

Exam 1, Math 3770, Fall 2008

September 15, 2008

1.
 - a. List the three axioms of probability from our text.
 - b. Define what it means for two events to be independent.
 - c. Define “upper fourth”, “lower fourth” and “fourth spread”.
 - d. Define “sample variance”.
 - e. Define “Bernoulli random variable”.
2. A bag contains 10 red marbles, 8 blue marbles and 6 green marbles. You draw marbles one at a time, without replacement, until you select a green marble, in which case you stop. What is the probability that you draw at least 3 marbles before you stop?
3. Prove that if A and B are independent events then

$$P(A \cup B) = 1 - (1 - P(A))(1 - P(B)).$$

4. A cafe that only serves tea, serves three kinds: Green, Black and White. There are only two kinds of customers of the cafe: college students and locals (they are assumed to be mutually exclusive). 30 percent of locals prefer Black tea, while 20 percent prefer White tea; and, 10 percent of college students prefer Green tea. Locals make up 30 percent of the customers of the cafe. What is the probability that a randomly selected Green tea drinker (they prefer Green tea) is a local?
5. Compute the median, mean, sample variance, and fourth spread of the following numbers:

1, 2, 3, 6, 7, 4, 10.