Conditional Probability, Bayes' rule and LoTP

1. In poker, you are dealt a hand of five cards from a standard deck of 52 cards. What is the probability of getting a poker hand where all the cards are seven or higher, given that at least one of the cards is higher than ten (i.e. Jack, Queen, King, or Ace)?

2. Let A and B be two events where $P(B) > 0$.

   (a) Show that if $P(A) = 1$, then $P(A|B) = 1$.

   (b) Interpret what (a) means intuitively.

3. In deterministic logic, the statement "A implies B" is equivalent to its contrapositive: "not B implies not A". In this problem, we will consider analogous statements in probability, the logic of uncertainty. Let A and B be events with probabilities not equal to 0 or 1. Show that if $P(B|A) = 1$, then $P(A^c|B^c) = 1$. *Hint: Start with Bayes' rule.*