Exercise sheet 2

Probability and Statistics, MTH102

- 1. Show that if the probability of $P(E|F) = P(E|F^c)$ then E is independent of F. In other words, if the probability of E remains unchanged whether F occurs or does not occur, then E must be independent of F.
- 2. Show that if $P(E|F^c)=0$, then P(F|E)=1. Can you give a real life interpetation of this?
- 3. Show that $P(A \cap B \cap C) = P(A)P(B|A)P(C|A \cap B)$
- 4. Show that $P(E_1 \cap E_2 \cap E_3 \cap E_4) = P(E_1)P(E_2|E_1)P(E_3|E_1 \cap E_2)P(E_4|E_1 \cap E_2 \cap E_3)$
- 5. If a deck of playing cards is divided into 4 piles of 13 cards each then what is the probability that each pile has at least one ace.