Examlet 2a **Foundations of Advanced Math** **2/23/24**

1. Write each of the following in as simple a way as possible:

   (a) $(5, 10) - [6, 12]$

   (b) $[5, 10] - [6, 12]$

   (c) $(5, 10) \cap [6, 12]$

   Circle T or F for each of the following statements:

   (d) $\varnothing \subseteq \{0, 1, 2\}$ T F

   (e) $\{\varnothing\} \subseteq \{0, 1, 2\}$ T F

2. (a) What is $\bigcap_{n\in\{1,2,3\}} \left(-\frac{1}{n}, \frac{1}{n}\right)$?

(b) What is $\bigcup_{n\in\{1,2,3\}} \left(-\frac{1}{n}, \frac{1}{n}\right)$?

(c) What is $\bigcap_{n\in\mathbb{Z}^+} \left(-\frac{1}{n}, \frac{1}{n}\right)$?

(d) What is $\bigcup_{n\in\mathbb{Z}^+} \left(-\frac{1}{n}, \frac{1}{n}\right)$?

3. $\left(\bigcup_{i\in I} B_i\right)' = \bigcap_{i\in I} B_i'$.

4. (a) $\forall a, b, c, d \in \mathbb{R}, a < b \text{ and } c < d \Rightarrow \frac{a}{d} < \frac{b}{c}$

(b) $\forall a, b, c, d \in \mathbb{R}^+, a < b \text{ and } c < d \Rightarrow \frac{a}{d} < \frac{b}{c}$

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