9. [8 points] The server for a website stores user data. Let \( D(t) \) be the amount of user data stored on the server, in gigabytes (GB), at time \( t \) hours after noon. Below is a portion of the graph of \( D'(t) \), the derivative of \( D(t) \). The function \( D'(t) \) is

- constant for \( 3 \leq t \leq 5 \), for \( 7 \leq t \leq 8 \), and for \( t \geq 10 \), and is
- linear for \( 5 \leq t \leq 7 \) and for \( 8 \leq t \leq 10 \).

\[
\begin{array}{c}
\text{y (GB/hr)} \\
\hline
\text{y = D'(t)} \\
\hline
\text{t (hr)}
\end{array}
\]

a. [2 points] On which of the following intervals of \( t \) is the amount of user data stored on the server increasing for the entire interval? Give your answer as a list of one or more intervals, or write NONE.

- (0.5, 1.5)
- (1, 2)
- (7, 8)
- (10, 12)

b. [2 points] When the amount of user data on the server is changing faster than 2 GB/hr, either increasing or decreasing, the server is said to be in an “excited state.” How many hours, between noon and midnight, does the server spend in an excited state?

c. [2 points] The server hibernates when the amount of user data is not changing. How many hours, between noon and midnight, does the server spend in hibernation?

d. [2 points] At midnight, 450 GB of data is stored on the server. If the rate of change of user data stays the same from midnight to 5 am the following morning, how much user data will be stored on the server at 5 am?