Problem-1:

Consider a scenario where the rate of heat transfer to a material is given by:

$Q(t) = 20 * (1 - e^{(-t/3)}) W$

The total temperature change of the material can be described using the heat capacity relationship:

$\Delta T(t) = (1 / (m * c)) \int_{0}^{t} Q(\tau)\, d\tau$

Here, T = 3 s, m = 5 kg, and c = 0.9 kJ/kg°C.
Find ΔT as a function of time for $0 \leq t \leq 6T$.

You may use any of the trapezoidal, Simpson 1/3 or Simpson 3/8 rule for this problem.
Assume $\Delta T(0) = 0$.

(Hint: define a time array and always integrate from 0 to t.)