Math 363 Homework Due Wednesday, September 20

Problems 1.7–20. Do not do the problem as stated in the textbook. Modify it as follows. Use the parameter values $k = 0.3$, $N = 2500$, so that the differential equation becomes

$$\frac{dP}{dt} = 0.3P\left(1 - \frac{P}{2500}\right) - C\,,$$

where $P = P(t)$ is the fish population in a lake at time t years and C is the annual fishing rate.

a. Suppose the average catch of a fisherman/woman with a license is 3 fish per year. What is the largest number of licenses that can be issued if the fish are to have a chance of surviving in the lake? (Note: The number of fishing licenses must be a **whole** number.)

b. Now suppose the number of fishing licenses in part a is issued. What happens to the fish population? In particular, how does the behavior of the population depend on the initial population?