

Harvey Mudd College
Computer Science 80
Logic for Computer Science
Fall Semester 1999

Assignment #5 – Propositional Logic: Natural Deduction
Due 11:00am, Wednesday October 13, 1999

Give Natural Deduction proofs of each of the following formulas. That is, give a Natural Deduction proof tree with the given formula as its conclusion, and no undischarged assumptions. (Note, brackets are used in place of parentheses in some formulas to make the structure clearer):

1. $[(p \wedge q) \Rightarrow r] \equiv [p \Rightarrow (q \Rightarrow r)]$
2. $(p \Rightarrow q) \Rightarrow [(r \Rightarrow p) \Rightarrow (r \Rightarrow q)]$
3. $([(p \Rightarrow q) \Rightarrow p] \Rightarrow p)$
4. $(p \Rightarrow r) \equiv \neg(p \wedge \neg r)$
5. $(p \Rightarrow r) \equiv (\neg p \vee r)$