

Mathematics 172

Quiz #13

Name: Key

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

For the Leslie matrix

$$L = \begin{bmatrix} 0 & 2.0 & 3.0 \\ .9 & 0 & 0 \\ 0 & .3 & 0 \end{bmatrix}$$

and initial condition

$$N_0 = \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix}$$

answer the following:

(1) What is the initial number of one, two and three year olds?

Number of one year olds. 10

Number of two olds. 20

Number of three olds. 30

(2) What is the per capita birth rate of three year olds?

3.0

(3) What is the survival rate of two year olds?

.3 (or 30%)

(4) What is  $N_1$ ?

$$\begin{aligned} \vec{N}_1 &= L \vec{N}_0 \\ &= \begin{bmatrix} 0 & 2 & 3 \\ .9 & 0 & 0 \\ 0 & .3 & 0 \end{bmatrix} \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix} \end{aligned}$$

used calculator

$$= \begin{bmatrix} 130 \\ 9 \\ 6 \end{bmatrix}$$

$N_1 =$  \_\_\_\_\_