1. Prove that if $X$ is a Noetherian space, and $U \subset X$ is a subspace, then $U$ is a Noetherian space and hence quasi-compact.

2. For each $s \in \mathbb{C}$, consider the given ideal $I_s \subset \mathbb{C}[x, y, z]$ and quotient ring $R_s = \mathbb{C}[x, y, z]/I_s$. Decide whether $\text{Spec} R_s$ is connected and whether it is irreducible.
   1. $I_s = (x^2 + y^2 - z^2, x - s)$.
   
   2. $I_s = (x^2 + y^2 - z^2, z - s)$.

3. Calculate the (Krull) dimension of $\text{Spec} R$ for each given ring $R$.
   1. $R = \mathbb{C}[x]/(x^2)$.
   
   2. $R = \mathbb{C}[[x]]$.
   
   3. $R = \mathbb{C}[x, y, z]/(xy, xz)$. 