Theorem (2.2.8a). *Let A be a set. A is idempotent such that $A \cup A = A$.*

Proof. Let x be an element in $A \cup A$. By the definition of set union we have, $(x \in A) \vee (x \in A)$. The logical idempotent law says $(x \in A) \vee (x \in A) \equiv (x \in A)$ which is precisely $A \cup A = A$ by definition. Thus proves the idempotent law for the union of sets. ∎