Q6: Suppose not. That is, suppose that there exists an irrational number $q \in [0,1]$ but with $q \notin A$. Since A is closed, it follows that $\mathbb{R} \setminus A$ is open. Therefore, there exists a $\epsilon > 0$ such that $(q-\epsilon, q+\epsilon) \subset \mathbb{R} \setminus A$. By the density of the rational numbers in $\mathbb{R}$, there exists some $r \in \mathbb{Q}$ with $r \in (q-\epsilon, q+\epsilon) \subset \mathbb{R} \setminus A$. Note that since $q \in [0,1]$ and r is within ϵ of q, $q \in [0,1]$. However, $q \in \mathbb{R} \setminus A \implies q \notin A$. We obtain a contradiction, since we assume that every rational between 0 and 1 is contained in A. $\blacksquare$