



# Ordered Pairs

## 1 Why

We speak of an ordered pair of objects: one selected from a first set and one selected from a second set.

## 2 Definition

Let  $A$  and  $B$  be non-empty sets. Let  $a \in A$  and  $b \in B$ . The *ordered pair* of  $a$  and  $b$  is the set  $\{\{a\}, \{a, b\}\}$ . The *first element* of  $\{\{a\}, \{a, b\}\}$  is  $a$  and the *second element* is  $b$ .

The *cartesian product* of  $A$  and  $B$  is the set of all ordered pairs. If  $A \neq B$ , the ordering causes the cartesian product of  $A$  and  $B$  to differ from the cartesian product of  $B$  with  $A$ . If  $A = B$ , however, the symmetry holds.

### 2.1 Notation

We denote the ordered pair  $\{\{a\}, \{a, b\}\}$  by  $(a, b)$ . We denote the cartesian product of  $A$  with  $B$  by  $A \times B$ , read aloud as "A cross B." In this notation, if  $A \neq B$ , then  $A \times B \neq B \times A$ .