Assignment V:

Sections	Topic	Page	Assigned Problems	Practice Problems
9.4	Competing Species	525	2bcdef	6bcdef
9.5	Predator-Prey	534	2abcd, 3abcd	4abcd

Also assigned for V: is the following problem about a Predator-Prey system This problem is similar to the example in the text (page 529-533), but with different numbers.

$$\begin{aligned} x' &= x(1 - 0.5y) \\ y' &= y(-0.5 + 0.25x) \end{aligned}$$

Let τ be the trajectory for which $x(0) = 1$, $y(0) = 2$.

The lines $x = 2$, $y = 2$ separate the (x,y) plane into four regions:

I: $(x > 2, y > 2)$
II: $(x < 2, y > 2)$
III: $(x < 2, y < 2)$
IV: $(x > 2, y < 2)$

Then answer the following questions.

1. What are the first four regions the trajectory τ passes through?

2. Show that τ is a closed curve. In particular, when τ crosses the line $y = 2$ with $0 < x < 2$, it passes through $(1, 2)$

3. What is the value of x when τ crosses the line $y = 2$?

****

I answered these questions in class on Oct 17, for the following problem

$$\begin{aligned} x' &= x(y - 2) \\ y' &= y(3 - x) \end{aligned}$$

In this problem, x and y satisfy the equation: $3 \ln x - x = y - 2 \ln y + C$, where $C \approx -.7$.