Examlet 2 Foundations of Advanced Math 2/28/14

1. For any sets A, B, C and D, if $A \subseteq B$ and $C \subseteq D$, then $A \cup C \subseteq B \cup D$.

2. a) Suppose that $a, b, c, d \in \mathbb{R}$. If $a > b$ and $c > d$, then $a + c > b + d$.

b) Suppose that $a, b, c, d \in \mathbb{R}$. If $a > b$ and $c > d$, then $a - c > b - d$.

3. For each $x \in \mathbb{N}$, let $A_n = (-1, n]$.
   a) What is $\bigcap_{n\in\{1,2,3\}} A_n$?

   b) What is $\bigcup_{n\in\{1,2,3\}} A_n$?

   c) What is $\bigcap_{n\in\mathbb{N}} A_n$?

   d) What is $\bigcup_{n\in\mathbb{N}} A_n$?

4. $\forall\, x \in \mathbb{R}, -|x| \leq x \leq |x|$.

5. Let I be a set and for each $i \in I$ let A_i be a set. Then $\left(\bigcup_{i \in I} A_i \right)' = \bigcap_{i \in I} A_i'$.