1. There are two boxes of cards. One is a standard 52 card deck, containing 12 "face cards" (Jacks, Queens, and Kings). The other is a 24 card Euchre deck, also containing 12 "face cards" (Jacks, Queens, and Kings).

Anneliese picks one of these two boxes of cards at random; she is equally likely to pick either deck. After she picks a deck of cards, she randomly picks a card. If she gets a face card, what is the probability that she had chosen the standard 52 card deck?

2. Suppose that 20% of students in a certain university are in the College of Science. Among the students in the College of Science, 70% are good at math. On the other hand, among the students who are not in the College of Science, 60% are good at math. Given that a person is good at math, what is the conditional probability that they are in the College of Science?

3. There are three coins available. Coin "A" is dented in such a way that, when we flip it, we have a probability of 49% of getting heads. Coin "B" is dented in such a way that, when we flip it, we have a probability of 52% of getting heads. Coin "C" is a fair coin.

We randomly grab a coin (all three coins are equally likely to be selected) and we flip it 7 times.
3a. If we get 7 heads, what is the conditional probability that we selected coin "A"?
3b. If we get 7 heads, what is the conditional probability that we selected coin "B"?
3c. If we get 7 heads, what is the conditional probability that we selected coin "C"?

4. Alice rolls a die. Whatever value she gets, Bob tosses that many fair coins. (For example, if Alice rolls a "5", then Bob tosses 5 fair coins.)
4a. What is the probability that Bob has at least 3 heads?
4b. If Bob has exactly 2 heads (and possibly some tails), what is the probability that Alice rolled a value of 4?