

1. $P \rightarrow (Q \vee R) \vdash (P \rightarrow Q) \vee (P \rightarrow R)$
 Strategy 1: use $P \vee \neg P$. If P , then $Q \vee R$ hence $(P \rightarrow Q) \vee (P \rightarrow R)$.
 If $\neg P$ then $P \rightarrow Q$ hence $(P \rightarrow Q) \vee (P \rightarrow R)$.
 Strategy 2: use RAA. Assume the negation of the conclusion, then use DeMorgans.
2. $\vdash (Q \rightarrow P) \vee (P \rightarrow Q)$
 Strategy 1: use $P \vee \neg P$.
3. $\vdash (Q \rightarrow P) \vee (P \rightarrow R)$
4. $\vdash ((P \rightarrow Q) \rightarrow P) \rightarrow P$
 Strategy 1: Assume $(P \rightarrow Q) \rightarrow P$. Assume $\neg P$ for RAA. Do MT, then use material conditional on $\neg(P \rightarrow Q)$.