MAE384, Spring 2020 Homework #4

A statement on collaboration is required for all reports. This statement must be placed in the beginning of the first page of report. If no collaboration occurred, simply state "No collaboration". Please see related clarifications in the front page of Homework #1.

Note: Uses of Matlab built-in functions for numerical integration, such as **trapz**, **quad**, and **integral**, are NOT allowed for this homework.

Prob 1 (5 points)
Evaluate the following integral,

$$I = \int_0^{3.6} f(x)dx \ ,$$

where

$$f(x) = e^{[\sin(e^x)]} + 0.1x^2 - 2 \ ,$$

using **(a)** the composite Trapezoidal method, **(b)** the composite Simpson's 1/3 method, and **(c)** the composite Simpson's 3/8 method. For each method, perform the calculation with three different choices of grid spacing: $h = 0.1, 0.01$, and 0.001. Fill Table 1 with the outcome of your calculations. **IMPORTANT: Each number in Table 1 must be listed to at least 7 digits to the right of the decimal point. In Matlab, this can be done by using formatted output (e.g., using `fprintf` function with the format of %10.7f), or by designating "format long" then directly dumping the number on screen.** Briefly discuss the results.

A properly filled Table 1 and the computer codes for the three methods are the key deliverables of this problem. No credit without the computer codes.

Table 1: Fill the blanks with the values of the integral, I.

	Trapezoidal method	Simpson's 1/3 method	Simpson's 3/8 method
$h = 0.1$			
$h = 0.01$			
$h = 0.001$			