Math 215: Introduction to Advanced Mathematics

Problem Set 5

Due Friday October 5

1) Prove that $A - (B \cap C) = (A - B) \cup (A - C)$.

2) Let $\mathcal{P}(A)$ be the power set of A. Prove that $A \subseteq B$ if and only if $\mathcal{P}(A) \subseteq \mathcal{P}(B)$.

3) Prove that $A \cap (B \cup C) = (A \cap B) \cup C$ if and only if $C \subseteq A$.

4) Let A and B be subsets of a universal set U.

a) Prove that $B \subseteq A^c$ if and only if $A \cap B = \emptyset$.

b) Using a) and taking complements, prove that $A^c \subseteq B$ if and only if $A \cup B = U$.

c) Deduce from a) and b) that $B = A^c$ if and only if $A \cap B = \emptyset$ and $A \cup B = U$.