# Algebra

## 1 Why

We want a notion of combining elements of a set to get another (possibly different) element of the set.

## 2 Basics

Let $A$ a set. An **operation** on $A$ is a function $g : A \times A \to A$. Operations map ordered pairs of elements of a set to elements of the same set. An **algebra** is a set together with an operation.

### 2.1 Notation

Let $A$ a set and $g : A \times A \to A$. We commonly forego the notation $g(a, b)$ and instead write $a\, g\, b$. We call this style **infix** notation. Using lower case latin letters for every object is confusing, but we often have special symbols for particular operations. Examples of such symbols include $+$, $-$, $\cdot$, $\circ$, and $\star$.