CSc 30100

Assignment due March 17, 2020

Calculate the first derivative of the function

$$f(x) = \sin^2(x)$$

as accurately as you can at $x = \frac{1}{10}$ radians using the five-point midpoint formula,

$$f'(x_0) = \frac{1}{12h}\left[f(x_0 - 2h) - 8f(x_0 - h) + 8f(x_0 + h) - f(x_0 + 2h) \right] + \frac{h^5}{5} f^{(5)}(\xi),$$

where ξ lies between $x_0 - 2h$ and $x_0 + 2h$.

Compare your result with the "exact" result you get using the math routine(s) in numpy.

Discuss your results. Include all of your analysis and discussion in an .ipynb file and submit the file thorugh Blackboard.
The name of the file you submit should be

lastname_firstname_AS05.ipynb.

Include your name in the first cell in your .ipynb notebook.

Do not clear your results after your last run so that I will be able to see your results without rerunning your file.

If you collaborate with anyone on this assignment, be sure to follow the collaboration guidelines in the syllabus including listing with whom you collaborated in your ipynb file.