(all use of the exchange rule is implied to be inductive)

1a

$$\dfrac{\dfrac{\dfrac{\Phi \vdash \psi \Rightarrow \psi'}{\Phi, \psi \vdash \psi'}\,(\Rightarrow\text{-Adj}) \qquad \Phi' \vdash \psi}{\Phi', \Phi \vdash \psi'}\,(\text{cut})}{\Phi, \Phi' \vdash \psi'}\,(\text{exchange})$$

0

b

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\Phi, \psi \vdash \theta}{\Phi, \psi, \Phi' \vdash \theta}\,(\text{weaken})}{\Phi, \Phi', \psi \vdash \theta}\,(\text{exchange}) \qquad \dfrac{\dfrac{\Phi', \psi' \vdash \theta}{\Phi', \psi', \Phi \vdash \theta}\,(\text{weaken})}{\Phi, \Phi', \psi' \vdash \theta}\,(\text{exchange})}{\Phi, \Phi', \psi \vee \psi' \vdash \theta}\,(\vee\text{-adj})}{\Phi, \Phi' \vdash \psi \vee \psi' \Rightarrow \theta}\,(\Rightarrow\text{-adj}) \qquad \Phi'' \vdash \psi \vee \psi'}{\Phi, \Phi', \Phi'' \vdash \theta}\,(\text{part a})$$

2 Consider the discrete ~~one~~ object category $C_0 = \{C\}$. Let $Mor_C(C)$ be the three element linear order $x \le y \le z$. Since the only morphism is the identity, all operations are conserved under pullback.
Define $\wedge$ and $\vee$ as usual. ~~Notice that since $\wedge$ preserves the order, by linearity of~~ with $\bot = x$ and $\top = z$.
Define $A \to B$ as $\begin{cases} z & \text{if } A \le B \\ B & \text{if otherwise} \end{cases}$

[in the first case $C \wedge A \le A \le B$ always holds so all elements must be $\le$ than $A \to B$
in the second $C \wedge A \le B$ holds iff $C \le B$ so $A \to B = B$.]

Hence C is a prop category with the desired properties, but $((y \to x) \to x) = (x \to x) = z > y$. The result follows by 5.4.7.