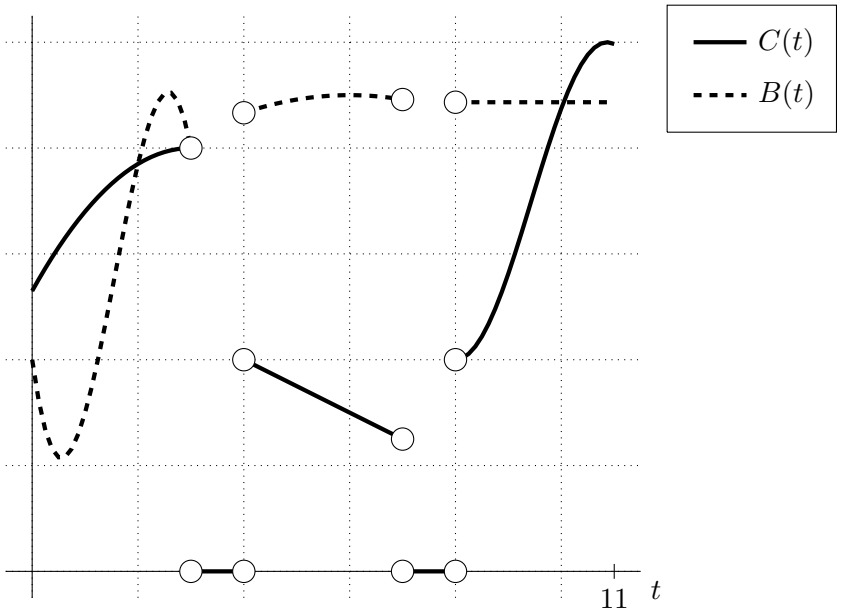
7. [9 points] Boxers Paul "Stretch" Cassenick and Stephen "Dee" Boxer decide to rematch for the heavyweight title. Suppose that the match consists of three 3-minute rounds with a 1-minute break in between each round. Suppose $C(t)$ is a function which models the number of punches Paul throws per minute, t minutes after the start of the match. Similarly, suppose $B(t)$ models the number of punches Stephen throws per minute, t minutes after the start of the match. Assume all punches thrown in the match are taken by the opponent.



a. [3 points] Find an expression involving integrals that represents the average number of punches thrown per minute by Stephen t minutes after the fight has started.

b. [2 points] Paul's scoring margin at time t is defined to be

(Total punches thrown by Paul at time t) − (total punches taken by Paul at time t).

At approximately what time(s) is Paul's scoring margin the largest? The smallest?

Largest at $t =$ _____

Smallest at $t =$ _____

c. [4 points] Assuming that the winner is the boxer who threw the most punches, who wins the fight? Give a brief justification of your answer making reference to the graph.