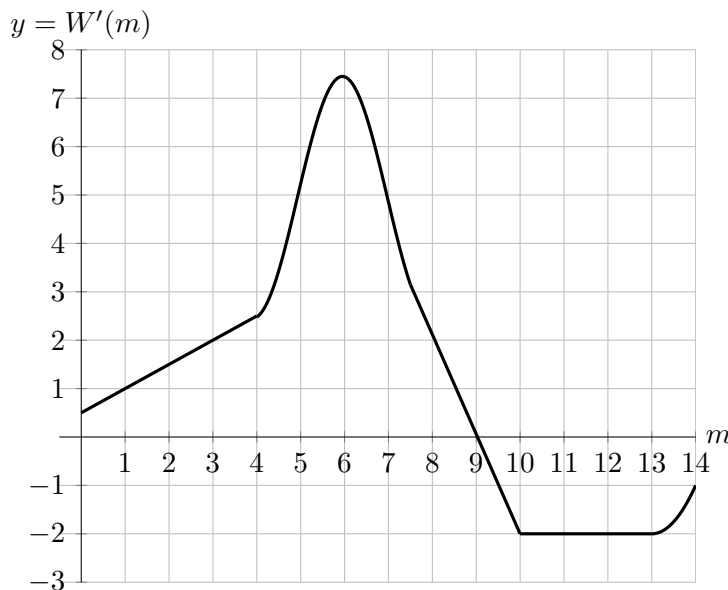


1. [13 points] Let $W(m)$ be the weight, in Newtons, that an ant that is m months old can carry on its back. The graph of $W'(m)$, (*the derivative of W*), is shown below.



Answer the following questions. Write “NI” if there is not enough information to answer the question.

- a. [2 points] At what age m , with $0 \leq m \leq 14$, can an ant carry the most weight on its back?

Solution: $m = 9$.

- b. [2 points] At what age m , with $0 \leq m \leq 14$, is the amount of weight an ant can carry on its back increasing most quickly?

Solution: $m = 6$

- c. [2 points] On which, if any, of the following intervals does it appear that the function $W(m)$ is always linear? Circle all correct choices, or circle NONE OF THESE if appropriate.

(0, 4) (4, 7) (8, 10) (10, 13) NONE OF THESE

- d. [2 points] On which, if any, of the following intervals does it appear that the function $W(m)$ is always decreasing? Circle all correct choices, or circle NONE OF THESE if appropriate.

(0, 3) (6, 9) (9, 10) (10, 14) NONE OF THESE

- e. [3 points] Complete the following sentence using the fact that $W'(13.5) = -1.75$.

Solution: As the age of an ant increases from 13 months to 13.5 months, the amount of weight it can carry on its back *decreases approximately by 0.875 Newtons*.

- f. [2 points] In the context of this problem, what are the units of the output values of the function $W'(m)$?

Solution: Newtons per month.