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Logic: Propositional Logic (Quickstudy: Academic)

Quick Study ACADEMIC

LOGIC

THE BASIC PRINCIPLES OF PROPOSITIONAL & SYLLOGISTIC LOGIC - PLUS QUANTIFICATION THEORY

BASIC ELEMENTS

EQUIVALENT NAMES

Propositional Calculus - Symbolic Logic
Symbolic Functional Logic - Algebra of Propositions

SYMBOLS

- Sentences Variables: p, q, r, \dots
- Sentence Abbreviations: A, B, C...
- Predicate Abbreviations (Reading Device):
• Symbols: $\neg, \wedge, \vee, \rightarrow, \leftrightarrow$ (read only left)

OPERATIONS

1. **Negation**
• Read as "not"
• Symbol: \neg
• Example: $\neg p$ (not p)
• Example: $\neg(\neg p)$ (not not p)
2. **Conjunction**
• Read as "and"
• Symbol: \wedge
• Example: $p \wedge q$ (p and q)
• Example: $(p \wedge q) \wedge r$ (p and q and r)
3. **Disjunction**
• Read as "or"
• Symbol: \vee
• Example: $p \vee q$ (p or q)
• Example: $(p \vee q) \vee r$ (p or q or r)
4. **Conditional**
• Read as "if...then"
• Symbol: \rightarrow
• Example: $p \rightarrow q$ (if p then q)
• Example: $(p \rightarrow q) \rightarrow r$ (if (if p then q) then r)

TRUTH-TABLE METHOD

OUTLINE OF METHOD

- An inference is correct (is valid) only if its conclusion is true whenever all its premises are true. A sentence is consistent if its truth-table yields a row in which it is true. A sentence is a tautology if its truth-table yields a row in which it is true. A sentence is a contradiction if its truth-table yields a row in which it is false. A sentence is a contingency if its truth-table yields both a row in which it is true and a row in which it is false.

INFERENCE: PREMISES & CONCLUSION

An **Inference** for argument is usually indicated by the presence of a **premise** word or **conclusion** word or both.

- **Premise-words:** since, because, for, for the reason that, etc.
- **Conclusion-words:** therefore, hence, thus, an consequence, it follows that, etc.

Note: The conclusion of an inference is always appearing at the final column of a truth-table. It is usually not the last sentence of an inference in ordinary language.

TRUTH-TREE METHOD

OUTLINE OF METHOD

- General: This method uses the **method of Assumptions** (or **method of proof** or **"Indirect Proof"** under Symbolic Truth Tables). The formula being tested is first assumed (regarded as true). Truth (contingency) formula is Assumed until the result is either an atomic proposition or a negation. If and only if the tree yields a contradiction, an error formula in the formula is tautology.

SHORTER TRUTH-TABLE METHOD

OUTLINE OF METHOD

- **Indirect Proof** (method of **absurdity**): Assume a well-formed formula is true, substitute in valid. If a truth-table assignment can be found that is consistent with the initial proposition of T , then the well-form is not necessarily true. Inference is invalid.

TRUTH-TABLE DEFINITIONS OF OPERATORS

	COLUMNS			
Truth Function:	p	q	$p \wedge q$	$p \vee q$
Lines:	T	T	T	T
	T	F	F	T
	F	T	F	T
	F	F	F	F

Note: The truth values "T" and "F" stand for "true" and "false". The above matrix stands only for those on they correspond to ordinary language expressions (i.e. and, or, etc.).

WELL-FORMED FORMULA (wff)

- $(p), (A), (\neg A), (A \wedge B)$
- If A is a wff, then $\neg A$ is a wff.
- If A and B are wffs, then $(A \wedge B)$ and $(A \vee B)$ are wffs.

EXAMPLES

WELL-FORMEDNESS

1. $(p \rightarrow (q \rightarrow r)) \rightarrow (p \rightarrow q) \rightarrow r$

VALID INFERENCE

1. $(p \rightarrow (q \rightarrow r)) \rightarrow (p \rightarrow q) \rightarrow r$

2. $(p \rightarrow q) \rightarrow (q \rightarrow r) \rightarrow (p \rightarrow r)$



Synopsis

This 4-page study guide contains fundamental logic definitions and analysis which is specifically designed to aid science students.

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Customer Reviews

Read with an introduction to logic, this BarChart fits well with the student who wishes to 'think-straight,' a task which seems harder to do in this age when ideology and dogma clutter the open-ness of mind which is the requisite of reality-based progress. I carry this chart with me in my back-pack and refer to it often as a corrective to 'boners' and lapses in sound reason. Would that everyone who is patsy for demagogues could do the same! For the price and for the reward of clear address to problem-solving, this chart is certainly 'well worth the price.' --Vernon Lynn Stephens

I completed a Logic class about a year ago and having this Quickstudy is a good reference instead of digging into my notes or textbook .

I bought this for my son's first logic class at Alabama, and it really helped to define some of the basic principles. Good item !

Durable, may be punched to fit a ring binder, fit in standard binder cover pockets, and good for

skim-studying or memory refreshing on a topic.

cool... though i don't understand it yet... haha... plan on keeping it as a reference.

High quality and delivered on time.

Chart arrived in good conditon.

great.

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