MA 1124 Assignment 2 Due Wed 3rd Feb.

1. (a) Use the corresponding logical equivalence to prove

$$(A \cap B)^c = A^c \cup B^c$$

(b) Prove it like we did for $(A \cup B)^c$

2. Prove by induction that if X has n elements, then $P(X)$ has 2^n elts.

3. If A and B are subsets of X, define $A \setminus B = \{x : x \in A \text{ and } x \notin B\}$.

Prove $A \setminus B = A \cap B^c$

4. Let $f : X \to Y$ be a function.

Define a relation on X by

$x_1 \sim x_2$ means $f(x_1) = f(x_2)$

Is $\sim$ an equivalence relation?

What are the equivalence classes?