Exam 1.

The solutions are due Wednesday February 7th before class. Either bring them to class, or send them by e-mail to my address (preferably in pdf).

1. Provide an example of formulas A, B in sentential logic such that $A \vdash B$ holds and at the same time $B \vdash A$ does not hold. Justify your answer.

2. Provide a formal proof of $A \to B \vdash \neg B \to \neg A$ in the natural deduction calculus for sentential logic.

3. Consider the sentence $\forall x\ \exists y\ \forall z\ (\neg x\ R\ z) \to x\ R\ y$ in the language with one special binary symbol R. Produce a structure in which this sentence holds.

4. Consider the language L with one special binary functional symbol for multiplication. (No addition or ordering or constants.) Lookk at the following three L-structures: rationals with multiplication, reals with multiplication, and the complex numbers with multiplication. For each one, find an L-sentence which is satisfied in it but not in the others.