2. A person purchased a car at the end of the year 2019 ($t = 0$). The car's value decreases over time. At the end of the year 2020 ($t = 1$), the car was valued at 27.2 thousand dollars. At the end of the year 2025 ($t = 6$), the car was valued at 14.8 thousand dollars.

The value of the car can be modeled by the function V given by $V(t) = ab^t$, where $V(t)$ is the value of the car, in thousands of dollars, at time t, and t is the number of years since the end of 2019.

A.

i. Use the given data to write two equations that can be used to find the values for constants a and b in the expression for $V(t)$.

ii. Find the values for a and b as decimal approximations.

B.

i. Use the given data to find the average rate of change of the value of the car, in thousands of dollars per year, from $t = 1$ to $t = 6$ years. Express your answer as a decimal approximation. Show the computations that lead to your answer.

ii. Use the average rate of change found in part B (i) to estimate the value of the car, in thousands of dollars, at $t = 3$ years. Show the work that leads to your answer.

iii. The average rate of change found in part B (i) can be used to determine the secant line for the graph of V on the interval $1 \le t \le 6$. Let $A(t)$ represent the estimate of the value of the car, in thousands of dollars, at time t years, using the secant line. For $A(3)$, found in part B (ii), it can be shown that $A(3) > V(3)$.

In general, $A(t) > V(t)$ for all t, where $1 < t < 6$. Use the secant line and the graph of V to explain why this is true.

C. When the value of the car reaches 2 thousand dollars, the car's owner plans to donate it to an auto mechanic school. As a result, the car will immediately lose all of its value. Explain how this information can be used to determine a domain limitation for the model V.

END OF PART A