Mathematics 172

Quiz #28 Name: Key

You must show your work to get full credit.

Consider a predator-prey system governed by the equations

$$\frac{dV}{dt} = .1V - .002VP$$
$$\frac{dP}{dt} = -.2P + .0001VP$$

1. What is the intrinsic growth rate of the victim population?

Intrinsic growth rate is .1

This is the coefficient of V in the $\frac{dV}{dt}$ equation

2. What is the intrinsic death rate of the prey population?

Intrinsic death rate is .2

This is $-$ the coefficient of P in the $\frac{dP}{dt}$ equation

3. What is the average number of victims and predators.

$\widehat{V} =$ 2000

$\widehat{P} =$ 50

solve $\frac{dV}{dt} = .1V - .002VP = V(.1 - .002P) = 0$

to get $V = 0$

$P = \frac{.1}{.002} = 50$ so $\widehat{P} = 50$

$\frac{dP}{dt} = -.2P + .0001VP = P(-.2 + .0001V) = 0$

to get $P = 0$ $V = \frac{.2}{.0001} = 2000$