Mathematics 172

Quiz 5 Name: Key

You must show your work to get full credit.

Assume that a pond has a population of mosquito fish in a pond that, due to predation by bass in the pond, have a intrinsic growth rate of $r = -.08$ (fish/fish)month. The owner of the pond wants a stable population of 500 mosquito fish in the bond. At what rate should she stock the pond to achieve this? Include units on your answer.

Stocking rate is $S =$ 40 fish/week.

Let $P(t)$ = number of mosquito fish in pond in week t and let S be the stocking rate. Then P satisfies the rate equation

$$\frac{dP}{dt} = -.08P + S.$$

We want $P = 500$ to be an equilibrium solution. Plugging into the rate equation gives

$$0 = -.08(500) + S$$

So

$$S = (.08)(500) = 40 \text{ fish/week}$$