

**Applied and Mathematical Statistics**  
**Homework One**  
**Due April 4, 2011**



Figure 1: A mouse. Figure source: George Shulkin. <http://en.wikipedia.org/wiki/Mouse>

Please do this before class on Monday. There is no need to hand it in. We'll make extensive use of this problem in Monday.

Suppose that there are two types of mice, white mice and brown mice. You have reason to believe that there are equal numbers of each mouse in the wild and they are both spread out evenly across the environment. You thus anticipate that in a sample of  $N$  mice the number of brown mice will follow a binomial distribution with  $p = 1/2$ .

You are censusing the mouse population of different barns. In a certain barn you capture 20 mice and observe that 16 of them are brown. Answer the following questions, assuming that the probability of observing  $n$  brown mice is given by the Binomial distribution.

1. What is the probability that you observe exactly 16 brown mice?
2. What is the probability that you observe 16 or more brown mice?
3. What is the probability that you observe 4 or fewer brown mice?

Determine decimal values for all answers.