Language (for logic):
- symbols
  - letters
  - connectives
  - parentheses
- wffs, formulas
  $p \rightarrow (q \land r)$
  $p \rightarrow (\neg (q \lor r))$

$\neg$-table ("meaning")

Reasoning:

Inference

Need a notion of "follows from" or "logical consequence"

Rules of inference

Examples

1. $p \rightarrow q$
   $p$
   $\underline{q}$
   "modus ponens"
   $M_P$

2. $p \rightarrow q$
   $\neg q$
   $\neg p$
   "modus tollens"
   $M_T$
**Def:** A rule of \( \text{if its conclusion is true (T) in every } \)
\( \text{truth row in which } \) all its premises are \( \text{T} \).

**Example:**

\( (P \rightarrow \varphi) \)
\( \varphi \rightarrow R \)
\( P \rightarrow R \)

"Trans it with valid!!"
A 

Am 

No letters 

in this 

belief 

could be 

refuted 

by any 

witness. 

\( \alpha \rightarrow \beta \) 

\( \beta \rightarrow \beta \) 

The left \( Q \rightarrow P \) 

called the 

converse of 

\( P \rightarrow Q \)
A proof (from given axioms)

can be an argument

is a sequence of

rules

(W₁, W₂, W₃, \ldots, Wₙ)

where each wi either

is an axiom or

a derived rule.

As contrapositive.

\((\neg Q \rightarrow \neg P)\)

\((P \rightarrow \neg Q)\)

\(\equiv\)