1. Differentiate each of the following functions

(a) \( P(t) = 200e^{-12t} \)
\[ \frac{dP}{dt} = 200 \cdot (-12)e^{-12t} \]

(b) \( P(t) = 3000(1.02)^t \)
\[ \frac{dP}{dt} = 3000 \cdot \ln(1.02)(1.02)^t \]

2. The value of an automobile purchased in 2009 can be approximated by the function \( V(t) = 25(0.85)^t \), where \( t \) is the time, in years, from the date of purchase, and \( V(t) \) is the value, in thousands of dollars.

(a) Evaluate and interpret \( V(4) \), including units.
\( V(4) = 13.05 \) thousand dollars

(b) Find an expression for \( V'(t) \), including units.
\( V'(t) = 25 \cdot \ln(0.85)(0.85)^t \) thousand dollars per year.

(c) Evaluate and interpret \( V'(4) \), including units.
\( V'(4) = -2.12 \) thousand dollars per year. i.e at the end of year 4, the car will lose value at a rate of $2,120 dollars per year