$L_M := \text{Left Ideals of } M \ \forall M \in Ob(Monoid)$

$$L_{M} = \{M, \emptyset\} \land (e \in X \implies X = M \ \forall X \in L_{M}) \implies$$

$$\{X \in L_{M} \mid e \notin X\} = \{\emptyset\} \implies$$

$$\forall x \in M, \exists y \in M | x \times y = e \implies$$

$$M \in Ob(Grp)$$
(from)

$$M \in Ob(Grp) \implies$$

$$\forall x \in M, \exists y \in M | x \times y = e \implies$$

$$\forall X \in L_M \setminus \emptyset, e \in X \implies$$

$$\forall X \in L_M \setminus \emptyset, X = M \implies$$

$$L_M = \{M, \emptyset\}$$
(to)

$$L_M = \{M,\emptyset\} \cong M \in Ob(Grp)$$