Exercise 1: Sets etc.

September 11, 2007

1. Prove the distributive law of sets holds. [Hint: to show $A = B$, show $A \subset B$ and $B \subset A$.]

2. Prove deMorgan's laws.

3. Given n objects, shows there are 2^n subsets, including the empty set. [Hint: Induction].

4. Given n, show $1 + 2 + \ldots + n = \frac{1}{2}n(n+1)$. [Hint: Induction].

5. Show $1 + r + r^2 + \ldots = \frac{1}{1-r}$ for $r \in [0, 1)$. [Note: This result has nothing to do with what we covered in class, but you should prove it at some point.]