MAT 127A - Real Analysis - Fall 19

Exercise 13: Let $A \subset \mathbb{R}$ be nonempty and bounded. Prove that $\sup A \in \overline{A}$. Can an open set ever contain its supremum?

Exercise 14: Determine true or false. Provide proof or counterexample.

- An open subset of $\mathbb{R}$ containing $\mathbb{Q}$ must be $\mathbb{R}$.
- If $U$ is an open nonempty set, then $U \cap \mathbb{Q} \neq \emptyset$.

Exercise 15: Assume $A, B$ are proper nonempty subsets of $\mathbb{R}$. Suppose $A$ is open and $B$ is closed. Determine if the following sets are open, closed, both or neither.

- $\overline{A \cup B}$
- $A \setminus B$
- $(A^c \cup B)^c$
- $(A \cap B) \cup (A^c \cap B)$
- $(\overline{A})^c \cap \overline{A^c}$