

CSE 311: Foundations of Computing I

Section : Inference

1. Formal Proof (Direct Proof Rule)

Show that $\neg p \rightarrow s$ follows from $p \vee q$, $q \rightarrow r$ and $r \rightarrow s$.

2. Formal Proof

Show that $\neg p$ follows from $\neg(\neg r \vee t)$, $\neg q \vee \neg s$ and $(p \rightarrow q) \wedge (r \rightarrow s)$.

3. Formal Proofs in Predicate Logic

For this question only, write *formal proofs*.

(a) Prove $\forall x (R(x) \wedge S(x))$ given $\forall x (P(x) \rightarrow (Q(x) \wedge S(x)))$, and $\forall x (P(x) \wedge R(x))$.

(b) Prove $\exists x \neg R(x)$ given $\forall x (P(x) \vee Q(x))$, $\forall x (\neg Q(x) \vee S(x))$, $\forall x (R(x) \rightarrow \neg S(x))$, and $\exists x \neg P(x)$.

4. Odds and Ends

Prove that for every even integer, there exists an odd integer greater than that even integer.