Mathematics 172

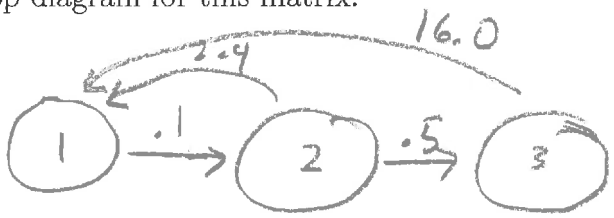
Quiz 24 Name: Key

You must show your work to get full credit.

A species of grasshopper lives for two years and has three life stages. The first is hatchling, the second is juvenile, and the thrid is adult. A population of these grasshopper's lives in a meadow and the Leslie matrix for this population is

$$L = \begin{bmatrix} 0.0 & 2.4 & 16.0 \\ 0.1 & 0.0 & 0.0 \\ 0.0 & 0.5 & 0.0 \end{bmatrix}$$

1. Draw the loop diagram for this matrix.



Now assume that in some year there are 412 hatchlings, 42 juveniles, and 20 adults.

2. Compute the number and proportion in each of the classes 40 years from now to 3 decimal places.

Number in stage 1 734.864

Number in stage 2 72.457

Number in stage 3 35.712

Proportion in stage 1 .872

Proportion in stage 2 .086

Proportion in stage 3 .042

3. Compute the number and proportion in each of the classes 50 years from now to 3 decimal places.

Number in stage 1 846.709

Number in stage 2 83.479

Number in stage 3 41.154

Proportion in stage 1 .872

Proportion in stage 2 .086

Proportion in stage 3 .042

4. Explain why this population as reached its stable age distribution after 40 years.

The proportion in each stage stays the same to 3 decimal places