

Chapter 3 Logic / Section 1

Statements- a sentence that can be judged either true or false / Ex = "Pigs can Fly"

A statements symbolic form is represented by letters, most commonly used in this chapter and homework are (p and q)

There are **TWO** kinds of statements (simple and compound)

Simple statements- Conveys one idea / Ex = "that car is red"

Compound statements- Conveys two or more statements / Ex = "that car is red and the wheels are black"

Negations (Not Statements)

Negation is symbolized by \sim and read "not". They can also be used to negate conjunctions, disjunctions, conditional, and biconditional statements.

Negation of a true statement is false, and the negation of a false statement is true.

Ex = John is going to collage. $\sim(p)$ "John is not going to Collage."

Ex = I'm not Teaching the class. $\sim(p)$ "I'm teaching the class."

Negation is the same as negative. $-(n) = -n / -(-n) = n$

Conjunctions (And Statements)

Conjunctions is symbolized by \wedge and read "and".

Most commonly conjunctions are expressed as and. There are other words used to express a conjunction are (but, however, nevertheless)

Ex = You have cats and you have dogs. $P \wedge Q$

Ex = You are tall and you are a fast runner. $P \wedge Q$

Conjunctions mean that you have both or you have neither of them.

Disjunction (Or Statements)

Disjunction is symbolized by \vee and read "or".

Ex = Lee went to class or Lee went to the mall. $(p \vee q)$

Ex = you do your homework or you take walk. $(p \vee q)$

Disjunctions can mean you did one or the other, or you did both.

Conditional (If- Then Statements)

Conditional is symbolized by \rightarrow and read "if- then"

A conditional statement consists of two parts: the part that is in front of the arrow is the *antecedent* and the part that follows the arrow is the *consequent*.

Ex = If I have a Lab, then I have a dog. ($p \rightarrow q$)

Ex = If Jack is not 3 years old, then he is a child. ($p \rightarrow q$)

Biconditional (If and Only If Statement)

Biconditional is symbolized by \leftrightarrow and is read "if and only if"

Ex = Travis went to the movies if and only if he finished his chores. ($p \leftrightarrow q$)

Ex = the dog got a treat if and only if it did not chase the cat. ($p \leftrightarrow q$)

Formal name	Symbol	Read	Symbolic form
Negation	\sim	"Not"	$\sim p$
Conjunction	\wedge	"And"	$p \wedge q$
Disjunction	\vee	"Or"	$p \vee q$
Conditional	\rightarrow	"If-then"	$p \rightarrow q$
Biconditional	\leftrightarrow	"If and only if"	$p \leftrightarrow q$