# Practice Exam 1: Math 362

February 2, 2007

1. Suppose that 8 indistinguishable balls are randomly distributed in 4 bins, A, B, C and D so that every bin has at least one ball. Describe a sample space for this experiment and determine the number of elements in this sample space.

2. Suppose a fair coin is tossed 6 times.

(a) What is the probability that 1 or more heads occurs? Hint: what is the complementary event?

(b) Given that heads occurs on the first 5 tosses what is the conditional probability that heads occurs on the $6^{th}$ toss?

(c) What is the probability that there are exactly two heads?

3. Suppose a 6 sided die is rolled three times. What is the probability that the sum of the rolls is 12?

4. Suppose that a disease occurs in the population with a frequency of 5%. A test for the disease is positive 95% of the time when the person being tested actually has the disease. The same test is negative 80% of the time when the person being tested does not have the disease (i.e., the test is right 80% of the time in these circumstances). Given that a randomly selected person from the population tests negative for the disease what is the probablility that they do in fact have the disease?

5. Suppose that an urn contains 3 white and 5 black balls. Suppose that all 8 balls are removed from the urn *without replacement.* Let $b_j$ be the event that a black ball is selected on the $j^{th}$ draw and $w_j$ the event that a white ball is selected on the $j^{th}$ draw. Find $P(b_8)$ and $P(w_2 b_7)$.