Mathematics 172

Quiz 8 Name: Key

You must show your work to get full credit.

1. For the discrete dynamical

$$P_{t+1} = \frac{25P_t}{1+.3P_t^2}, \qquad P_0 = 10$$

compute the following:

Used calculator to find those.

$P_1 =$ 8.065

$P_2 =$ 9.830

$P_3 =$ 8.195

$P_4 =$ 9.688

2. We wish to find the equilibrium points of the system above.

(a) What is the equation we need to solve to find the equilibrium points?

$$P = \frac{25P}{1+.3P^2}$$

(b) What are the equilibrium points?

The equilibrium points are: 0, 8.944

$$P = \frac{25P}{1+.3P^2}$$

$P(1+.3P^2) = 25P$ (cross multiply)

$P(1+.3P^2) - 25P = 0$

$P((1+.3P^2) - 25) = 0$

$P(.3P^2 - 24) = 0$

so $P = 0$

or $.3P^2 - 24 = 0$

$.3P^2 = 24$

$P^2 = \frac{24}{.3}$

$P = \pm\sqrt{\frac{24}{.3}} = \pm 8.944$

we only need the positive solution