called a semigroup isomorphism if there exists a morphism of semigroups  $G: \mathbf{T} \rightarrow$ **S** such that

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

**Definition** (Semigroup isomorphism). A morphism of semigroups  $F: \mathbf{S} \to \mathbf{T}$  is