Category Theory PSet 5

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The Kliesli representation of a monad on a category \mathcal{C} is defined by the following data:

- a function $F : \operatorname{ob} \mathcal{C} \to \operatorname{ob} \mathcal{C};$
- for each object $A \in \mathcal{C}$, a morphism ret $A \in \mathcal{C}(A, FA)$;
- for each morphism $f \in \mathcal{C}(A, FB)$, a morphism bind $f \in \mathcal{C}(FA, FB)$.

These satisfy the following:

- bind $\operatorname{id}_A = \operatorname{ret} A;$
- the following two diagrams always commute:



Show that every Kliesli monad gives rise to a standard monad, and vice versa.