Homework 2

1. Find out if the following equalities hold true for any sets $A$ and $B$ in any topological space $X$:
\[
\text{Cl}(A \cup B) = \text{Cl} A \cup \text{Cl} B \\
\text{Cl}(A \cap B) = \text{Cl} A \cap \text{Cl} B
\]

2. Give an example in which one of the equalities of Problem 1 is wrong.

3. In the example that you found when solving Problem 2, an inclusion of one side into another one holds true. Does this inclusion hold true for arbitrary $A$ and $B$?

4. Prove that the intersection of an open everywhere dense set with an arbitrary everywhere dense set is everywhere dense.