MA 511
Problems for Week #4

Your work on these problems will be collected on Wednesday, October 1, in class.

Part A. (September 24, 2003)

Part B. (September 26, 2003)
1. Here is a theological question. The gods Mercury and Thor each have a large barrel. One day last year the following events transpired.
   0. At 11:00AM Mercury had infinitely many balls in his barrel and Thor had none.
   1. At 11:30AM Mercury took two balls from his barrel and put them into Thor’s barrel. Thor removed one of the balls from his barrel and threw it away.
   2. At quarter to twelve Mercury took two more balls from his barrel and put them into Thor’s barrel. There were now three balls in Thor’s barrel. Thor removed one of them and threw it away.
   3. At an eighth of an hour before noon Mercury took two more balls from his barrel and put them into Thor’s barrel. There were now four balls in Thor’s barrel. Thor removed one of them and threw it away.
   ... and so on.
   n. At 1/2^n hours before noon Mercury took two more balls from his barrel and put them into Thor’s barrel. There were now n + 1 balls in Thor’s barrel. Thor removed one of them and threw it away.
   ... ad infinitum.

Please analyze the following questions. How many balls were in Mercury’s barrel at noon? How many were in Thor’s barrel at noon?

Caution. Like many theological questions, these questions do not have unique answers.