

Logical Connectives

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Statements

A **statement** (or **proposition**) is a sentence that is either true or false, but not both. Represented by variables $p, q, r, \dots$

Basic connectives

Connective	Symbol	Alt. symbol
not	$\sim$	$\neg$
and	$\wedge$	
or (inclusive)	$\vee$	

$p \vee q$ is true when p is true, q is true, or both (“inclusive or”).

Exclusive or ($\oplus$)

“One or the other, but not both”:

$$p \oplus q \equiv (p \vee q) \wedge \sim (p \wedge q)$$

p	q	$p \oplus q$
T	T	F
T	F	T
F	T	T
F	F	F

Order of operations

1. $\sim$ first.
2. $\wedge, \vee$ equal second — parenthesise, else left to right.

Truth tables

A truth table for a statement form with n variables has 2^n rows. Build in **standard form** (systematically covering every combination, e.g. TTT, TTF, TFT, ...) so it's easy to verify completeness.

See also

- [logical-equivalence-laws](#)¹
- [conditional-statements](#)²
- [practice-problems](#)³ — §1 Logical Form, with full worked solutions

¹[courses/math1061/logical-equivalence-laws.pdf](#)

²[courses/math1061/conditional-statements.pdf](#)

³[courses/math1061/practice-problems.pdf](#)