Quiz 5 (make-up)

Question 1. 5 points

True or false (and justify your answer): the $(X, \preceq)$ poset with Hasse diagram

$$\bullet \to \bullet \leftarrow \bullet,$$

admits an embedding into $(\mathbb{Q}, \leqslant)$ (where $\leqslant$ is the usual less-than-or-equal-to on $\mathbb{Q}$).

Question 2. 10 points

Let $A_1, A_2 \subseteq X$ and $Y_1, Y_2 \subseteq B$ be subsets and $X_1 \cap X_2 = Y_1 \cap Y_2 = \varnothing$. Assume that $\#A_i = \#B_i$ for $i = 1, 2$. Prove that

$$\#(A_1 \cup A_2) = \#(B_1 \cup B_2).$$