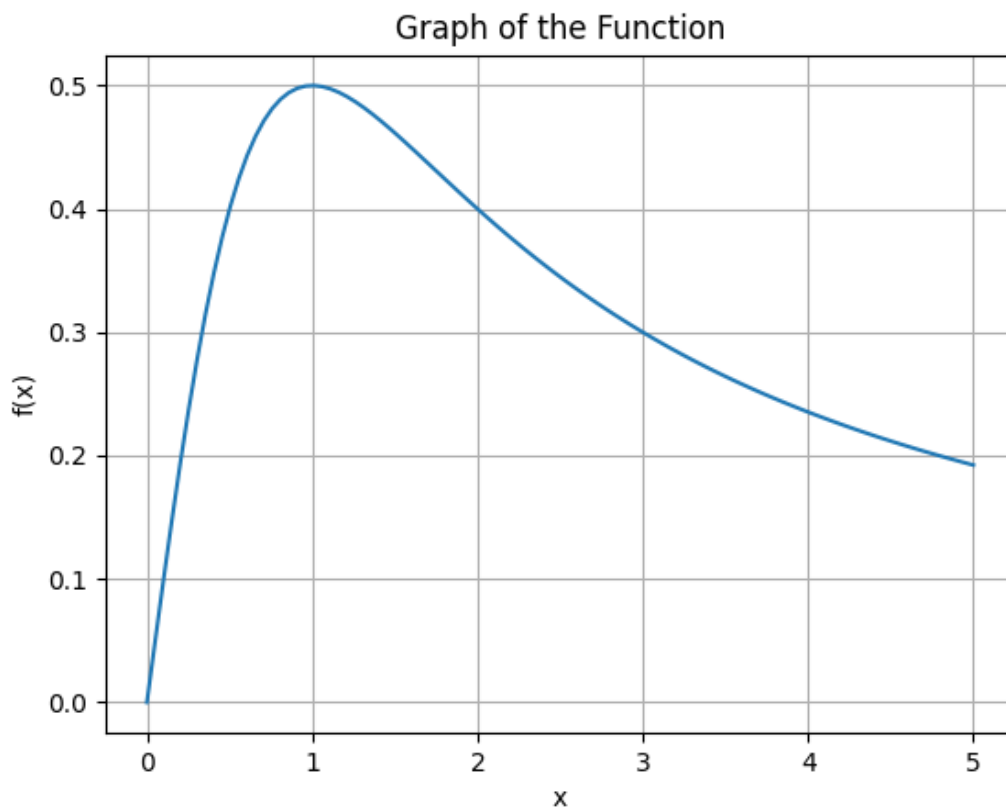
Newton Method:



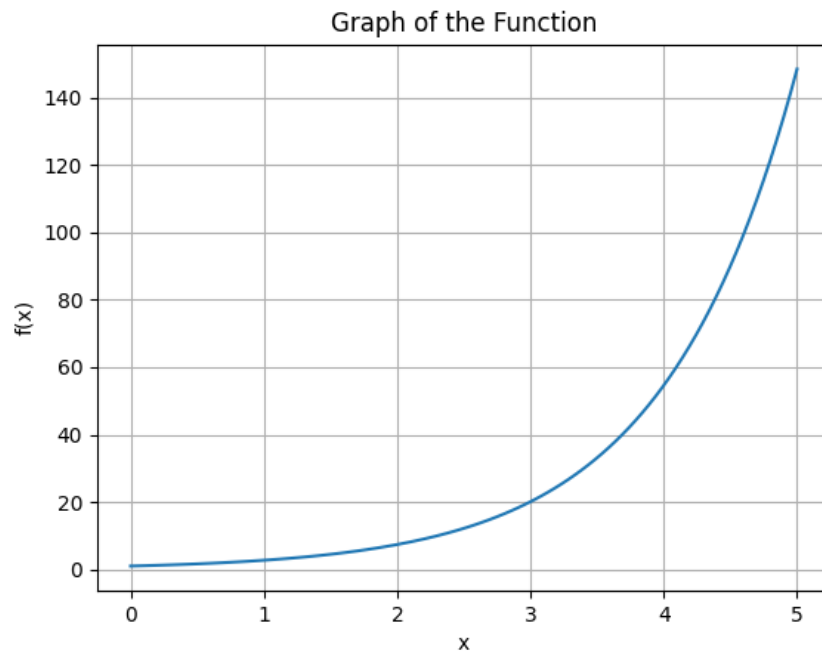
Task 2

N	Midpoint Approximation (M_N)	Trapezoidal Rule (T_N)	Analytical Method (I)	Abs Error $ M_N - I $	Abs Error $ T_N - I $
For Function 1					
10	1.6403	1.606	1.6290	0.0113	0.022
30	1.6302	1.6266	1.6290	0.001	0.002
50	1.6294	1.6281	1.6290	0.0004	0.0008
100	1.6291	1.6288	1.6290	0.0001	0.0002
500	1.6290	1.6290	1.6290	0.000004	0.000008
For Function 2					
10	145.88	150.47	147.41	1.5244	3.058
30	147.24	147.75	147.41	0.170	0.3410
50	147.35	147.53	147.41	0.0614	0.122
100	147.39	147.44	147.41	0.0153	0.030
500	147.41	147.41	147.41	0.0006	0.001

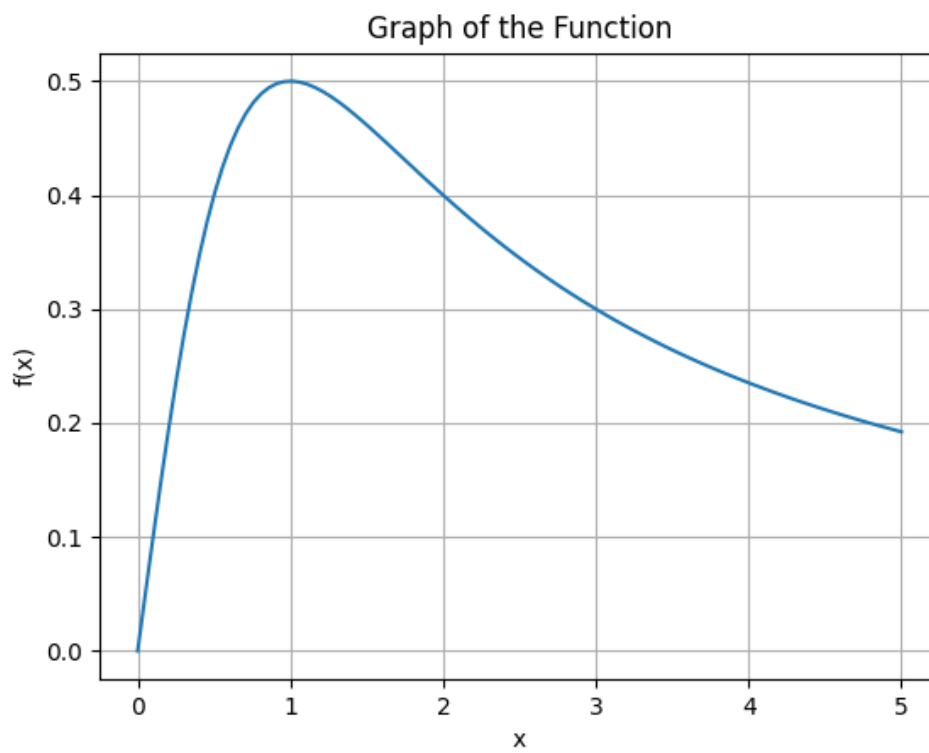
Midpoint Approx Graph (F1):



Midpoint Approx Graph (F2):



Trapezoidal Method (F1):



Trapezoidal Method (F2):

