Homework 2

Due Friday, June 31

Worksheet 3: Do each of the problems (1–14).
Worksheet 4: Do problems 2–3, 5–14, and 16. Also, do the version of problem 15 below.
Worksheet 5: Do problems 1–13, and the version of problem 14 below.
As always, come by office hours if you have any questions.

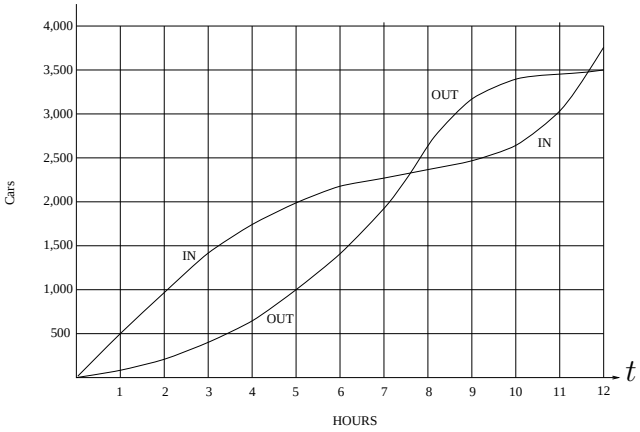
Worksheet #4

→ 15 A counter at the gate of a parking lot counts the number of cars that have entered the lot by any given time. Another counter counts the number of cars that have exited the lot by any given time. The two graphs below show the number of cars that have come in and gone out over a 12-hour period. Suppose the lot had 1,000 cars in it at time $t = 0$.

a) Find the overall average rate of flow into the parking lot over the first 10 hours.

b) Name a 2-hour interval over which about 1300 cars left the lot.

c) How many cars are in the lot at $t = 3$? At $t = 8$?



d) What is the incremental rate of flow out of the lot over the time period from 6 hours to 8 hours?

e) Name the time at which the lot will have the greatest number of cars in it. Name the time when the lot will have the smallest number of cars in it. How many cars will be in the lot at each of those times?

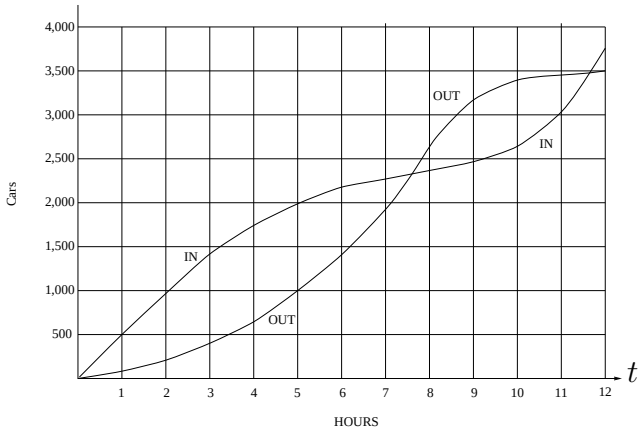
Worksheet #5

→ 14 The following graph shows the total number of cars that have entered a parking lot over a 12-hour time interval, and the number that have exited. Assume there are 1000 cars in the lot at $t = 0$. (This is the same setup as worksheet #4, question 15.) Let $C(t)$ represent the number of cars in the lot after t hours.

a) Is it true that $C(0) < C(10)$?

b) Between $t = 6$ and $t = 8$, is $C(t)$ increasing or decreasing?

c) Name the longest time interval over which the overall rate at which cars *exit* the lot is declining.



d) Suppose the flow *out* of the lot is changed so that every car leaves the lot exactly 3 hours later than shown on the graph. Under this new assumption, what is the value of $C(9)$?