8. [11 points] Let $W(t)$ be the temperature, in degrees Fahrenheit, of a cake $t$ minutes after it is put in the oven. Assume $W(10) = 220$.

a. [3 points] Give a practical interpretation of the statement $\int_{5}^{10} W'(t) dt = 120$.

\textit{Solution:} Between minutes five and ten in the oven, the cake’s temperature increases by $120^\circ$F.

b. [3 points] Give a practical interpretation of the statement $\frac{1}{2} \int_{3}^{5} W(t) dt = 80$.

\textit{Solution:} Between minutes three and five in the oven, the cake’s average temperature is $80^\circ$F.

c. [3 points] Write a single mathematical equation describing the following statement: The average temperature of the cake over the first five minutes in the oven is the same as its temperature after three minutes in the oven.

\textit{Solution:} \[ \frac{1}{5} \int_{0}^{5} W(t) dt = W(3) \]

d. [2 points] Assuming all of the above statements in (a)-(c) are true, what will the temperature of the cake be five minutes after it is put in the oven?

\textit{Solution:} From (a), we deduce $W(10) - W(5) = 120$. So $220 - W(5) = 120$, which means $W(5) = 100^\circ$F.