Mathematics 172

Quiz 14 Name: Key

You must show your work to get full credit.

Jalapeno peppers are an annual plant. A population of jalapeno plants are growing wild in a village commons with a per capita growth rate of $r = 1.2$ (plants/year)/plant and a carrying capacity of $K = 120$. Let N_t be the number of pepper plants number of pepper plants in year t.

1. What is the equation satisfied by N_t?

The equation is $N_{t+1} = N_t + 1.2N_t\left(1 - \frac{N_t}{120}\right)$

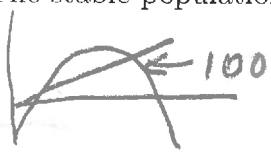
2. The villagers decide to harvest 20 of the pepper plants a year.

(a) What is the new equation satisfied by N_t?

The equation is $N_{t+1} = N_t + 1.2N_t\left(1 - \frac{N_t}{120}\right) - 20$

(b) What is the new stable population size of the population of pepper plants? *Hint:* A reasonable choice for graphing is Xmin=0 and Xmax=150.

The stable population size is 100 pepper plants



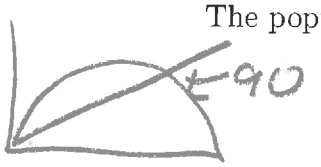
3. At some point the villagers stop harvesting 20 plants per year and start harverting 30% of the plants.

(a) What is the new equation satisfied by N_t?

The equation is $N_{t+1} = N_t + 1.2N_t\left(1 - \frac{N_t}{120}\right) - .3N$

(b) What is the new stable population size?

The population size is 90



(c) How many plants a year are the villagers harvesting?

30% of 90 is 27

They harvest: 27.