

York University

Faculties of Science and Engineering, Arts, Atkinson

MATH 1090. Problem Set #2

Posted October 7, 2005

Due: October 21, 2005; 4:00pm, in the course box

Section A



Worth reproducing (from the course outline):

“The homework must be each individual’s own work. While consultations with the instructor, tutor, and among students, are part of the learning process and are encouraged, nevertheless, at the end of all this consultation each student will have to produce an individual report rather than a copy (full or partial) of somebody else’s report.

See <http://www.yorku.ca/secretariat/legislation/senate/acadhone.htm> to familiarise yourselves with Senate’s expectations regarding Academic Honesty.

The concept of late assignments does not exist.”



In what follows, “give a proof of $\vdash A$ ” means to give an equational or Hilbert-style proof of A . What style —Hilbert or equational— is up to you, but I advise that in the following problems equational proofs have the advantage.

Annotation is required!

(5 MARKS/Each) **Do the following problems (some are taken, but are rephrased, from the GS text, Chapter 3).**

1. Show that the last three axioms listed in the web notes are tautologies (actually all are, but I am only asking you to verify via truth tables that the last three are)
2. Give a proof of $\vdash A \vee B \equiv A \vee \neg B \equiv A$
3. Do parts (1) and (2) of Exercise 1.4.21 in the web notes.
4. Give a proof of $\vdash A \wedge (A \vee B) \equiv A$
5. Give a proof of $\vdash A \vee A \wedge B \equiv A$
6. Give a proof of $\vdash A \wedge B \vee A \wedge \neg B \equiv A$

7. Give a proof of $\vdash A \equiv B \equiv (A \wedge B) \vee (\neg A \wedge \neg B)$
8. Give a proof of $\vdash A \Rightarrow (B \Rightarrow C) \equiv (A \Rightarrow B) \Rightarrow (A \Rightarrow C)$
9. Give a proof of $A, B \vdash A \equiv B$
10. Give a proof of $A, \neg A \vdash \textit{false}$