Lab 7: Intergration using OOP in Python

Due date: April 7 , 11:59pm
Write an object-oriented class that can integrate a given function f for a single parameter, nuisance parameter may be given as a list.
The class should have at least two methods,

`__init__` function that specifies the function, the bounds a and b, and the number of intervals to use .

`solve` function that returns the result of the integrals, use Simpsons method (see wikipedia), the most simple approach uses three points within an interval $x_s, x_{(s+e)/2}, x_e$, to calculate the function value $f(x_s), f(x_{(s+e)/2}), f(x_e)$. so if you have three intervals and bounds a and b then you would need to call the Simpson function 3 times, and each will need to do 3 function evaluations, You must need to look up the Simpson formula to do this right! For example, Wikipedia 'Numerical Integration' or 'Simpson rule'.

Analyze this particular function:

$$f(x) = \int_0^{7\pi} sin(x)dx$$

using $a = 0$, $b = 7\pi$ and 1,2,5,10,50,100 intervals, discus the improvement of the result , what is the rate of improvement? Graph the rate of convergence, for example use x as the number of intervals and y the f(x) or the absolute error $t - e$ where t is the true result, and e is the approximation, or use $|(t - e)/t|$ as the relative error.
Turn in your python program and a PDF file that contains the graph and any comment you have.