Quiz #10                    Name: ___Key___
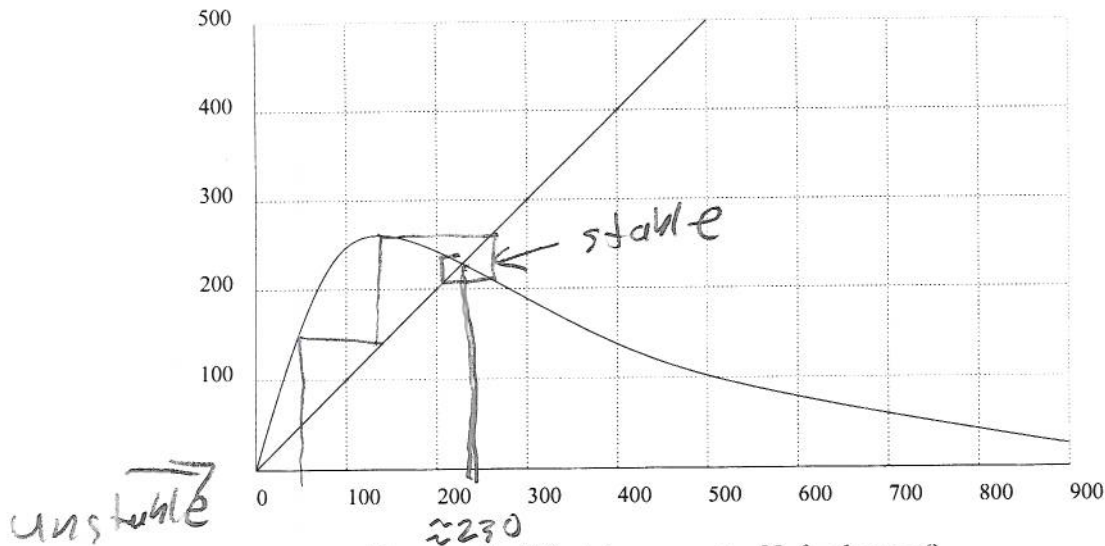
***You must show your work to get full credit.***



unstable

~230

FIGURE 1. What happens to $N_t$ for large $t$?

(1) The population goes to ~230 (stable)

(2) For the discrete dynamical system

$$N_{t+1} = 5N_t e^{-.01N_t}$$

find the equilibrium points and classify as to stable or unstable.

Solve $N = 5Ne^{-.01N}$

In calculator set

$Y_1 = 5xe^{\wedge}(-.01x)$

$Y_2 = x$

The intersections are at $N_* = 0$ (unstable)

and $N_* = 160.9$

at $N_* = 160.9$ $\frac{dy}{dx} = -.609$.

Thus $\left|\frac{dy}{dx}\right| < 1$ so $160.9$ is unstable