Quiz 13   Name:_____Key_____
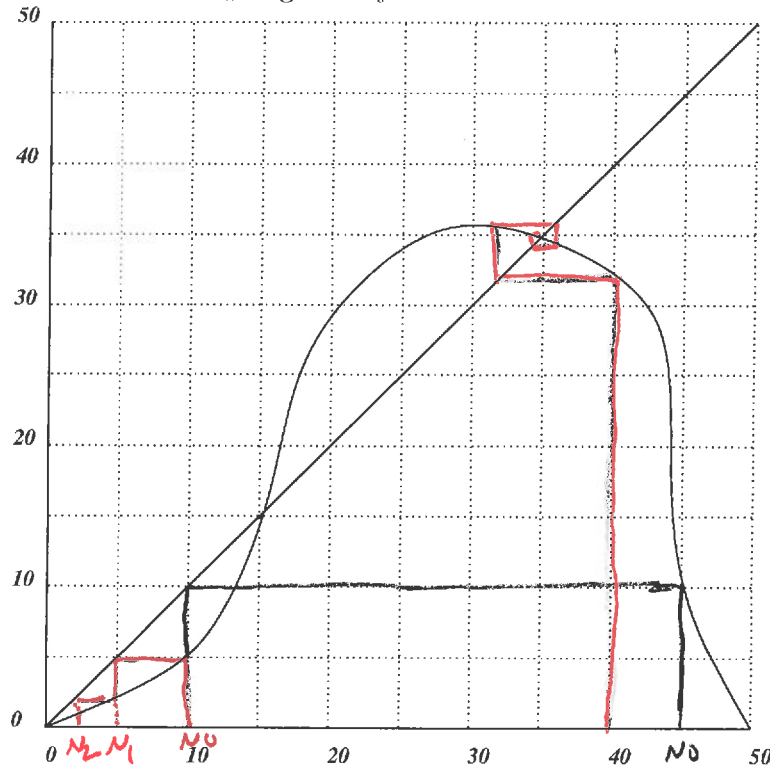
You must show your work to get full credit.

For the dynamical system
$$N_t = f(N_{t-1}).$$
the graph of N_t as a function of N_{t-1} is given by

1. What are the equilibrium points?   The equilibrium points are: ___0, 15, 35___

2. Which of the equilibrium points are stable and which are unstable?
                                    The stable points are: ___0, 35___

                                    The unstable points are: ___15___

3. If $N_0 = 10$ estimate N_1 and N_2.
            $N_1 \approx$ ___5___ $N_2 \approx$ ___2.5___

4. If $N_0 = 5$ estimate N_{100}. If converges down to 0 $N_{100} \approx$ ___0___

5. If $N_0 = 40$ estimate N_{87} Starting at 40 it $N_{87} \approx$ ___35___
      cobwebs into 35

6. If $N_0 = 45$ estimate N_{93} starting at $N_0 = 45$ $N_{93} \approx$ ___0___
      Since $N_1 \approx 10$ and we converge
      into 0