

7. [10 points] Two housecats, Jasper and Zander, escape from their house at the same time and travel along a straight line between their house and a tree. Let $J(t)$ (respectively $Z(t)$) be Jasper's (respectively Zander's) distance, in feet, from the tree t seconds after escaping. The table below shows some of the values of $J(t)$ and $Z(t)$. Assume that $J(t)$ is invertible.

t	6	17	22	31	37
$J(t)$	41	33	21	14	2
$Z(t)$	39	32	31	36	43

- a. [2 points] What is Jasper's average velocity for $6 \leq t \leq 22$? *Be sure to include units.*

Answer: _____

- b. [2 points] Estimate $Z'(31)$. *Remember to show your work.*

Answer: _____

- c. [3 points] Circle the one statement below that is best supported by the equation

$$Z(J^{-1}(8) - 4) = 34.$$

- 34 seconds after escaping, Zander is 4 feet closer to the tree than Jasper was 8 seconds after escaping.
 - Four seconds before Jasper is 8 feet from the tree, Zander is 34 feet from the tree.
 - When Jasper is 4 feet further from the tree than he was 8 seconds after escaping, Zander is 34 feet from the tree.
 - When Jasper is 4 feet closer to the tree than he was 8 seconds after escaping, Zander is 34 feet from the tree.
 - Four seconds after Jasper is 8 feet from the tree, Zander is 34 feet from the tree.
- d. [3 points] Circle the one statement below that is best supported by the equation

$$(J^{-1})'(3) = -0.2.$$

- In the third second after leaving the house, Jasper travels about 0.2 feet.
- When Jasper is 3 feet from the tree, he is traveling about 0.2 feet/second slower than he was one foot earlier.
- Jasper gets about 1.5 feet closer to the tree during the third second after leaving the house.
- It takes Jasper about one-tenth of a second to go from 3 feet to 2.5 feet from the tree.
- One-half of a second before Jasper was 3 feet from the tree, he was about 2.9 feet from the tree.