Quiz #6   Name: Key

You must show your work to get full credit.

A garden has a population of aphids that grows logistically with an intrinsic rate of .3 bugs per bug per week and a carrying capacity of 20,000 bugs. Ladybugs are introduced into the garden and they eat 25% of the aphid population per week.

(1) What it the rate equation for the growth of the aphid population after the introduction of the ladybugs?

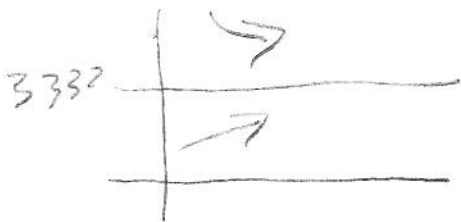$$\frac{dP}{dt} = .3P\left(1 - \frac{P}{20000}\right) - .25P$$

(2) What happens to the size of the aphid population after the introduction of the lady bugs?

solve

$$.3P\left(1 - \frac{P}{20,000}\right) - .25P = 0$$

$$P\left(.3 - \frac{.3P}{20,000} - .25\right) = 0$$

$$P = 0 \quad \text{or} \quad \frac{.3P}{20,000} = .05 \Rightarrow P_* = 3,333.3$$

3333

$P_* = 3,333$ is a stable equlibirum point, so the aphid population goes to 3,333.