Instructions for preparing the solution script:

- Write your name, ID#, and Section number clearly in the very front page.

- Write all answers sequentially.

- Start answering a question (not the pat of the question) from the top of a new page.

- Write legibly and in orderly fashion maintaining all mathematical norms and rules. Prepare a single solution file.

- Start working right away. There is no late submission form. If you miss the deadline, you need to use the make-up assignment to cover up the marks.

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1. Consider the following function: $f(x) = e^x - x$, which is continuous on the interval $[1, 3]$. Use this function to answer the following:

   (a) [**2 marks**] Find the actual integral value for this function.
   (b) [**10 marks**] Use Composite Newton-cotes formula to find the numerical integration for 4 segments.
   (c) [**4 marks**] Compute the error in percentage between the results obtained in the previous two parts. How can we decrease the error more?
   (d) [**4 marks**] Use the Simpson rule to find the numerical integration.

2. Consider the following function: $f(x) = 6x^2 - 4x - 9$. Now answer the following questions:

   (a) [**5 marks**] Use the Trapezium rule to numerically integrate over the interval $[-2, 2]$.
   (b) [**3 mark**] Compute the exact integrated value of the given function.
   (c) [**2 marks**] Calculate the relative error in percentage.