Problem statement Suppose that the outdoor temperature (in ° F) on a particular day was approximated by the function

$$T(t) = 50 + 14 \sin\left(\frac{\pi t}{12}\right),$$

where t is time (in hours) after 9 AM.

a) Find the *maximum* temperature $T_{\max}$, *minimum* temperature $T_{\min}$, and *average* temperature

$$T_{\text{aver}} = \frac{1}{12} \int_0^{12} T(t)\, dt$$

on that day during the period between 9 AM and 9 PM.

b) Show that $T_{\text{aver}} \neq \frac{1}{2}(T_{\min} + T_{\max})$. (This is the definition that the weather bureau uses for "average temperature".)

c) Show that if T is not given by the above formula, but rather $T(t)$ is a *linear* function of t, then $T_{\text{aver}} = \frac{1}{2}(T_{\min} + T_{\max})$. (Use either geometric reasoning or an integral.)