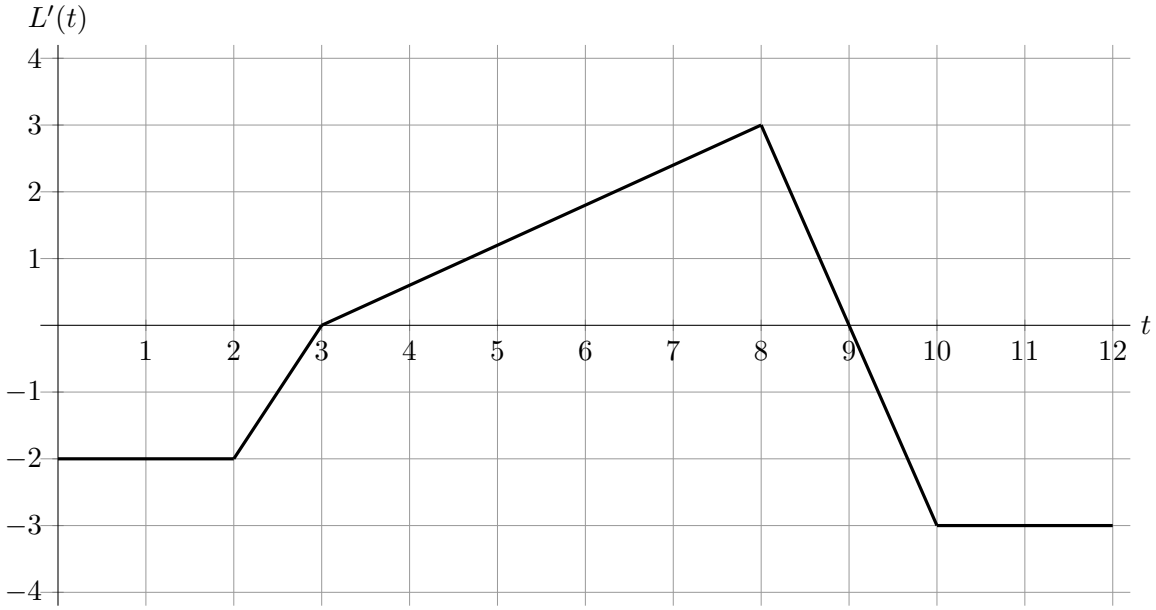
1. [5 points] Emily runs a lemonade stand. Her cumulative net profit fluctuates throughout the year. The function $L(t)$ represents the cumulative net profit of Emily's lemonade stand, in dollars, t months after January 1, 2024. Below is a graph of $L'(t)$, the **derivative** of $L(t)$.



For each part below, circle the **one** best option.

a. [2 points] Based on the graph of $L'(t)$, on what point in 2024 will the cumulative net profits of Emily's lemonade stand be largest?

i. $t = 0$ iii. $t = 8$ v. $t = 12$

ii. $t = 3$ iv. $t = 9$ vi. NONE OF THESE

b. [2 points] There is a chocolate cake at a nearby store that Emily really wants to buy, but she wants the cumulative net profits of her lemonade stand to be at least \$10 before she buys the chocolate cake. What is the smallest that $L(0)$ could be in order for her to be able to buy the chocolate cake at some point in 2024?

i. \$0 ii. \$2 iii. \$4 iv. \$6 v. \$8 vi. \$10

c. [1 point] Based on the graph of $L'(t)$, Emily tries to make a graph of $L(t)$ by assuming that the cumulative net profits of her lemonade stand are P_0 dollars on January 1, 2024. Later she discovers that the cumulative net profits on January 1, 2024 were instead $P_0 + 3$ dollars. How should Emily change her graph of $L(t)$ to reflect this discovery?

i. Shift $L(t)$ up by 3 iii. Shift $L(t)$ up by $P_0 + 3$

ii. Shift $L(t)$ down by 3 iv. Shift $L(t)$ down by $P_0 + 3$.