1.2.x. Exercise questions

1. Suppose you know that a certain argument is valid but do not know whether its premises and conclusion are true or false. If you are given one of the further items of information **a-c** about the premises of the argument, what if anything can you say about the truth value of its conclusion?
   a. The premises are all true.
   b. The premises are all false.
   c. Some premises are true and some are false.

2. Suppose that ϕ, ψ / χ is an argument that you know to be valid. If you find that the conclusion χ is false, what if anything can you say about the truth values of the premises ϕ and ψ?

3. For each of the following items of information, tell what you can conclude from it about the equivalence of sentences ϕ and ψ.
   a. ϕ and ψ are both true
   b. ϕ and ψ are both false
   c. ϕ is true and ψ is false
   d. There is a sentence χ such that χ and ϕ together entail ψ, and χ and ψ together entail ϕ (i.e., χ, $\phi \Rightarrow \psi$ and χ, $\psi \Rightarrow \phi$)

4. For each of the following pieces of information, tell what if anything you can conclude about the possibilities left open and the possibilities ruled out by the sentence ϕ:
   a. ϕ is equivalent to a tautology ψ
   b. ϕ entails $\top$
   c. a tautology ψ entails ϕ
   d. ϕ is equivalent to $\bot$
   e. ϕ entails an absurdity ψ
   f. $\bot$ entails ϕ