

Lemma. Given a set \mathbf{A} and a family of subsets of \mathbf{A} , denoted $\{\mathbf{A}_i\}_{i \in I}$ (with index set I), one has:

$$\bigcup_{i \in I} \bigcup \{A_i\} = \bigcup_{i \in I} \{A_i\}.$$