Applied Statistics HW 9

1. We will be picking a student at random from the whole Hanover population. We will be looking at their gender, and whether they smoke or not. Imagine the following numbers: 65% chance of the students are female, so there is a 65% chance that a randomly selected student will be female. 25% of our students are females that smoke, so there is a 25% chance that a randomly selected student is female AND smokes. 20% of our students are males that smoke, so there is a 20% chance that a randomly selected student will be male and smoke.

   a. We can model this situation with a probability model with 4 outcomes, to account for the various combinations of smoking and gender. What are those outcomes?

   b. What are the chances, that a randomly selected student is female AND does not smoke?

   c. What are the chances, that a randomly selected student is male?

d. What are the chances, that a randomly selected student is male and does not smoke?

e. What are the chances, that a randomly selected student does not smoke?

f. What are the chances, that a randomly selected student is either male or does not smoke, or possibly both?

g. Suppose we select 10 students at random. What are the chances, that they will all turn out to be females?

2. In a game of chance, you have a 25% chance of winning. What are the chances, that you will lose 3 times in a row? What are the chances that you will win at least one of the 3 rounds?

3. John gets to shoot 5 shots from the free throw line. We know from past experience, that for any particular shot, he has an 80% chance of getting it in. What are his chances of getting all 5 shots in?

4. We roll a 6-sided die that is biased: The sides 1, 2, 3 are all twice as likely as the sides 4, 5, 6. What are the various possible outcomes and their probabilities?

5. We flip twice a coin which has a 90% chance of coming heads. We then count the number of heads. What are the possible outcomes, and how likely is each outcome?