

4. [13 points] Severus Snake is slithering along the banks of a river. At noon, a scientist starts to track Severus's distance away from the edge of the river. After a few minutes, the scientist realizes Severus's distance away from the edge of the river is a sinusoidal function. Let $D(t)$ be Severus's distance, in centimeters, away from the edge of the river t seconds after noon.
- a. [5 points] At noon exactly, the scientist notes that Severus is 97 centimeters away from the edge of the river, which is the farthest away he ever gets. Three seconds after that, Severus's distance is 65 centimeters away from the river, the closest he gets.
Graph $y = D(t)$ for $0 \leq t \leq 12$. (Clearly label the axes and important points on your graph.
*Be very careful with the **shape and key features of your graph.***)



- b. [6 points] Find the period, amplitude, equation of the midline, and a formula for the sinusoidal function $D(t)$. (*Include units for the period and amplitude.*)

Period: _____

Amplitude: _____

Midline: _____

Formula: $D(t) =$ _____

- c. [2 points] How far away from the river is Severus 11 seconds after noon?
Give your answer accurate to at least two decimal places.

Answer: _____