Matthew Hatami - Homework02

Code 1:

This was a pretty easy exercise. I just imported two libraries of Numpy for mathematical calculations and Matplotlib for plotting.

I divided the code in different sections as it was explained in the class. Here are the sections in code 1:

- Section 1: importing the libraries that I have used later
- Section 2: defining the function and generating values of x axis based on pi
- Section 3: plotting the results.
    - Something that I might wan to clarify in this section was defining pi_labels and using them for the x-axis of the plot. I'm not sure if there is a default library for doing that.

Code 2:

This code was a bit more challenging, I had to divide it in 4 different sections as below:

- Section 1: importing libraries same as previous code, but also the quad library from scipy and pi value from numpy
- Section 2: defining the Sin(x)/x function, the challenge was handling the 0/0 division, I reviewed how to use np.where() for this purpose. Then I defined the trapezoidal and midpoint method functions with vector notation. I also wanted to know how accurate they were, so I calculated the exact value from the quad function that I imported from scipy earlier.
- Section 3: I defined 6 different intervals to evaluate and compare how two functions work, I defined empty vectors to save the results and errors of both methods. Then I wrote a "for loop" to loop over different values of n and calculate the results and eros and append them to the vectors that I build earlier. At the end I put some print functions to compare the results and errors for each interval.
- Section 4: plotting the results. However, here I didn't plot the output of the functions directly. In order to compare how accurate the two functions work with different intervals, I plotted their errors comparing with the exact value. As the plot suggests, both methods have their errors of the same order of magnitude, and as the number of intervals increase, their error decreases and gets close to 0.