Homework Assignment Eight
Linear Algebra

Five.II.1 (pp. 348–349)

1. 1.4
2. 1.10
3. 1.11

Five.II.2 (pp. 352–353)

1. 2.6
2. 2.8
3. 2.11
4. 2.15

Five.II.3 (pp. 358–360)

1. 3.21
2. 3.24
3. 3.27
4. 3.35(a)

Markov Chains and Population Models

1. Suppose that if you floss your teeth one night you floss your teeth the next night forty percent of the time. But if you don't floss your teeth one night, there is an eighty percent chance that you'll floss your teeth the next night. In the long run, how often do you floss?

2. Consider a species of plant which live to a maximum age of two years. So there are three ages: 0, 1, and 2 years. The probability that a "newborn" plant survives to age 1 is $\frac{1}{2}$. And the probability that a plant at age 1 survives to age 2 is $\frac{1}{4}$. One-year-old plants produce two offspring. Two-year-old plants produce one offspring.

   (a) Write down the Leslie matrix for this system.
   (b) Suppose that there are initially 100 newborn plants. What is the distribution of plants each of the next three years?
   (c) Does the plant population reach a stable value?
   (d) In the long run, what ratio of ages do you expect in the plant population?