

Subject 24-241 (Logic I). Homework due in LEC #5.

1. Use the method of truth tables to classify each of the following sentences as either valid, contradictory, or indeterminate:
  - (a)  $((P \rightarrow Q) \vee (Q \rightarrow R))$
  - (b)  $((P \leftrightarrow Q) \leftrightarrow (P \leftrightarrow \neg Q))$
  - (c)  $((P \leftrightarrow (Q \leftrightarrow R)) \leftrightarrow ((P \leftrightarrow Q) \leftrightarrow R))$
  - (d)  $((P \rightarrow (Q \rightarrow R)) \leftrightarrow ((P \rightarrow Q) \rightarrow R))$
  
2. Use the method of truth tables to check whether the following arguments are valid:
  - (a)  $(\neg A \rightarrow \neg(B \rightarrow C))$   
 $\neg B$   
 $\therefore A$
  
  - (b)  $((A \vee B) \rightarrow (C \vee D))$   
 $\neg(A \rightarrow C)$   
 $\therefore (B \rightarrow D)$
  
3. Show that a disjunction is inconsistent if and only if both its disjuncts are inconsistent.
  
4. Show, by giving an example, that it's not always the case that a disjunction is valid if and only if both disjuncts are valid.
  
5. Show that a sentence is contradictory if and only if it implies every sentence.
  
6. Give an example of a five-element inconsistent set of SC sentences of which every four-element subset is consistent.