Worksheet 06

1. At Betty Boop's birthday party, each of her ten guests received a party favor. The nicest two were wrapped in white paper, the next three nicest party favors were wrapped in blue, and the remaining five were wrapped in red. As it happens, the Bobsy twins (Bobo and Mimi) attended the party, and they tend to have huge fights when they don't get exactly the same thing. Mrs. Boop plans to distribute the party favors completely at random. (a) What's the probability that neither of the Bobsy twins got favors wrapped in white paper? (b) Given that neither of the Bobsy twins got a white favor, what's the probability that their party favors were the same color?

2. Four male members of the Davis Opera Society went to see La Boheme at the Mondavi Center last night. They turned in their top hats at the hat check stand and they were placed by themselves in a small box. When they left, the hat check clerk was nowhere to be seen. Since all four hats looked the same, they each took one of the hats at random. What's the probability that none of them got their own hat? Hint: You may need to brute force this problem.

3. Mr. Phelps plays poker on Wednesday nights. About 70% of the time, he will return home inebriated. Mrs. Phelps will retire before he comes home, but she leaves the porch light on for him. When Mr. Phelps comes home inebriated, he forgets to turn off the porch light with probability 0.6; otherwise, he forgets with probability 0.2. On those Thursday mornings on which Mrs. Phelps finds the porch light on, what probability should she ascribe to her husband having been inebriated the night before?

4. Sally will go to the homecoming dance with probability .5, while John will go with probability .2. If the probability that at least one of them goes is .6, can Sally's decision on whether or not to go be considered independent of John's?

5. Just before going on stage, a magician crams 3 bunnies and 2 squirrels into his top hat. At the beginning of his act, he takes off his hat, nervously wipes his brow, and shows the audience what appears to be an empty hat. Then he sets the top hat on a table and proceeds to draw animals from the hat. (a) What is the probability that one of the first two draws is a squirrel and the other is a bunny? (b) Given that the same kind of animal was drawn in the first two draws, what is the probability that they were both bunnies?

6. The Pennsylvania School of Psychic Arts and Sciences has 1000 students. The admission criteria at PSPAS include the requirement that students have vivid dreams every night. It is known that the chance that a given dream will be predictive (that is, entirely come true within 30 days) is 1 in 10,000. What is the probability that at least one student at the school will have a predictive dream in the next seven days?