Mathematics 172

Quiz 36 Name: Key

You must show your work to get full credit.

A population of wild onions is starts to grow in a park. The onions have three stages: seedling, juveniles, and adults. The Leslie matrix defining the population growth is

$$L = \begin{bmatrix} 0 & 3.5 & 24 \\ .1 & 0 & 0 \\ 0 & .4 & 0 \end{bmatrix}$$

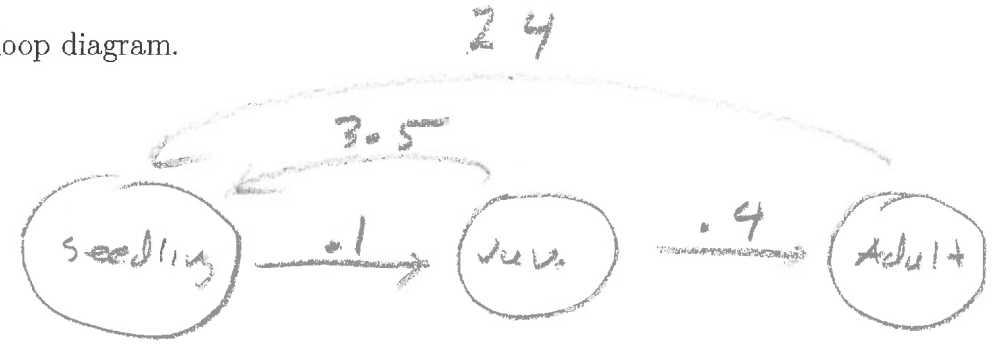
1. In this matrix what does the number 24 represent?

The average number of off spring to an adult that survive to be a seedling.

2. What does the number .1 represent?

The proportion of seedlings that survive to be juveniles.

3. Draw the loop diagram.



4. If in the first year there are 7 seedlings and no juveniles or adults, find the number in each stage in years one, two, three and four.

Year 1:
Stage 1 0 Stage 2 .7 Stage 3 0

Year 2:
Stage 1 2.45 Stage 2 0 Stage 3 .28

Year 3:
Stage 1 6.72 Stage 2 .245 Stage 3 0

Year 4:
Stage 1 .8575 Stage 2 .672 Stage 3 .098

5. Has the population reached its stable age distribution by year 3? Write a sentence or two explaining your answer. First compute the proportion in each class

Year 3 stage 1 .915 stage 2 .035 stage 3 0
Year 4 stage 1 .53 stage 2 .413 stage 3 .0602

So we have not reached stable distribution as there

6. Find the number in each stage in the years 50 and 51. number one estimates

Number in each stage year 50:

Stage 1 367.18 Stage 2 33.27 Stage 3 12.05

Proportion in each stage year 50:

Stage 1 .840 Stage 2 .084 Stage 3 .024

7. Find the proposition in each stage in the years 50 and 51.

Number in each stage year 51:

Stage 1 405.70 Stage 2 36.72 Stage 3 13.31

Proportion in each stage year 51:

Stage 1 .840 Stage 2 .084 Stage 3 .024 i

8. Has the population reached its stable ~~population size~~ distribution by year 50? Write a sentence or two explaining your answer.

Yes, because the proportions stay the same in going from year 50 to year 51.