1. If you did not show that the category of pointed cpos is not cartesian closed last time, then do the following exercise. The category of pointed sets \( \text{Sets}_\star \) has as objects sets with a specified point and as morphisms maps preserving the point. This category has products given by \((X, a) \times (Y, b) = (X \times Y, (a, b))\) (you do not need to prove this). What is the initial object, and what is the terminal object? Show (using an exercise from last time) that \( \text{Sets}_\star \) is not cartesian closed.

2. Let \( C \) be a complete category, and let \( I \) be some small category. Taking limits extends to a functor \( \text{lim} \leftarrow: C^I \to C \). The construction is similar to the one showing that products define a functor \( C \times C \to C \), but you can use this fact without a proof. Show that \( \text{lim} \leftarrow \) is right adjoint to the diagonal functor \( \Delta: C \to C^I \) defined on objects as \( \Delta(X)(i) = X \). What are the unit and counit of this adjunction?