

1. Let  $\mathbb{R}^+$  denote the set of positive real numbers. Prove that

$$\bigcap_{r \in \mathbb{R}^+} (-r, r) = \{0\}$$

2. Prove that

$$\left( \bigcup_{\alpha \in \Delta} A_\alpha \right) \cup \left( \bigcup_{\beta \in \Gamma} A_\beta \right) = \bigcup_{\omega \in (\Delta \cup \Gamma)} A_\omega.$$