

Phil 225 -- Symbolic Logic
Strategies for Derivations in Sentential Logic

In general, look briefly at your premises and see if you can make quick, easy progress working directly with them. If so, work with them til you run out of steam. Then look at what you are trying to derive and take your cue from that. This will usually give you some additional premise to work with.

Remember that every conditional is equivalent to its contrapositive, which may be in a more useful form than the original.

When you have a negation outside a sentence, it will usually be useful to use DeMorgan's law to drive it in, especially if it is outside a disjunction or a conditional.

You are trying to derive:

($A \rightarrow B$): (1) take A as a premise and try to derive B ; use rule C
(2) take $\neg B$ as a premise and try to derive $\neg A$; use contra then rule C
(3) maybe you could just derive B flat out (or $\neg A$), and then use rule C
(4) if you get stuck on (1) or (2), try RAA

($A \vee B$): (1) this is a conditional, ($\neg A \rightarrow B$) in drag. Try to derive its conditional form along the lines of (1) - (4) above
(2) maybe you'll get lucky and be able to derive either A or B flat out; use DI
(3) try RAA -- this gives you a powerful premise to work with. This is like assuming $\neg A$ (for C) to derive B , and then taking $\neg B$ as a premise (for RAA), but all in one step.

($A \wedge B$): (1) derive both A and B ; use CI

($A \leftrightarrow B$): (1) try to derive both conditionals ($A \rightarrow B$) and ($B \rightarrow A$); use BI

When you are stuck anywhere, take the negation of what you are trying to derive as a premise for RAA .

You are trying to USE:

($A \rightarrow B$): (1) try to derive A ; use MP
(2) try to derive $\neg B$; use contra
(3) trade it in for its corresponding disjunction ($\neg A \vee B$) and use dilemma

($A \vee B$): (1) try to derive $\neg A$ or $\neg B$ and use DE
(2) where you are trying to derive C , take A as a premise to derive C , then take B as a premise to derive C , then use dilemma

($A \wedge B$): (1) use CE to get both A and B

- (A \leftrightarrow B): (1) try to derive either side, then use BE to get the other
(2) try to derive the opposite of either side, then use BE to get the opposite of the other