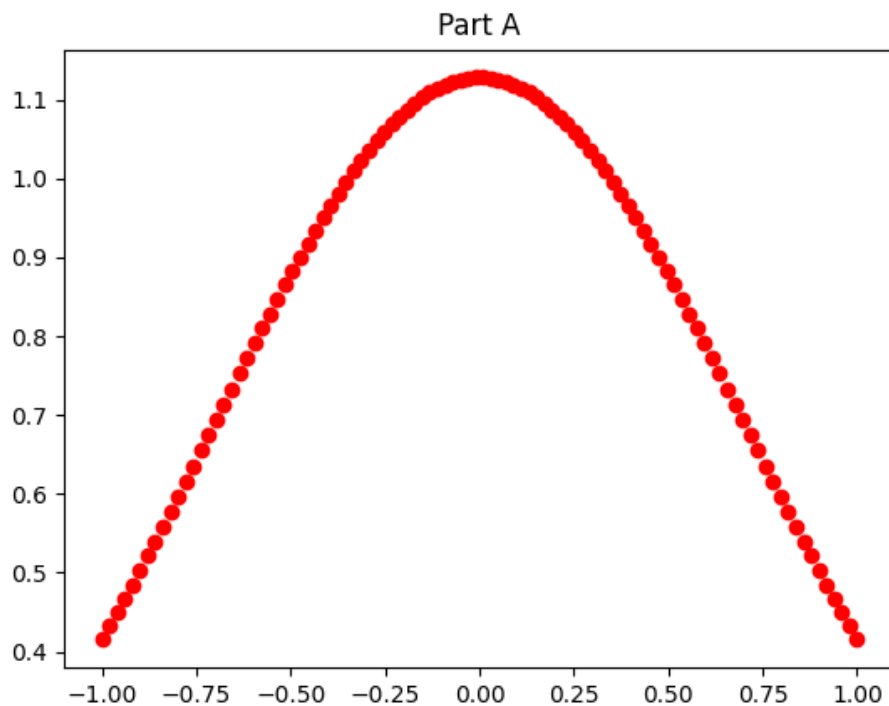Henry Song
May 6, 2021
MA375
Dr. Aquino

Homework #7: Quadrature

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

Part A

b. Using scipy.integrate.quad(), below are the manual 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   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
```

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
----------------------------------------------------
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
henry@Henrys-MacBook-Pro Song_Henry_Homework #7 %
```