1. a) Let $A = \{1,2,4\}$ and $B = \{1,3,4\}$. What is $A \cup B$?

   b) Let $A = \{1,2,4\}$ and $B = \{1,3,4\}$. What is $A \cap B$?

   c) Let $C = [0, 5]$ and $D = (4, 8)$. What is $C - D$?

2. a) Let $\mathbb{N}^+ = \mathbb{N} - \{0\}$. Let $A_n = (0, n)$ for each $n \in \mathbb{N}^+$. What is $\displaystyle\bigcup_{n \in \mathbb{N}^+} A_n$?

b) Let I be a set such that for each $i \in I$, B_i is itself a set. Then $\displaystyle A \cap \bigcup_{i \in I} B_i = \bigcup_{i \in I} \left(A \cap B_i \right)$.

3. a) $\forall\, b \in \mathbb{R}$, if $b > 0$, then $0 < \dfrac{b}{2} < b$.

b) $\forall\, b \in \mathbb{R}$, $|b| \geq 0$.

4. Let A be a set. Show that $A - A = \emptyset$.

5. a) $\forall a, b, c, d \in \mathbb{R}$, if $a > b$ and $c > d$, then $a + c > b + d$.

    b) $\forall a, b, c, d \in \mathbb{R}$, if $a > b$ and $c > d$, then $a - c > b - d$.