Let E be a set and $(A_i)_{i \in I}$. Proove that:

$$E \setminus \left(\bigcap_{i \in I} A_i \right) = \bigcup_{i \in I} (E \setminus A_i)$$

Let $x \in E \setminus \left(\bigcap_{i \in I} A_i \right)$
$\iff x \in E$ and $\left(x \notin A_{i_1} \text{ or } x \notin A_{i_2} \text{ or ... or } x \notin A_{i_n} \right)$
$\iff \left(x \notin E \text{ and } x \notin A_{i_1} \right) \text{ or } \left(x \notin E \text{ and } x \notin A_{i_2} \right) \text{ or ... or } \left(x \notin E \text{ and } x \notin A_{i_n} \right)$
$\iff x \in \bigcup_{i \in I} (E \setminus A_i)$
$\iff E \setminus \left(\bigcap_{i \in I} A_i \right) = \bigcup_{i \in I} (E \setminus A_i)$

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