Mathematics 172

Quiz 33 Name: Key

You must show your work to get full credit.

1. If we have a discrete model for population growth of the form

$$\Delta P = f(P)$$

what is the condition that $P = R^*$ is an equilibrium point?

The condition is $f(P) = 0$

2. If we have a discrete model for population growth of the form

$$P_{t+1} = F(P_t)$$

(a) what is the condition that $P = R^*$ is an equilibrium point?

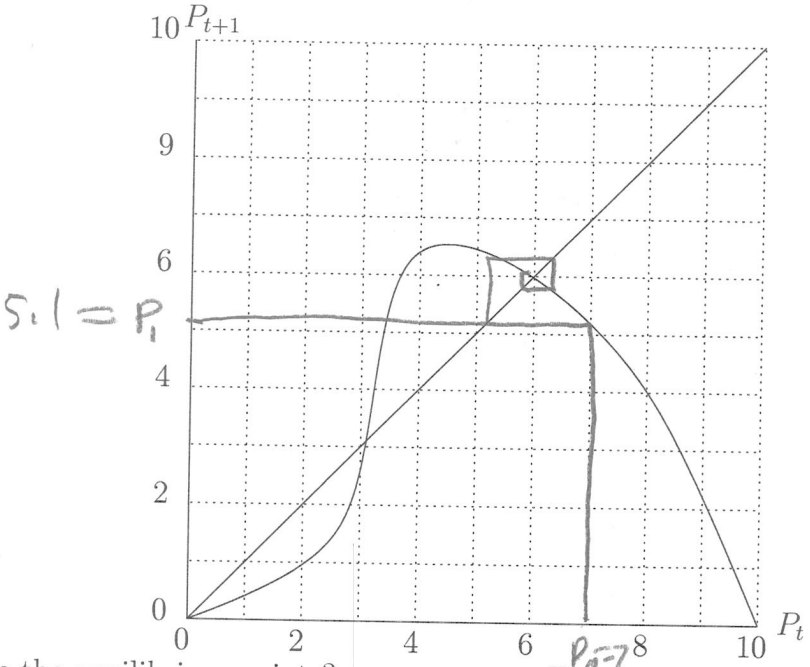
The condition is $F(P) = P$

(b) What is the condition that the equilibrium point P^* is stable?

The condition is $|F'(P^*)| < 1$

3. The graph below gives P_{t+1} as a function of P_t, that is

$$P_{t+1} = F(P_t)$$



(a) What are the equilibrium points?

The points are 0, 3.1, 6

(b) Which of these points is stable?

Stable points are 0, 6

(c) If $P_0 = 7$ estimate P_1.

$P_1 \approx$ 5.1

(d) If $P_0 = 07$ estimate P_{20}.

$P_{20} \approx$ 6