Notes for Introduction to Mathematical Thinking

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1 Week 1

Introduction to symbols:

$\wedge$ means a logical conjunction
$\vee$ means a logical disjunction
$\neg$ is negation

Truth Tables for these operators

Conjunction

ϕ	ψ	$\phi \wedge \psi$
T	T	T
T	F	F
F	T	F
F	F	F

Disjunction

ϕ	ψ	$\phi \vee \psi$
T	T	T
T	F	T
F	T	T
F	F	F

Negation

ϕ	$\neg\phi$
T	F
F	T

2 Week 2

2.1 Lecture 3: Implication

Implication has two parts, a truth part, and a causation part.
For the purpose of this course we are ignoring the causation part.

> The truth part is called the conditional or sometimes the material conditional.
> $\Rightarrow$ means implication.

In a conditional statement you have a statement $\phi \Rightarrow \psi$.
In this statement ϕ is the antecedent, and ψ is the consequent.

> The truth or falsity of the statement $\phi \Rightarrow \psi$ depends upon the truth values of ϕ and ψ.

This means that you can use truth tables to find the truth or falsity of an implication statement.

> For any implication statement, if ϕ is true and ψ is false, then the implication statement is false. For any other case, the implication statement is true.