Pop Quiz 1 solutions

Let A, B be open sets.

Claim: $A \cup B$ is open.

Proof: Let $x \in A \cup B \Rightarrow x \in A$ or $x \in B$, WLOG

Without loss of generality. (WLOG) assume $x \in A$.

As A is open $\exists r > 0$ such that $B(r, x) \subseteq A$

$\Rightarrow B(r, x) \subseteq A \cup B$

$\Rightarrow A \cup B$ open. ∎

Note: We can say WLOG because the argument for the $x \in B$ case is a direct translation of the $x \in A$ case.

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