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Assignment 2
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Exercise 1. *Show that every poset considered as a category has equalizers and coequalizers of all pairs of morphisms.*

Exercise 2. *Let the functor $F : \mathbb{C} \to \mathbb{D}$ be an isomorphism of categories. Show the following.*

- *If $\mathbb{C}$ has binary products so does $\mathbb{D}$ and F preserves them.*
- *If $\mathbb{C}$ has binary coproducts so does $\mathbb{D}$ and F preserves them.*
- *If $\mathbb{C}$ has equalizers so does $\mathbb{D}$ and F preserves them.*
- *If $\mathbb{C}$ has coequalizers so does $\mathbb{D}$ and F preserves them.*

Hint: You may use duality in your reasoning.

Exercise 3. *Let $\mathbb{C}$ be a category and X an object of $\mathbb{C}$. Show the following.*

- *The slice category $\mathbb{C}/X$ always has a terminal object.*
- *If $\mathbb{C}$ has an initial object then so does $\mathbb{C}/X$.*
- *If $\mathbb{C}$ has equalizers so does $\mathbb{C}/X$.*