Homework assigned Friday, February 3.

Consider the following discrete dynamical system

$$N_{t+1} = .1N_t e^{.6N_t(4-N_t)}.$$

We wish to use our calculators to find the equilibrium points and determine which are stable.

(1) What two functions to we want for $\diagdown Y_1=$ and $\diagdown Y_2=$? *Answer:* $\diagdown Y_1=$ `.1Xe^(.6X(4-X))` and $\diagdown Y_2=$ `X`.

(2) As usual the hardest part is finding an appropriate window. It is clear that `xmin = 0`. Do some trial and error to find a value for `xmax` that seems to work well. *Answer:* There is no single anwer for this. I used `xmax = 3` and it worked fine.

(3) Use the calculator to find the equilibrium points. *Answer:* $N_* = 0$, $N_* = 1.5970$, and $N_* = 2.4029$.

(4) What are the slopes at the equilibrium points? *Answer:* At $N_* = 0$ `dy/dx = .1000002` At $N_* = 1.5970$, `dy/dx = 1.7722` At $N_* = 2.4029$ `dy/dx = -.16175`

(5) Which of the equilibrium points are stable? Which unstable? *Answer:* $N_* = 0$ and $N_* = 2.4029$ are stable. $N_* = 1.5970$ is unstable.

(6) If $N_0 = 1$ estimate N_{20}. *Answer:* $N_{20} \approx 0$.

(7) If $N_0 = 2$ estimate N_{30}. *Answer:* $N_{30} \approx 2.4029$.