

# Axioms

Kai Prince SFHEA

2025-08-06

## Table of contents

**Definition 0.1** (associativity). For all  $a, b, c$  in  $S$ , one has  $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ .

**Definition 0.2** (identity). There exists an element  $e$  in  $S$  such that, for every  $a$  in  $S$ , one has  $e \cdot a = a$  and  $a \cdot e = a$ . Such an element is unique and is called the **identity element**.

**Definition 0.3** (inverse). For each  $a$  in  $S$ , there exists an element  $b$  in  $S$  such that  $a \cdot b = e$  and  $b \cdot a = e$ , where  $e$  is the identity element.

For each  $a$ , the element  $b$  is unique and is called the **inverse** of  $a$  and is denoted  $a^{-1}$ .