

## Math 2001 Homework 03

**Due date: Wednesday 6 Feb** (start of class)

When constructing proofs in natural deduction, use only the list of rules given in Section 3.1.

1. Give a natural deduction proof of  $A \wedge (A \rightarrow B) \rightarrow B$ .
2. Give a natural deduction proof of  $A \rightarrow \neg(\neg A \wedge B)$ .
3. Give a natural deduction proof of  $\neg(A \wedge B) \rightarrow (A \rightarrow \neg B)$ .
4. Give a natural deduction proof of  $(A \vee B) \wedge (A \rightarrow C) \wedge (B \rightarrow D) \rightarrow C \vee D$ .
5. Give a natural deduction proof of  $\neg A \wedge \neg B \rightarrow \neg(A \vee B)$ .
6. Give a natural deduction proof of  $\neg(A \leftrightarrow \neg A)$ .