



## Why

We generalize the algebraic structure of addition and multiplication over the integers.

## Definition

A *ring* is two algebras over the same ground set with: (1) the first algebra a commutative group (2) an identity element in the second algebra, and (3) the operation of the second algebra distributes over the operation of the first algebra.

We call the operation of the first algebra *ring addition*. We call the operation of the second algebra *ring multiplication*.

## Example

Of course,  $\mathbf{Z}$  with the usual operations is a ring.



