Mathematics 172

Quiz #14   Name: **Key**

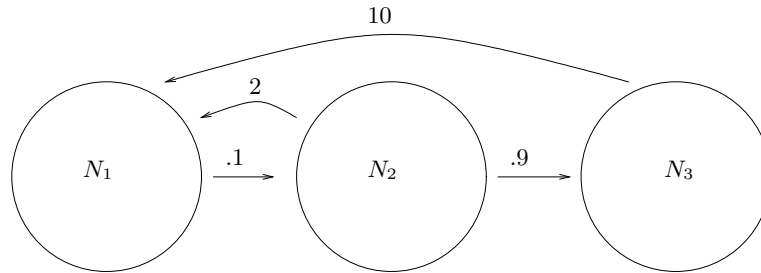### *You must show your work to get full credit.*

FIGURE 1

A species of fish has survival and per capita given by the diagram above (with N_1 the number of one year olds, N_2 the number of two year olds and N_3 the number of three year olds). A pond is stocked with 100 one year olds.

(1) What is the Leslie matrix?

$$L = \begin{bmatrix} 0 & 2 & 10 \\ .1 & 0 & 0 \\ 0 & .9 & 0 \end{bmatrix}$$

(2) How many one, two and three year olds are there after 20 years?
    From the calculator: $N_{1,20} = \underline{81.79}$

$$N_{2,20} = \underline{5.09}$$

$$N_{3,20} = \underline{6.44}$$

(3) What is the stable age distribution (use $t = 50$ years to compute this).
    From the calculator:

$N_{1,50} = 193.9$ $N_{2,50} = 18.8$ $N_{3,50} = 16.0$ Total $= 193.9 + 18.8 + 16.0 = 228.7$

These can be used to compute the percents:

$$\% \text{ one year olds} = \frac{193.9 \times 100\%}{228.7} = 84.8\%,$$

$$\% \text{ twp year olds} = \frac{18.8 \times 100\%}{228.7} = 8.2\%,$$

$$\% \text{ three year olds} = \frac{16.0 \times 100\%}{228.7} = 7.0\%$$