

3.2.x. Exercise questions

1. Use derivations to establish each of the claims of entailment shown below. Notice that **c** is a claim of tautologousness; it requires a derivation without initial assumptions. All the resources used in a such a derivation will come from suppositions.
 - a. $\neg A \Rightarrow \neg (A \wedge B)$
 - b. $\neg B \Rightarrow \neg (A \wedge B) \wedge \neg (B \wedge C)$
 - c. $\Rightarrow \neg (A \wedge \neg A)$
 - d. $J \wedge C \Rightarrow J \wedge \neg (J \wedge \neg C)$ (see [exercise 1j of 3.1.x](#))
2. Use derivations to establish each of the claims of entailment shown below. You will need to introduce lemmas to exploit the negated compounds that appear as premises. For most, Adj is enough; but, for the last, you will need to use the rule [LFR](#) introduced in §2.4.
 - a. $\neg (A \wedge B), A \Rightarrow \neg B$
 - b. $\neg (A \wedge \neg B), \neg B \Rightarrow \neg A$
 - c. $A, \neg (A \wedge B), \neg (A \wedge C) \Rightarrow \neg B \wedge \neg C$
 - d. $\neg (A \wedge B), \neg (C \wedge \neg B) \Rightarrow \neg (A \wedge C)$