1) Consider the experiment of flipping a fair coin once and rolling a fair four-sided die once. Let the event A={a head and an odd number occurred}

a) What is the sample space for this experiment?

b) What is the probability associated with each sample point?

c) What sample points make up the event A?

d) Find P(A).

2) Consider the example of Wofford's basketball team that went 0-for-18 on three pointers. Assume that they have a 28.9% chance of making each three point shot, and the shots are independent of each other.

a) What is the probability of missing the next shot?

b) What is the probability that the next two shots taken in a row will be missed?

c) What is the probability that the next eighteen shots in a row will be missed?

Now consider wanting to find the probability that they would go 1-for-18.

d) What is the probability that they would make the next shot and then miss the 17 after that?

e) What is the probability that they would miss the next one, then make one, and then miss the 16 after that?

f) How many different ways are there to hit exactly one basket out of 18?

g) What is the probability of hitting exactly one out of 18 shots? (Hint: Use the addition rule for mutually exclusive events and what you found in d-f.)

And now combining these too parts...

h) What is the probability of making one or fewer three point shots out of 18?

i) What is the probability of making two or more three point shots out of 18?

j) What is the probability of making zero three point shots out of 18 given that you have made one or fewer?

k) What is the probability of making zero three point shots out of 18 given that you have made two or more?

3) One way of explaining part of the game show “Let’s Make a Deal” is as follows. There are three doors. Behind one door is a prize that you would actually like to win. Behind the other two doors are farm animals that you don’t even get to take home if you win them. The host (Monty) knows what is behind each door. The contestant (you) doesn’t. The game proceeds as follows:

i) You are dressed in some goofy costume, and Monty chooses you to play.

ii) The real prize is randomly placed behind one of the three doors, and Monty knows which one.

iii) You randomly choose one of the doors.

iv) Monty doesn’t show you what’s behind the door you chose. From among the doors that are left, that don’t have the real prize behind them, Monty randomly chooses one and opens it. This leaves two closed doors (one with the prize behind it and one with a fake prize), and one open door with a fake prize. <u>He never opens the door that has the prize behind it.</u>

v) You either choose to stay with the door you picked originally, or you switch to the other closed door.

vi) Monty shows you what is behind the door, and you either win or lose.

The question is: Does it matter if you stay with the door you picked originally or if you switch to the other door? That is, do you have a better chance of winning if you stay with the door you picked originally, if you switch, or is it the same either way?

What does the obvious answer seem to be?

Now try answering it by making a tree-diagram. The first split is randomly choosing where the car is. The second split is you randomly guessing where the prize is. The third split is Monty randomly showing you one of the remaining doors that doesn’t have the prize. What is the chance you would win if you stayed? What is the chance you would win if you switch? (It might be quicker to skip the first branch in the tree and assume he has put it behind a particular door).