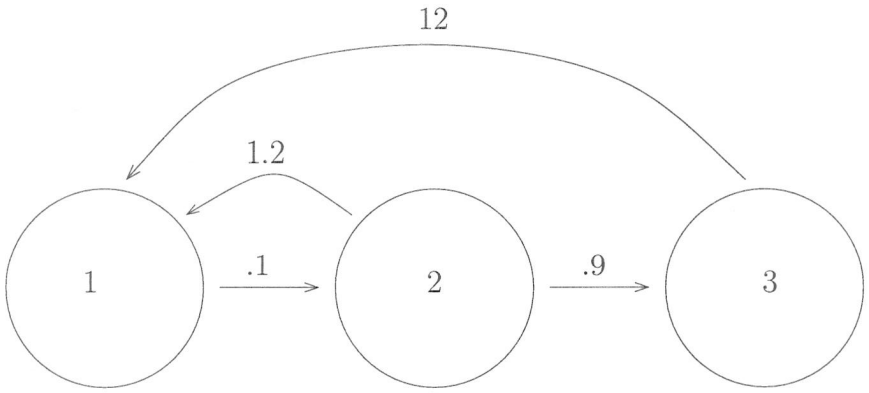
Mathematics 172

Quiz 15 **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 matrix for this loop diagram.

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

2. 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.

$$\vec{N_0} = \begin{bmatrix} 100 \\ 20 \\ 10 \end{bmatrix}$$

$$\vec{N_{20}} = A^{20}\vec{N_0} = \begin{bmatrix} 560.1 \\ 51.5 \\ 34.6 \end{bmatrix}$$

Number in Stage 1 560.1

Number in Stage 2 51.5

Number in Stage 3 34.6