Definition (Identity morphism)
Let $\mathbf{S}$ be a semigroup. The identity function $\mathrm{Id}_{\mathbf{S}} : \mathbf{S} \to \mathbf{S}$ is always a morphism of semigroups. We can easily check that **??** is satisfied:

$$\mathrm{Id}_{\mathbf{S}}(x \mathbin{⨾_{\mathbf{S}}} y) = x \mathbin{⨾_{\mathbf{S}}} y = \mathrm{Id}_{\mathbf{S}}(x) \mathbin{⨾_{\mathbf{S}}} \mathrm{Id}_{\mathbf{S}}(y).$$

We call this the *identity morphism* of $\mathbf{S}$.