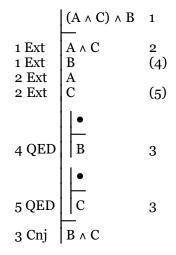
## 2.2.x. Exercise questions

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



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

Glen Helman 25 Aug 2005