

Homework 2.

Follow the instructions from lecture. The Lemmon book will not help with doing these exercises.

1. Prove that the following arguments are valid. You may use the following rules of inference: $\&I$, $\&E$, $\vee I$, MPP, MTT, DN.

(a) 1. $P \& Q$ / $P \vee Q$

(b) 1. $\neg P \rightarrow \neg Q$
2. Q / P

(c) 1. $(A \vee B) \rightarrow T$
2. $Z \rightarrow (A \vee B)$
3. $T \rightarrow W$
4. $\neg W$ / $\neg Z$

(d) 1. $\neg A \rightarrow \neg B$
2. $A \rightarrow C$
3. $Z \rightarrow W$
4. $\neg C \& \neg W$ / $\neg B \vee W$

(e) 1. $(\neg A \vee \neg B) \rightarrow \neg G$
2. $\neg A \rightarrow (F \rightarrow G)$
3. $(A \rightarrow D) \& \neg D$ / $\neg F$

(f) 1. $(A \rightarrow B) \rightarrow (C \rightarrow D)$
2. $(F \rightarrow A) \rightarrow (A \rightarrow B)$
3. $A \rightarrow (F \rightarrow A)$
4. $A \& C$ / $D \vee F$

(g) 1. $(U \vee W) \rightarrow (T \rightarrow R)$
2. $U \& H$

$$3. \neg R \& \neg J \quad / \quad U \& \neg T$$

2. *Knights and knaves.* Knaves always lie, knights always tell the truth, and in Transylvania, where everybody is one or the other (but you can't tell which by looking), you encounter two people A and B. A says: "Either B's a knight or I'm a knave." (Note: The "or" in this sentence should be interpreted in the inclusive sense.) What are they? (Explain how you got your answer.)