Universiteit van Amsterdam
Institute for Logic, Language and Computation

Reasoning and Formal Modelling for Forensic Science

2010/2011; 2nd Semester
Prof. Dr. Benedikt Löwe

Homework Set # 1 *Deadline:* 15 February 2011

Homework can be handed in

(1) in class at the beginning of the *werkcollege* (11am) or
(2) *via* e-mail to `carl@math.uni-bonn.de` until 11am.

Late homework will not be accepted.

Exercise A (8 points).

Prove, using truth tables, that $\neg(p \vee q) \leftrightarrow (\neg p \wedge \neg q)$ and $((p \to q) \wedge \neg q) \to \neg p$ are valid.

Exercise B (12 points).

Consider the binary connective $\odot$

$\odot$	T	F
T	F	F
F	T	F.

It can be split into two unary connectives. Which ones? Is there a unique answer to this question? Be as precise as possible, i.e., give a definition of what "splitting a binary connective" means and why $\odot$ has this property. Argue that all binary connectives can be split into two unary connectives. What does this have to do with $4 \times 4 = 16$?

Exercise C (5 points).

Let $\Rightarrow$ denote the (non-truth-functional) binary connective of "causal implication". Check the causal variant of our rule *ex contradictione quodlibet*:

$$(p \wedge \neg p) \Rightarrow q.$$

Is it a valid rule? (If so, give an argument; if not, give a counterexample.)