Math 130B - More Review

1. A man has five coins, two of which are double-headed, one is double-tailed, and two are normal. He shuts his eyes, picks a coin at random, and tosses it.

   (a) What is the probability that the lower face of the coin is a head?

   (b) He opens his eyes and see that the coin is showing heads. What is the probability that the lower face is heads as well?

   (c) He shuts his eyes again, and tosses the coin again. What is the probability that the lower face is head?

   (d) He opens his eyes and sees that the coin is showing heads. What is the probability that the lower face is a head?

   (e) He discards this coin, picks another one at random (but not the same coin), and tosses it. What is the probability that it shows heads?

2. Consider an experiment whose sample space consists of a countably infinite number of points. Show that not all points can be equally likely. Can all points have a positive probability of occurring?

3. If X has distribution function F, what is the distribution function of e^X?

4. Let X be a binomial random variable with parameters (n, p). What value of p maximizes $\Pr[X = k]$ for $k = 0, 1, \ldots, n$?