

Exercise Set 4

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1. One of the following is valid in the modal logic \mathbf{K} (and hence also in $\mathbf{K4}$). One is not valid in \mathbf{K} but is valid in $\mathbf{K4}$. Figure out which is which. For the one valid in \mathbf{K} give a \mathbf{K} destructive tableau proof. For the one valid in $\mathbf{K4}$ but not \mathbf{K} , give a $\mathbf{K4}$ destructive tableau proof, and a \mathbf{K} counter-model.
 - (a) $(\Box\Diamond P \wedge \Diamond\Box Q) \supset \Diamond\Diamond(P \wedge Q)$
 - (b) $(\Box P \wedge \Diamond\Box Q) \supset \Diamond\Box(P \wedge Q)$
2. Give a Priest style tableau proof, in \mathbf{K} , of $(\Diamond P \wedge \Box Q) \supset \Diamond(P \wedge Q)$.