Inference and Testing

1. A box contains 3 coins C_1, C_2 and C_3 with probability of head as 1/4, 1/2 and 3/4 respectively. You pick a coin out of the box but you don't know which one it is so you assign a *a priori* probability of 1/3 for each choice of coin. You flip the coin 120 times and get 70 heads. What is the *a posteriori* probability that you will assign to each choice of coin.

2. In order to check a coin for bias, it is flipped a large number of times. In 10000 flips it shows heads 4844 times. Calculate the likelihood ratio between the maximum likelihood value for p and 0.5. Would you take the coin as unbiased or not? Justify your answer.

3. In order to check a coin for bias, it was flipped a large number of times. With 10000 flips it turns up 4913 heads.
   (a) What is an assertion that we can make with 70% confidence?
   (b) What is an assertion that we can make with 95% confidence?
   (c) What is an assertion that we can make with 99% confidence?