

Formally prove the following statements about the cardinalities of (not necessarily finite) sets — do not appeal to intuition!

- If $A \subseteq B \subseteq C$ and $|A| \geq |C|$, then $|A| = |B|$.
- If $|A| \leq |B|$, then $|\mathcal{P}(A)| \leq |\mathcal{P}(B)|$.