An Introduction to Mathematical Proofs

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1 Logic

1.1 Propositions, Logical Connectives, and Truth Tables

1.1.1 Propositions

Propostional logic **studies how the truth of a complex statement is determined by the truth or falsehoods of its parts.**

A *propositon* is a statement that is either true or false, but not both.

1.1.2 Propositional Forms

An expression which is built up by combining *propositional variables* (capital letters) using logical symbols, is called a *propositional form*

The following tables shows the symbols used in propositional logic and their meaning:

Logical Symbol	English Translation
$\neg P$	P is not true
$P \wedge Q$	P and Q.
$P \vee Q$	P or Q.
$P \oplus Q$	P or Q, but not both
$P \implies Q$	if P, then Q
$P \iff Q$	P if and only if Q

2 Proofs

3 Sets

4 Integers

5 Relations and Functions

6 Equivalence Relations and Partial Orders

7 Cardinality

8 Real Numbers (Optional)