Examlet 2b **Foundations of Advanced Math** **2/24/17**

1. (a) What is $\{1,2\} \cap \{2,3\}$?

(b) What is $(1,2) \cap (2,3)$?

(c) What is $[1,2] \cap [2,3]$?

(d) What is $\{1,2\} \cup \{2,3\}$?

(e) What is $(1,2) \cup (2,3)$?

(f) What is $[1,2] \cup [2,3]$?

(g) What is $\{1,2\} - \{2,3\}$?

(h) What is $(1,2) - (2,3)$?

(i) What is $[1,2] - [2,3]$?

(j) What is $\mathcal{P}\{1,2\}$?

2. (a) State the definition of

$$\bigcap_{i \in I} A_i$$

(b) Let $\mathbb{Z}^+ = \{n | n \in \mathbb{Z}^+ n > 0\}$. If $A_n = \left[\frac{1}{n}, 1\right] \forall n \in \mathbb{Z}^+$, what is

$$\bigcap_{n \in \mathbb{Z}^+} A_n$$

(c) Let $\mathbb{Z}^+ = \{n | n \in \mathbb{Z}^+ n > 0\}$. If $A_n = \left[\frac{1}{n}, 1\right] \forall n \in \mathbb{Z}^+$, what is

$$\bigcup_{n \in \mathbb{Z}^+} A_n$$

3. $(A \cup B)' = A' \cap B'$

4.

$$A \cap \bigcup_{i \in I} B_i = \bigcup_{i \in I} (A \cap B_i)$$

5. (a) If $a > 0$ and $b > 0$, then $a + b > 0$.

(b) If $a < 0$ and $b > 0$, then $a \cdot b < 0$.