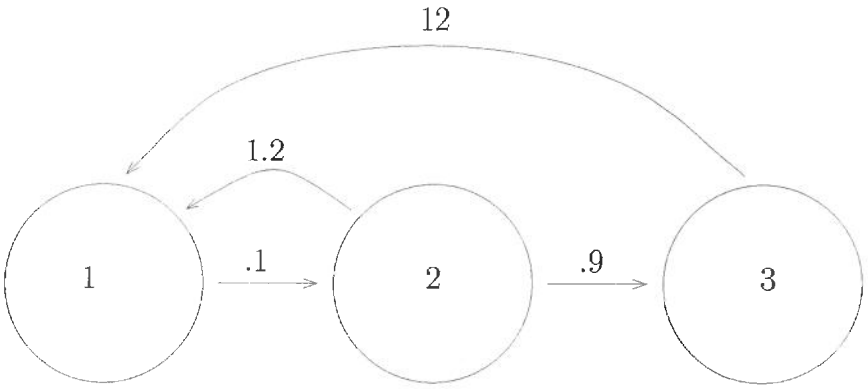
Mathematics 172

Quiz 20 Name: Key

You must show your work to get full credit.

The following loop diagram summarizes the life history of an aquatic insect that lives for three years.



1. Write the Leslie matrix for this loop diagram.

$$L = [A] = \begin{bmatrix} 0 & 1.2 & 12 \\ .1 & 0 & 0 \\ 0 & .9 & 0 \end{bmatrix}$$

2. What does the number 1.2 mean?

It is the average number of off spring to a stage 2 org. that live to stage 1

3. What does the number .9 mean?

That the proportion of stage 2 org. that survive to stage 3 is .9 (i.e. 90%)

4. Assume that a point starts with a population of 100 of the insects in Stage 1, 20 in Stage 2 and 10 in Stage 3. Then how many are in each stage 20 years later?

In the calculator enter [A] as above and

$[B] = N(0) = \begin{bmatrix} 100 \\ 20 \\ 10 \end{bmatrix}$

Then

$N(20) = [A]^{\wedge}20[B] = \begin{bmatrix} 560.07 \\ 51.55 \\ 34.58 \end{bmatrix}$

Number in Stage 1 560.07

Number in Stage 2 51.55

Number in Stage 3 34.58