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Class: Real Analysis

1. **Show that if M is the open interval (a,b), and p is in M, then p is a limit point of M.**

> **Solution:**
> Let M be the open interval (a,b) and p$\in$M, where a,b$\in\mathbb{R}$.
> Let S = $(p-\epsilon, p+\epsilon)$, where ϵ is an arbitrary positive real number and $|\epsilon|$ is such that $S \subseteq M$.
> $(p+\epsilon/2)$, p$\in$S for any $\epsilon\in\mathbb{R}^+$, and so S is an arbitrary interval that contains p and contains another point of M.
> Therefore p is a limit point of M.

2. **Show that if M is the closed interval [a,b], and p is not in M, then p is not a limit point of M.**

> **Solution:**
> Let M be the closed interval [a,b], and p$\notin$M. Assume, without loss of generality, that p > b.
> Let $\epsilon = \frac{p-b}{2}$, and let S = $(p-\epsilon, p+\epsilon)$. Hence $S \cap M = \emptyset$.
> Since S is an open interval that contains p but doesn't contain any element of M, p cannot be a limit point of M.

3. Q goes here

> **Solution:** Ans goes here