

**Theorem (2.2.6a).** *Let  $A$  be a set. The set identity for  $A$  is  $A \cup \emptyset = A$ .*

*Proof.* Let  $x$  be an element in  $A \cup \emptyset$ . By the definition of set union  $(x \in A) \vee (x \in \emptyset)$ . But  $x \in \emptyset$  is  $\perp$  because  $\emptyset$  is empty. Therefore  $x$  must be in  $A$ . It follows directly that  $A \cup \emptyset = A$ . Thus proves the set identity law for set union. ■