1 Show that wk is the smallest topology on $\mathscr{X}$ such that each x^* in $\mathscr{X}^*$

Must show that an arbitrary open set in wk can be generated by some collection of sets of the form $x^{*-1}(V)$.

Start with an arbitrary open set U. Since X with wk is a locally convex set, $\bigcap_{i=1}^{n}\{x\epsilon\mathscr{X} : p_j(x-x_0) < \varepsilon_j\} \subseteq U$ for some finite list of ε and p, where $p_{x^*} = |<x, x^*>|$. Say it's x_1^*, x_2^* ... x_n^*.

Since U is generated by the subbase of preimages of the collection of x^* and U is arbitrary, all open sets of wk are generated in this way, thus is the smallest possible topology.