

## 2.2.x. Exercise questions

1. Restate the derivation below as a tree-form proof, labeling each horizontal line with the number of the stage at which it is entered. That is, do what is done with the [example in 2.2.4](#)

	(A ∧ C) ∧ B	1
1 Ext	A ∧ C	2
1 Ext	B	(4)
2 Ext	A	
2 Ext	C	(5)
	•	
	B	3
	•	
	C	3
3 Cnj	B ∧ C	

2. Use the system of derivations to establish each of the following claims of entailment:
- a.  $A \wedge B \Rightarrow B \wedge A$
  - b.  $A \Rightarrow A \wedge A$
  - c.  $A \wedge (B \wedge C) \Rightarrow (C \wedge B) \wedge A$
  - d.  $A, B \wedge C, D \Rightarrow (C \wedge (B \wedge A)) \wedge B$   
[The derivation for **d** will have three premises above the initial horizontal line.]
  - e.  $A \wedge (B \wedge C) \Rightarrow (B \wedge A) \wedge (C \wedge A)$