MAE384, Spring 2022 Homework #5

Please include a statement of collaboration in your work. Uses of Matlab built-in functions for numerical integration, such as **trapz**, **quad**, and **integral**, are NOT allowed for this homework.

Problem 1 (7 points)
Evaluate the following integral,

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

where

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

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).** 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			