1 (Problem 14.3 in textbook) After your yearly checkup, the doctor has some good news and some bad news. The bad news is that you tested positively for a serious disease and that the test is 99% accurate (i.e. the probability of testing positive given that you have the disease is 0.99, as is the probability of testing negative given that you don't have the disease). The good news is that this is a rare disease, striking only 1 in 10,000 people. Why is it good news that the disease is rare? What are the chances that you actually have the disease?

2. Show that P(X,Y|Z) = P(X|Y,Z)*P(Y|Z)

3 (Problem 14.6 in textbook). Show that the statement P(A,B|C) = P(A|C)*P(B|C) is equivalent to P(A|B,C) = P(A|C) and P(B|A,C) = P(B|C).

4. Assume X is independent of Y given Z. Also assume that P(X,Y|Z,W) = P(X,Y|Z), i.e. that the joint distribution of X and Y is independent of W given Z. Show that X is independent of W given Z.

5. Given that P(X|Y,Z) = P(X|Y). Show that P(Z|Y,X) = P(Z|Y), i.e. that Conditional Independence is Symmetric.