

**Definition** (Semigroup isomorphism). A morphism of semigroups  $F : \mathbf{S} \rightarrow \mathbf{T}$  is called a *semigroup isomorphism* if there exists a morphism of semigroups  $G : \mathbf{T} \rightarrow \mathbf{S}$  such that

$$F \circ G = \text{Id}_{\mathbf{S}} \quad \text{and} \quad G \circ F = \text{Id}_{\mathbf{T}}.$$