CC112 flashcards p. 1 recto 17.6.2003 959	$p \to q$	$q \vee \neg p$
$p \vee q$	$p \wedge q$	$\neg p$
the conjunction of p and q	the disjunction of p and q	material implication
$\phi \equiv \psi$	truth table of $p \vee q$	truth table of $p \wedge q$
truth table of $p \to q$	truth table of $\neg p$	truth table of $p \leftrightarrow q$
$\top$	$\bot$	Modus Ponens

Typeset by $\mathcal{AMS}$-TEX

CC112 flashcards p. 2 recto 17.6.2003 959	Second Principle of Induction	Peano's Principle of Induction
Modus Tollens $p \to q$ $\neg q$ $\therefore \cdots$	Conjunctive Simplification $p \vee q$ $\therefore \cdots$	Disjunctive Addition p $\therefore \cdots$
Conjunctive Addition p q $\therefore \cdots$	Disjunctive Syllogism $p \vee q$ $\neg p$ $\therefore \cdots$	Hypothetical Syllogism $p \to q$ $q \to r$ $\therefore \cdots$
Division into Cases $p \vee q$ $p \to r$ $q \to r$ $\therefore \cdots$	Proof by Contradiction $p \to \perp$ $\therefore \cdots$	Universal Natural Deduction
Instantiation (unrestricted-quantifier form)	Instantiation (restricted-quantifier form)	First Principle of Induction
Well-Ordering Principle for $\mathbb{N}$		

$p \to q$

if p then q

CC112 flashcards
p. 1 verso
17.6.2003 959

not-p

p and q

p or q

$p \to q$

p or q

p and q

p	q	
T	T	T
T	F	F
F	T	F
F	F	F

p	q	
T	T	T
T	F	T
F	T	T
F	F	F

ϕ and ψ
have the same
truth table

p	q	
T	T	T
T	F	F
F	T	F
F	F	T

p	
T	F
F	T

p	q	
T	T	T
T	F	F
F	T	T
F	F	T

$p \to q$
p
$\therefore\ q$

always F

always T

if $A \subseteq \mathbb{N}$ and $0 \in A$ and $n+1 \in A$ whenever $n \in A$ then $A = \mathbb{N}$	$P(0)$ $\forall n \in \mathbb{N},$ $(\forall i \in \mathbb{N}, (0 \leq i < n) \rightarrow P(i))$ $\rightarrow P(n)$ $\therefore \forall n \in \mathbb{N}, P(n)$	CC112 flashcards p. 2 verso 17.6.2003 959
Disjunctive Addition . . . $\therefore\ p \vee q$	Conjunctive Simplification . . . $\therefore p$	Modus Tollens . . . $\neg q$ $\therefore\ \neg p$
Hypothetical Syllogism . . . $q \rightarrow r$ $\therefore\ p \rightarrow r$	Disjunctive Syllogism . . . $\neg p$ $\therefore\ q$	Conjunctive Addition . . . . . . $\therefore\ p \wedge q$
for any valid argument if both premises and conclusion are universalized with $\forall x$ the argument is still valid	Proof by Contradiction . . . $\therefore\ \neg p$	Division into Cases . . . $p \rightarrow r$ $q \rightarrow r$ $\therefore\ r$
$P(0)$ $\forall n \in \mathbb{N},$ $P(n) \rightarrow P(n+1)$ $\therefore \forall n \in \mathbb{N}, P(n)$	$\forall x \in A, P(x)$ $a \in A$ $\therefore\ P(a)$	$\forall x, P(x)$ $\therefore\ P(a)$
		if $A \subseteq \mathbb{N}$ is not empty there is an $m \in A$ such that $m \leq n$ for every $n \in A$