# Lesson 10

1. A store has capacity for 500 gallons of ice cream. They estimate that the ice cream sells at a daily rate equal to 10% of the *available* capacity. Use $A(t)$ for the amount in inventory after $t$ days.
   (a) What is $\frac{dA}{dt}$?
   (b) If there are initially 300 gallons of ice cream in the inventory, find $A(t)$.
2. A 1,000 gallon tank initially contains 500 gallons of a water based solution with 200 grams of solute dissolved in it. A solution with 2 grams of solute per gallon of water flows into the tank at a rate of 30 gallons per minute, and a well-mixed solution leaves the tank at 12 gallons per minute.
   (a) How much solute is in the tank after 15 minutes?
   (b) How much solute is in the tank when it is full?
3. In a given area, there is a population limit of 800 dodo birds. The population of dodo birds is initially 370, and starting at time $t = 0$ decreases at a yearly rate of 12% of the difference between the population limit and the actual population. When will the dodo birds become extinct?