Mathematics 172

Quiz # 29 Name: Key

You must show your work to get full credit.

For the predator victim system

$$\frac{dV}{dt} = .01V - .001VP \quad = V(.01 - .001P)$$

$$\frac{dP}{dt} = -.05P + .0001VP \quad = P(-.05 + .0001V)$$

1. What is the intrinsic growth rate of the victims?

Intrinsic growth rate is .01

2. What is the death rate of the predators?

Death rate is -.05

3. What are the average size of the victim and predator populations?

$\hat{V} = \frac{.05}{.0001} =$ $\hat{V} =$ 500

$\hat{P} = \frac{.01}{.001} = 10$ $\hat{P} =$ 10

4. If $V(0) = 200$ and $P(0) = 50$ what are $V'(0)$ and $P'(0)$?

$V'(0) = 200(.01 - .001(50))$ $V'(0) =$ -8

$= -8$

$P'(0) = 50(-.05 + .0001(200))$ $P'(0) =$ -1.5

$= -1.5$