

Logic pset 8

Resources: HLW [Ch 4](#) and Lectures [10](#), [11](#), and [12](#)

1. Prove that $\neg(P \leftrightarrow Q) \vdash P \rightarrow \neg Q$. Besides the basic rules, you may also cut in $\phi, \psi \vdash \phi \leftrightarrow \psi$ (biconditional).
2. Prove that $P \leftrightarrow Q, \neg(P \wedge Q) \vdash \neg P \wedge \neg Q$. You may only use the basic rules.
3. Prove that $P \leftrightarrow Q \vdash (P \wedge Q) \vee (\neg P \wedge \neg Q)$. Besides the basic rules, you may cut in sequents already proved in this pset and/or the sequent $\neg\phi \rightarrow \psi \vdash \phi \vee \psi$ (material conditional).
4. Prove that $\vdash (P \leftrightarrow Q) \vee (P \leftrightarrow \neg Q)$. You may cut in any of the “useful validities” from pp 233-4 in the book.