1. Find a formula in Disjunctive Normal Form that is logically equivalent to $(p \leftrightarrow q)$.
2. Let $G : \{\mathrm{T}, \mathrm{F}\}^3 \to \{\mathrm{T}, \mathrm{F}\}$ be given by: $G(x, y, z) = \begin{cases} \mathrm{T} & \text{if } x = y \text{ and } x \neq z \\ \mathrm{F} & \text{otherwise} \end{cases}$. Find a formula $A$ such that $H_A = G$.
3. True or False: If $S$ and $T$ are sets of formulas such that $S \subset T$ and $S$ is satisfiable, then $T$ is satisfiable. Prove your answer.
4. True or False: If $A$ and $B$ are formulas such that $\{A\} \models B$, then $\{\neg A\} \models \neg B$. Prove your answer.
5. True or False: If $A$, $B$, and $C$ are formulas such that $\{A\} \vdash B$, and $\{B\} \vdash C$, then $\{A\} \vdash C$. Prove your answer.

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