Math 215: Introduction to Advanced Mathematics
Problem Set 3

Due Tuesday Feb. 20

1. Do pg. 116: 10

2. Prove that $A - (B \cap C) = (A - B) \cup (A - C)$.
3. Let $\mathcal{P}(A)$ be the power set of A. Prove that $A \subseteq B$ if and only if $\mathcal{P}(A) \subseteq \mathcal{P}(B)$.
4. Prove that $A \cap (B \cup C) = (A \cap B) \cup C$ if and only if $C \subseteq A$.

5. Prove by truth tables the following two equivalences.

$$(p \to q) \leftrightarrow (\neg p \vee q).$$

(I.e. in English, (p implies q) if and only if ((not p) or q.

$$(\neg(p \to q) \leftrightarrow (p \wedge \neg q)$$

(I.e. in English, (not(p implies q)) if and only if (p and not q).
Use this information to write the negation of the proposition.
if $f(a) < g(a)$ then $a < b$.