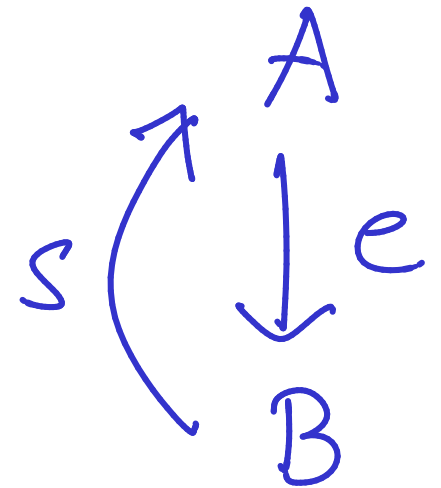# Axiom of choice

Every surjection has a section.

- Recall that a section for a function e is a function s such that

$$e \circ s = \mathrm{id}_B$$

$$s \left(\begin{array}{c} A \\ \downarrow e \\ B \end{array} \right.$$

- When $e: A \twoheadrightarrow B$ is a surjection we know that

$$\forall b \in B. \ \exists a \in A. \ e(a) = b$$

A section $s: B \to A$ postulated by The Axiom of Choice chooses for every $b \in B$ an element $a \in A$, namely $s(b)$, such that $e(a) = b$.

A

B

s

e

b b' b''