

Logic and Critical Thinking: Homework #2

Instructions

This homework is due at the beginning of class, Monday 4 March. I will not accept it 1 minute late or 5 minutes late or 10 minutes late. If you turn it in after I have collected it in class, I will throw your homework in the garbage can, and not consider it.

If you work together with another student on this homework, you will receive a 0 on the assignment, and any other penalty appropriate to cheating. This is not a collaborative project.

Using the logical system in the readings (and that we presented in class), provide derivations for the following:

1. $(P \rightarrow Q) \vdash ((P \ \& \ R) \rightarrow Q)$

Hint: use \rightarrow I.

2. $\sim\sim P \vdash P$

Hint: Notice that $(\sim P \ \& \ \sim\sim P)$ is a contradiction.

3. $(P \rightarrow (Q \rightarrow R)) \vdash ((P \ \& \ Q) \rightarrow R)$

4. $\sim(P \vee Q) \vdash \sim P$

Hint: Assume P for \sim I.

5. $(P \leftrightarrow \sim P) \vdash Q$

Hint: assume P for \sim I, and also compare the in-class proof of $(P \ \& \ \sim P) \vdash Q$.

Very hard bonus question: You don't have to do this proof. But if you do it, and you do it right, I'll give you an additional 2 points on your final grade for the class:

BONUS. Prove my favorite theorem: $\vdash (((P \rightarrow Q) \rightarrow P) \rightarrow P)$