1.5 Handout

1. Suppose a new medication comes out with the following traits: a person who ingests a dose daily will retain one third of the concentration from the previous day, and one dose is enough to increase the concentration by 3 mg/L.

   (a) Write down a discrete dynamical system that models the concentration of this drug in the bloodstream.

   (b) What is the "experiment" in this discrete dynamical system?

2. A bacteria population doubles each day, but due to a harsh environment, a quarter of them also die off every day. Furthermore, around 200 million bacteria are lost each day due to being carried away by other means.

   (a) Write down a discrete dynamical system modeling the population of the bacteria colony.

   (b) What is the "experiment" in this discrete dynamical system?

3. Find the solution to the discrete dynamical system in problem 1 with an initial value of 0 mg/L of the drug. What is the long-term concentration level?

4. Find the solution to the discrete dynamical system in problem 2 with an initial value of 300 million bacteria. What does the population do in the long run?