Math 215: Introduction to Advanced Mathematics
Problem Set 5

Due Friday October 13

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 $C \subseteq A$

Bonus Problem Let u_n be the n^{th} Fibonacci number.

a) Prove by induction on n that

$$u_{m+n} = u_{m-1}u_n + u_m u_{n+1}$$

for all $m \geq 2$ and $n \geq 1$.

b) Prove u_m always divides u_{mn}. [HINT: For $m = 1$ this is easy. For $m > 1$ use a) and induction on n.]