

Mathematics 172

Quiz #13

You must show your work to get full credit.

A population of bass in a pond has discrete logistic growth with carrying capacity of 100 fish and a growth rate of 1.2 (fish/year)/fish. If we harvest the population at the rate of 40/year.

(a) What is the new equation for the growth:

Answer:

$$N_{t+1} = N_t + 1.2N_t \left(1 - \frac{N_t}{100}\right) - 40$$

(b) What is the new carrying capacity?

Answer: Maybe the easiest way is to use the calculator. Enter

$$\backslash Y_1 = X + 1.2X(1 - X/100) - .4X$$

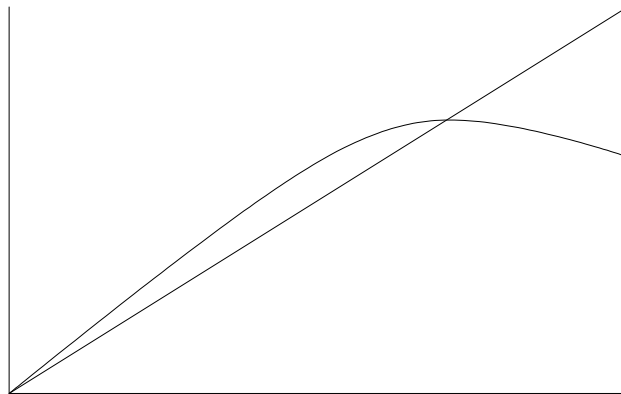
$$\backslash Y_2 = X$$

and set

$$X_{\min} = 0$$

$$X_{\max} = 100$$

Then do ZoomFit to graph it and get a picture that looks like:



Do 2nd CALC and then intersect. The calculator asks First curve? Press enter. It then asks for Second curve? Press enter again. It then asks Guess?. Use the arrow keys to move the cursor near where the curves intersect and hit enter yet again. You will then be told that

$$X = 66.666667$$

which is the answer. (Or 67 if we round off to the nearest bass.)