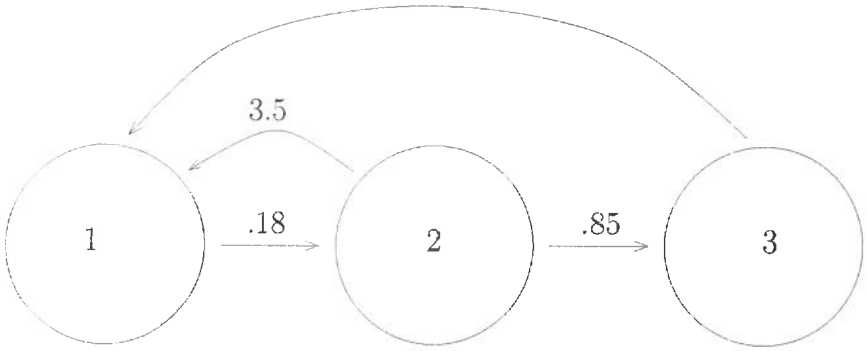
Mathematics 172

Quiz 13 Name: Key

You must show your work to get full credit.

1. Parsley is biannual, that is it lives for two years. A population of parsley is growing in an abandoned garden. There are three stages, Stage 1 is seedlings, Stage 2 is juveniles (one year older than a seedling), and Stage 3 is adults. The life cycle of this population is summed up in the following loop diagram: 14



(a) What is the Leslie matrix for this population: $L =$ $\begin{bmatrix} 0 & 3.5 & 14 \\ .18 & 0 & 0 \\ 0 & .85 & 0 \end{bmatrix}$

(b) Write a sentence or two explaining what the number .85 means.

.85 is proportion of stage 2 that live to be stage 3

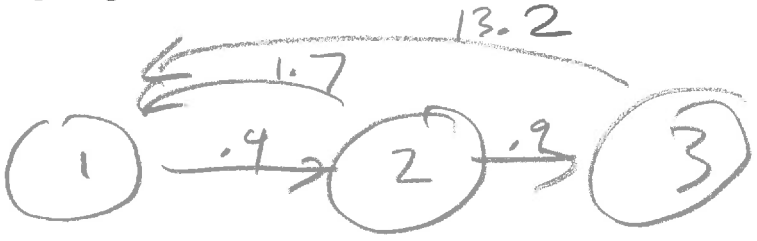
(c) Write a sentence or two explaining what the number 3.5 represents.

3.5 is the average number of offspring to a stage 2 individual

2. Fennel also biannual. Assume that in our abandoned garden that there is also a population of fennel and that the population growth for this population is given by the Leslie matrix

$$L = \begin{bmatrix} 0 & 1.7 & 13.2 \\ .4 & 0 & 0 \\ 0 & .9 & 0 \end{bmatrix}$$

(a) Draw the loop diagram for this matrix.



(b) What is the average number of offspring to an adult that lives to be a seedling?

The number is 13.2

(c) What proportion of seedlings that live to be adults?

The number is $(.4)(.9) = .36$