

## Homework #27 Hints

Try to solve each problem on your own. The more time you spend working on them, the more proficient you will become in doing proofs. If you simply look for the "easy way out," it will hurt you in the long run. If you have really worked on a problem and are getting frustrated, take a look at the hint for that one problem. Don't look ahead! Do the same for each problem. Use each hint as a last resort, but don't be discouraged if you need to use them. That is why they are here. ☺

### Exercise #28

1. You can probably create a proof for this argument without using the Destructive Dilemma, but you might find it challenging to do it in just two extra steps. Go ahead and solve it a longer way first if you need to, then come back for a hint on the shorter method. To finish in just two extra steps, start by using the Transposition rule of replacement.
2. Having a hard time thinking of your own rule of inference? Have you ever felt it was silly to use an extra step for something in a proof that seems obvious? Write a new rule and use it instead! Be sure to test its validity first.
3. Start with the Transposition rule of replacement.
4. Try using a Conditional Proof Assumption.
5. Try another Conditional Proof Assumption.
6. This seems very counter-intuitive, but start with a Double Negative replacement of the first proposition and see what you can do from there.
7. Try starting with a Reductio ad Absurdum assumption.

### Exercise #29

There are a few ways you can tackle this project (or even a combination of ways). You could start with the completed table which uses all of the logical operators we have learned so far (such as the top of the worksheet I handed-out in class), and for each proposition you're stuck on, try to use the rules of inference and replacement that you have learned to find equivalent propositions using only the negation and conjunction operators. Look especially at rules containing the operators you need to convert to and from.

You might also find it helpful to simply start making as many propositions as you can using  $p$  and  $q$  and the negation and conjunction operators. Place them at the top of a long row beginning with  $p$  and  $q$  (to start your truth table with), then under each new proposition you write, write out the truth table below it, corresponding to your first  $p$  and  $q$ . Now compare your T/F combinations for each proposition with the table you need to fill. If you haven't found them all, look at the T/F patterns you still need, and compare them to the patterns of the propositions you have created. Look for ones you might combine to get the pattern you need.

"All hard work brings a profit, but mere talk leads only to poverty." - Proverbs 14:23

Hard work pays off. Persevere and do your best!

