Answer on Question #75939 – Math – Discrete Mathematics

Question

Prove that A ∩ B = A ∪ B.

Solution

$A \cup B = \{x | x \in A \ or \ x \in B\}$

$A \cap B = \{x | x \in A \ and \ x \in B\}$

Let's show, that the equality $A \cup B = A \cap B$ is not always true, that is, we show that $\exists A \ and \ B : A \cup B \neq A \cap B$.

For example, $A = \{1, 2, 3\}, B = \{3, 4, 5\}$.

Then $A \cup B = \{1, 2, 3, 4, 5\}$ and $A \cap B = \{3\}$. Therefore $A \cup B \neq A \cap B$.

Nevertheless, the equality $A \cup B = A \cap B$ may be true (for example, if $A = B$).