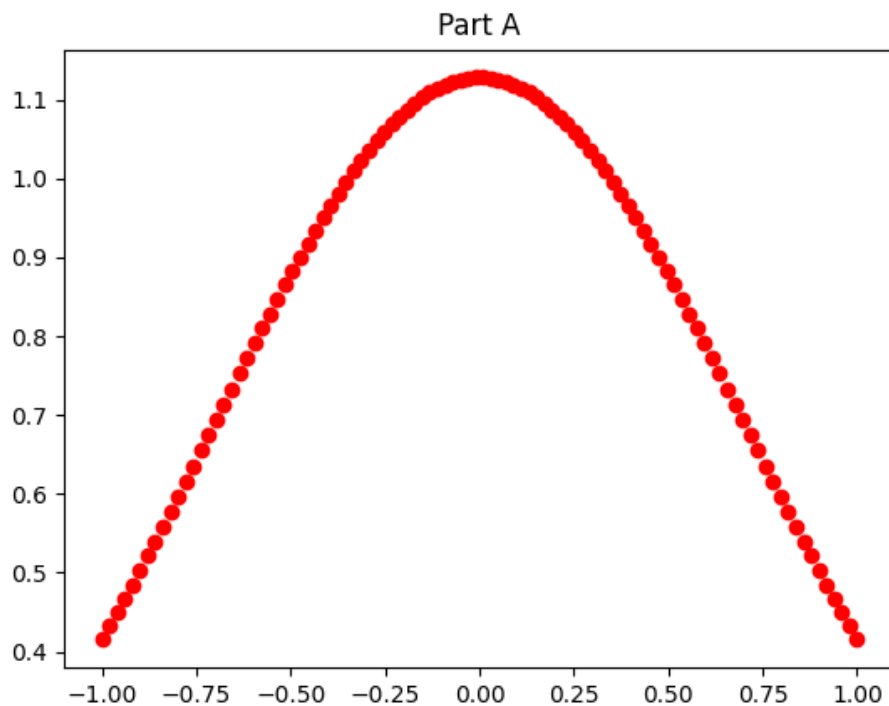


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MA375
Dr. Aquino

Homework #7: Quadrature

- a. Plot the integrand over interval $[-1, 1]$:



- b. Using `scipy.integrate.quad()`, below are the manual $\text{erf}(x)$ calculations:

x	Results
0.1	0.112462916018
0.2	0.222702589210
0.3	0.328626759459
0.4	0.428392355047
0.5	0.520499877813
0.6	0.603856090848
0.7	0.677801193837
0.8	0.742100964708
0.9	0.796908212423
1.0	0.842700792950

Part B: Manual erf function calculations
NOTE: values are rounded to 12 decimal places

x-value	Integrate Results	trapz Results
0.1	0.112462916018	0.112276538694
0.2	0.222702589210	0.221251395420
0.3	0.328626759459	0.323946011507
0.4	0.428392355047	0.417984093187
0.5	0.520499877813	0.501790436508
0.6	0.603856090848	0.574686779643
0.7	0.677801193837	0.636878909627
0.8	0.742100964708	0.689345981341
0.9	0.796908212423	0.733656483601
1.0	0.842700792950	0.771743332258

- c. Using `scipy.special.erf()`, below are the results of SciPy `erf(x)` calculations, as well as results from Part B to compare:

x	SciPy erf(x)	Manual erf(x)
0.1	0.112462916018	0.112462916018
0.2	0.222702589210	0.222702589210
0.3	0.328626759459	0.328626759459
0.4	0.428392355047	0.428392355047
0.5	0.520499877813	0.520499877813
0.6	0.603856090848	0.603856090848
0.7	0.677801193837	0.677801193837
0.8	0.742100964708	0.742100964708
0.9	0.796908212423	0.796908212423
1.0	0.842700792950	0.842700792950

Part C: SciPy erf function compared with manual calculations
NOTE: values are rounded to 12 decimal places

x-value	Part C Results	Part B Results(integrate results)
0.1	0.112462916018	0.112462916018
0.2	0.222702589210	0.222702589210
0.3	0.328626759459	0.328626759459
0.4	0.428392355047	0.428392355047
0.5	0.520499877813	0.520499877813
0.6	0.603856090848	0.603856090848
0.7	0.677801193837	0.677801193837
0.8	0.742100964708	0.742100964708
0.9	0.796908212423	0.796908212423
1.0	0.842700792950	0.842700792950

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