

Homework Set #1

Due: Thursday, October 9, 2008

1. Read Sections 2.1 to 2.5 in the text. Try to work on all examples.

2. *World Series*. The World Series is a seven-game series that terminates as soon as either team wins four games and is won mostly by the United States. Suppose San Diego Padres (denoted as A) and New York Yankees (denoted as B) match up in the series. Possible outcomes include AAAA, ABABABA, and BBBAAAA. Assume that each game is independent and both teams are equally strong.
 - (a) Describe the sample space of all possible outcomes.
 - (b) What is the probability that Padres will win the series?
 - (c) What is the probability that all seven games will be played?
 - (d) Suppose Padres lost the first three games. What is the (conditional) probability that they will still win the series?

3. *Monty Hall*. Gold is placed behind one of three curtains. A contestant chooses one of the curtains, Monty Hall (the game host) opens one of the unselected empty curtains. The contestant has a choice either to switch his selection to the third curtain or not.
 - (a) What is the sample space for this random experiment? (Hint: An outcome consists of the curtain with gold, the curtain chosen by the contestant, and the curtain chosen by Monty.)
 - (b) Assume that placement of the gold behind the three curtains is random, the contestant choice of curtains is random and independent of the gold placement, and that Monty Hall's choice of an empty curtain is random among the alternatives. Specify the probability measure for this random experiment and use it to compute the probability of winning the gold if the contestant decides to switch.

4. A number X is selected uniformly at random in the interval $[-1, 1]$. Let the events $A = \{X > 0\}$, $B = \{|X + 0.5| < 1\}$, and $C = \{X < -0.75\}$.
 - (a) Find the probabilities of B , $A \cap B$, and $A \cap C$.
 - (b) Find the probabilities of $A \cup B$, $A \cup C$, and $A \cup B \cup C$.

