

Definition (Semigroup). A *semigroup* \mathbf{S} is a set \mathbf{S} , together with a binary operation:

$$\circ : \mathbf{S} \times \mathbf{S} \rightarrow \mathbf{S},$$

called *composition*, which satisfies the *associative* law:

$$(x \circ y) \circ z = x \circ (y \circ z)$$

for all $x, y, z \in \mathbf{S}$.