

Logic pset 3

Resources: HLW [Ch 2](#), [Lecture 4](#) and [Lecture 5](#)

1. Prove that the following argument forms are valid. The premises are to the left of the \vdash symbol, the conclusion is to the right. You should number the lines of your proof, and each line must either be a premise (i.e. an assumption) or be justified by one of the following rules of inference: \wedge I, \wedge E, \vee I, MP, MT, or DN.

(a) $P \rightarrow (Q \rightarrow R), P \rightarrow Q, P \vdash R$

(b) $P \vdash (P \vee R) \wedge (P \vee Q)$

(c) $P \vdash Q \vee (\neg\neg P \vee R)$

(d) $\neg\neg Q \rightarrow P, \neg P \vdash \neg Q$

(e) $Q \rightarrow (P \rightarrow R), \neg R \wedge Q \vdash \neg P$

2. Explain what is wrong with the following “proof”.

(1) $P \vee (Q \wedge R)$ A

(2) $P \vee Q$ 1 \wedge E