Assignment 6   Due: 26.5.2021 (25.10.1443 AH)

Q1- The following table shows the distance of a moving object from a fixed point at intervals of 2 seconds:

Time (sec)	0	2	4	6	8
Distance (m)	0	8.25	13.9	22.7	34.5

     a- Use forward difference to approximate the object's velocity at time=0
     b- Use backward difference to approximate the object's velocity at time=8.
     c- Use central difference to approximate the object's velocity at time=6.

Q2- Approximate the integral:

$$\int_0^6 x^3 e^{-x} dx$$

using 7 points (6 intervals) by the following techniques:
- Trapezoidal rule.
- Simpson's 1/3 rule.
- Simpson's 3/8 rule.

and by:
- The antiderivative: $(-x^3 - 3x^2 - 6x - 6)e^{-x} + C$
- Compare and comment on the results.

Q3- Using the same h, suppose the central difference approximation of a function at a point was 50.5 and the backward difference approximation at the same point was 39. Compute the forward difference approximation at this point.

Hint:
First, find a general relationship between the 3 kinds of approximations by finding the sum of the formulas of the backward and the forward approximations and comparing it to the central difference formula.