Mathematics 172

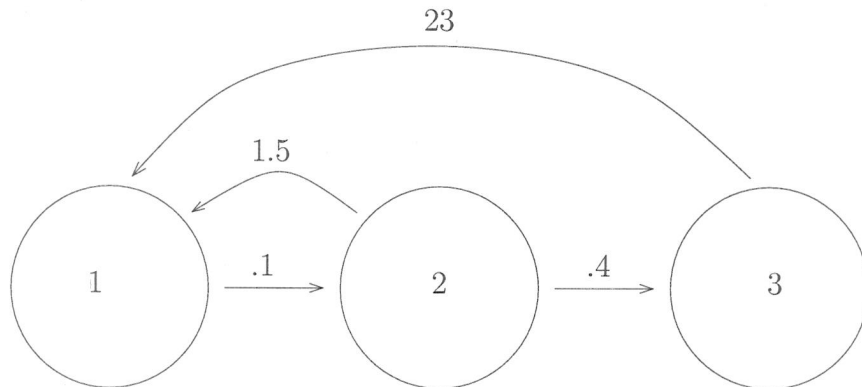Quiz 16   Name: ___Key___

You must show your work to get full credit.

23

1.5

1   .1   2   .4   3

For a plant that has three stages of growth and whose life history is given by the loop diagram above.

1. What does the number 23 mean in this context?

It is averse number of offspring to a stage 3 plant

2. What does the number .4 mean in this context.

It is the proportion of stage 2 plants that survive to stage 3.

3. If we start with 10 in stage 1 and none in the other two stages then

$$A = \begin{bmatrix} 0 & 1.5 & 23 \\ .1 & 0 & 0 \\ 0 & .4 & 0 \end{bmatrix}$$

$$\vec{N}_0 = \begin{bmatrix} 10 \\ 0 \\ 0 \end{bmatrix}$$

$$\vec{N}_{100} = \begin{bmatrix} 37.36 \\ 3.65 \\ 1.42 \end{bmatrix}$$

$$\vec{N}_{101} = \begin{bmatrix} 38.20 \\ 3.74 \\ 1.46 \end{bmatrix}$$

What is proportion in Stage 1 for $\vec{N}_{100}$ $\dfrac{37.36}{42.43} = .8801$

What is proportion in Stage 2 for $\vec{N}_{100}$ $\dfrac{3.65}{42.43} = .0860$

What is proportion in Stage 3 for $\vec{N}_{100}$ $\dfrac{1.42}{42.43} = .0269$

Total $= 37.36 + 3.65 + 1.42 = 42.43$

What is proportion in Stage 1 for $\vec{N}_{101}$ $\dfrac{38.20}{43.40} = .8801$

What is proportion in Stage 2 for $\vec{N}_{101}$ $\dfrac{3.74}{43.40} = .0862$

What is proportion in Stage 3 for $\vec{N}_{101}$ $\dfrac{1.46}{43.40} = .0336$

total $= 38.20 + 3.74 + 1.46 = 43.40$