

Homework assigned Monday, September 13

Problem 1. A population of fish in a large tank grows logistically with a carrying capacity of 500, and an intrinsic growth rate of $r = .2$ (fish/month)/fish.

- (a) If internally 300 fish are put into the tank, then what are the initial growth rate of the population and the initial per capita growth rate?
- (b) After some point the fish are harvested at rate of 15% of the population per month. What happens to the size of the stable population?

Problem 2. If a population of months grows logistically with $K = 1000$ and $r = .04$, then what is the maximum rate of growth of the population and at what population size does it occur?

Problem 3. (This one requires a bit of algebra). If a population grows by the logistic equation

$$\frac{dN}{dt} = rN \left(1 - \frac{N}{K} \right)$$

then show that the maximum growth rate occurs when the population size is $N = \frac{K}{2}$.