4. [10 points] Rita adopts a puppy, which she names Spot, and she records certain information about Spot for the first month she has him.

- Let $f(t)$ be the amount of food, in cups, that Spot eats t days after Rita adopts Spot.
- Let $w(t)$ be Spot's weight, in pounds, t days after Rita adopts Spot.
  - Assume that w is invertible during this month.

a. [8 points] For each of the following, either give a practical interpretation of the mathematical expression or equation, or explain why it doesn't make sense in the context of the problem.

(i) $f(8) = 0.75$

Solution: Spot eats 0.75 cups of food 8 days after Rita gets him.

(ii) $f(w^{-1}(10))$

Solution: $f(w^{-1}(10))$ is the amount of food in cups Spot eats when he weighs 10 pounds.

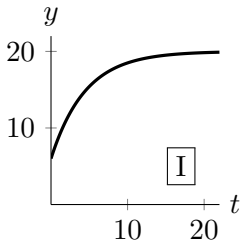
(iii) $w(f(9))$

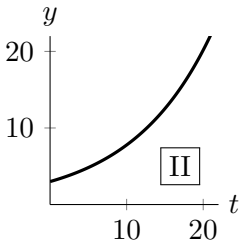
Solution: This expression does not make sense. $f(9)$ gives us an amount of food (in cups), but the input for w should instead be days.

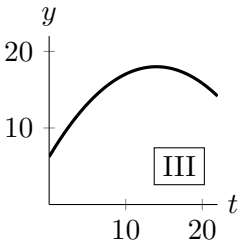
(iv) $\dfrac{f(14) - f(7)}{14 - 7} = 0.05$

Solution: Between 7 and 14 days after Rita gets him, Spot eats an average of 0.05 more cups of food each day than the previous day.

b. [2 points] Spot gains weight every day. When Rita first gets Spot, he is gaining weight very quickly, but he starts growing more slowly later on. Which of the following graphs could be a graph of $y = w(t)$? Choose the **one** best answer.







Answer:

I II III