Q1

Show that for a subspace $S \subseteq T$, that $S^{\perp\perp} = S$.

Let $x \in S^{\perp\perp}$. Then for any $y \in S^{\perp}$, $\langle x, y \rangle = 0$

Q2

Let $T : V \to W$. Show that if $\ker T = \{0\}$, then T is left invertible.

Solution: Suppose $\ker T = \{0\}$.