

# Math 502 Homework I

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Write up proofs of the following theorems in whatever style you feel comfortable with, using the proof strategies presented in section 2. I will mark on your making the important distinctions and clearly communicating your understanding of the (or an) argument for the result.

Read all of section 2 (except the section on sequents) and ask me if you have any questions. In the section on substitution and dummy variables, see if you understand the issue with the specific examples I give.

1. Prove the equivalence

$$A \rightarrow (B \rightarrow C) \equiv (A \wedge B) \rightarrow C$$

Yes, some of the parentheses are redundant. . .

2. Prove the equivalence

$$\neg(P \rightarrow Q) \equiv P \wedge \neg Q$$

3. Prove

$$\neg(\forall x.P[x]) \equiv (\exists x.\neg P[x])$$

Do not hesitate to seek help. I will be more forthcoming in my office than in class, by far. You can also try e-mailing me your attempts for comment. This will be due next Tuesday.