

HW 2 (Due October 9) In this problem we model the formation of a line of people waiting to get into a movie. Keep in mind that we are modeling a discrete process with a continuous function, so that we do not have an exact description of reality, but rather a (hopefully) reasonable approximation.

Assume for the 9:20 PM showing of *Gone With the Wind*, that the rate at which people arrive at the theatre (in people per minute) is given by the function

$$R(t) = 10 \sin\left(\frac{\pi}{30}t\right) \quad , \quad 0 \leq t \leq 30,$$

where t is the number of minutes since 9:00 PM. Assume that no one arrives before 9:00 PM, and that the ticket sellers can sell tickets at a maximum rate of 5 tickets per minute. The theatre holds 150 people.

- a. How many people are in line when the line is the longest?
- b. If you arrive at the theatre at 9:15 PM, what time do you purchase your ticket?
- c. What time is the last ticket sold?
- d. If you purchase your ticket at 9:20 PM, what time did you arrive?