Prof. David Draper
Department of
Applied Mathematics and Statistics
University of California, Santa Cruz

AMS 131: Quiz 2

Name: _____

(You can use another page if necessary in any or all parts of the problems.)

1. Each year starts on one of the seven days (Sunday through Saturday). Each year is either a leap year (i.e., it includes February 29) or not. How many different calendars are possible for a year? Explain briefly.

2. A box contains n balls, of which r are red (r and n are both positive integers, and $r \leq n$; suppose further that n is even). Consider what happens when the balls are drawn from the box one at a time, at random **without replacement**. Determine

(a) the probability that the first ball drawn will be red;

(b) the probability that the $\left(\frac{n}{2}\right)$th ball drawn will be red; and

(c) the probability that the last ball drawn will be red.

Explain briefly in each case. *Hint:* Imagine that the n balls are randomly ordered in a list, and then drawn in that order, which is equivalent to sampling at random without replacement. *Further Hint:* When choosing a sample (Y_1, Y_2) of size 2 at random without replacement from the population $\{1, 2, 9\}$ in class recently, what was the relationship between $P(Y_1 = 9)$ and $P(Y_2 = 9)$?