1. Adapt the proof from Wednesday's class to show the following: If $h : X \to Y$ is a continuous function, F is a sheaf on X, and E is étale over Y then there is a natural bijection $\mathrm{Hom}(h^{-1}(F^{\text{ét}}), E) \simeq \mathrm{Hom}(F, h_*(E^{\text{sh}}))$.

2. Suppose that X is a topological space. Verify that a presheaf F on X is a sheaf if and only if the map

$$F(U) \to \varprojlim_i F(V_i)$$

is a bijection whenever $\{V_i\}$ is a diagram of open subsets of $U \in \mathrm{Op}(X)$ and $\varinjlim V_i = U$ *in the category of topological spaces.*

3. A constant presheaf is a presheaf of the form $F(U) = S$ for a fixed set S. Why is a constant presheaf usually not a sheaf?

4. Show that the espace étalé of the constant presheaf with value S on X is $X \times S$.

5. A sheaf F on X is called locally constant if there is an open cover $X = \bigcup U_i$ such that each $F\big|_{U_i}$ is the sheafification of a constant presheaf. Show that F is a locally constant sheaf if and only if its espace étalé is a covering space of X.