Contrapositive

We showed $a \to b \equiv \neg b \to \neg a$ 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...

Properties of Logical Connectives

For every propositions a, b, r the following hold:

- **Identity**
  - $a \wedge \top \equiv a$
  - $a \vee F \equiv a$
- **Domination**
  - $a \wedge F \equiv F$
  - $a \vee \top \equiv \top$
- **Idempotent**
  - $a \vee a \equiv a$
  - $a \wedge a \equiv a$
- **Communtative**
  - $a \wedge b \equiv b \wedge a$
  - $a \vee b \equiv b \vee a$

- **Associative**
  - $(a \vee b) \vee r \equiv a \vee (b \vee r)$
  - $(a \wedge b) \wedge r \equiv a \wedge (b \wedge r)$
- **Distributive**
  - $a \wedge (b \vee r) \equiv (a \wedge b) \vee (a \wedge r)$
  - $a \vee (b \wedge r) \equiv (a \vee \wedge b) \wedge (a \vee r)$
- **Absorption**
  - $a \vee (a \wedge b) \equiv a$
  - $a \wedge (a \vee b) \equiv a$
- **Negation**
  - $a \vee \neg a \equiv \top$
  - $a \wedge \neg a \equiv F$