

- 45 Show that some of the axioms of Bunch Theory listed in Section 2.0 are provable from the other axioms. How many of the axioms can you remove without losing any theorems?

After trying the question, scroll down to the solution.

§ I prove union idempotence.

$A, A = A$  use antisymmetry  
=  $A, A: A \wedge A: A, A$  use antidistributivity to expand the left conjunct,  
and delete the right conjunct because it is an instance of generalization.  
=  $A: A \wedge A: A$  by reflexivity  
=  $\top$