

Logic I
Fall 2009
Problem Set 3
Due 10/6/2009

1. (12 pts.) Use a truth-table to prove that the following argument is truth-functionally valid. Be sure to explain how the truth-table proves that.

$$\frac{\sim (C \vee A)}{\sim (C \equiv \sim A)}$$

2. Prove that the following derivability claims hold in SD.
- (a) (10 pts.) $\{(A \supset B)\} \vdash [\sim B \supset \sim (A \& D)]$
 - (b) (12 pts.) $\{(A \supset B) \supset \sim B\} \vdash \sim B$
 - (c) (10 pts.) $\{F \supset (G \vee H), \sim (\sim F \vee H), \sim G\} \vdash \sim H$
3. (10 pts.) Use an SD derivation to complete problem 5.3E 12(b) from TLB.
4. (10pts.) Answer problem 5.3E 13(a) from TLB.
5. (10 pts.) Answer problem 5.3E 13(e) from TLB. Note that the problem concerns *validity in SD*, not, e.g., truth-functional validity, so be sure to appeal to the proper definition.
6. (14 pts.) Derive the following theorem in SD: $(A \supset B) \vee (B \supset A)$.
7. (12 pts.) Let SD* be the derivation system resulting from adding the rule Disjunctive Syllogism to the rule set of SD. Prove that in SD, we can derive anything that we can derive in SD*.

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