Graded Homework 2 Problems

1. Prove that \((A \cap B)^c = A^c \cup B^c\) implies \((A \cup B)^c = A^c \cap B^c\).
   
   \textit{Hint:} Use the fact that a set’s compliment is itself.

2. Prove that \(A \cap (B \cup C) = (A \cap B) \cup (A \cap C)\).

   \textit{Hint:} If you can find analogous logical operations for the above statement, you can prove it as a tautology.

3. Prove that \(A \Delta B = (A \cup B) - (A \cap B)\). Where

   \[ A - B = A \cap B^c \]  \hspace{1cm} (1)

   \[ A \Delta B = (A - B) \cup (B - A) \]  \hspace{1cm} (2)