CISC 404/604 assignment 6.

In most of these problems, you will need to use an additional Natural Deduction rule:

Axiom rule: If the last line of a deduction has k stars, one can always add an instance of an axiom as the next line, giving it k stars, and A as its justification.

А

Thus, if line 10 of a deduction is

10. *** $a = b \land a = c$

then we can add the line

11.*** $a = b \Rightarrow (a = c \Rightarrow b = c)$

and then the line

$$12.^{***} b = c$$
 TF 10,11

(line 11 is an instance of axiom A7.)

- 1. (10 points) Exercise 2.65, page 94 in Mendelson book.
- 2. (10 points) Exercise 2.66, page 96 in Mendelson book.
- 3. (10 points) Exercise 2.80, page 101 in Mendelson book.
- 4. (10 points) Exercise 2.82, parts (a), (b) and (c), page 101 in Mendelson book.
- 5. (10 points) Write the Skolem normal form (as defined in class and in the Schöning book) of
 (a) (∀x)(∀y)(∃z)C(x,y,z)

(b) $(\forall x)((\forall y)(\exists z)C(x,y,z) \Rightarrow A_i(x)) \Rightarrow (\forall x)A_i(x)$

Show all your work, i.e., show the rectified prenex normal form, the Skolem form, and the final Skolem normal form (Skolem form in conjunctive normal form).