

## **IDENTITY ELEMENTS**

## Why

We can construct functions on the ground set of an algebra by fixing an element in the ground set and defining a function which maps elements to the result of the operation applied to the fixed element and the given element.

## Definition

Let (A, +) be an algebra. For each  $a \in A$ , denote by  $+_a : A \to A$  the function defined by

$$+_a(b) = a + b.$$

If  $+_a$  is the identity function on A then we call a a left identity element of the algebra.

Similarly, denote by  $+^a: A \to A$  the function defined by

$$+^{a}(b) = b + a.$$

If  $+^a$  is the identity function on A then we call a a right identity element of the algebra.

An *identity element* of the algebra is an element which is both a left and right identity. If the operation commutes, then a left identity and right identities are the same.

