1. Suppose that a bacterium is absorbing a certain drug from its environment. At time \( t = 0 \), there is 0.2 mol of drug in the bacterium, and drug enters the bacterium at a rate of \( \frac{1}{1+t^2} \) mol min

(a) Let \( c(t) \) represent the amount (mol) of drug in the bacterium at time \( t \) (minutes). Write a pure-time differential equation and an initial condition for the situation described above.

(b) Apply Euler’s Method with \( \Delta t = 0.5 \) to estimate the amount of drug in the bacterium at time \( t = 1.5 \). Show your work clearly using a table.
2. Let $L(t)$ = the length (in cm) of a fish at time $t$ (in years). Suppose that the fish grows at a rate \( \frac{dL}{dt} = 5.0e^{-0.2t} \).

(a) Determine the total change in length of the fish between times $t = 5$ and $t = 10$. (Suggestion: First solve the differential equation.) Does the answer to this question depend on the initial condition $L(0)$?

(b) Determine $L(t)$ if $L(0) = 2$.

(c) What is $\lim_{t \to \infty} L(t)$ if $L(0) = 2$?