

# Contrapositive

We showed  $p \rightarrow q \equiv \neg q \rightarrow \neg p$  with a truth table. Let's do a proof.

Try this one on your own. Remember

1. Know what you're trying to show.
2. Stay on target – take steps to get closer to your goal.

Hint: think about your tools.

There are lots of rules with AND/OR/NOT,  
but very few with implications...

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Help me adjust my explanation!

# Properties of Logical Connectives

We will always give  
you this list!

For every propositions  $p, q, r$  the following hold:

- **Identity**

- $p \wedge \text{T} \equiv p$

- $p \vee \text{F} \equiv p$

- **Domination**

- $p \vee \text{T} \equiv \text{T}$

- $p \wedge \text{F} \equiv \text{F}$

- **Idempotent**

- $p \vee p \equiv p$

- $p \wedge p \equiv p$

- **Commutative**

- $p \vee q \equiv q \vee p$

- $p \wedge q \equiv q \wedge p$

- **Associative**

- $(p \vee q) \vee r \equiv p \vee (q \vee r)$

- $(p \wedge q) \wedge r \equiv p \wedge (q \wedge r)$

- **Distributive**

- $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$

- $p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$

- **Absorption**

- $p \vee (p \wedge q) \equiv p$

- $p \wedge (p \vee q) \equiv p$

- **Negation**

- $p \vee \neg p \equiv \text{T}$

- $p \wedge \neg p \equiv \text{F}$