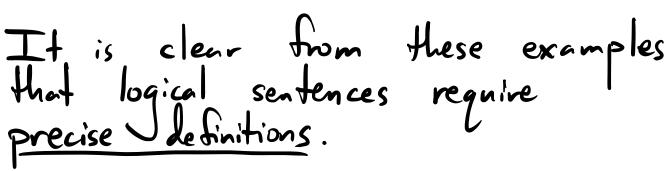
Ex: "OSU is in Columbus, OH." (T) "2+2 = 5." (F) "x>7" (Depends on variable x) <u>Non-Ex</u>: "Go outside." "Are you cold?"



Propositional Calculus  
How to "build" new sentences from excisting  
ones?  
Use logical connectives.  
Logical Connective Symbol Plain English  
negation "not"  
conjunction 
$$\Lambda$$
 "and"  
disjunction  $V$  "or" (inclusive)  
implication  $\Longrightarrow$  "if and only if"

Let P, Q, R, ... stand for sentences.  

$$Ex$$
:  $P = "It$  is Friday."  
 $Q = "We're having finn in Math 3345."$   
 $-P$ ,  $PAQ$ ,  $P \Rightarrow Q$ , etc.

① <u>Negation</u>: ¬ means "not" The negation ¬P has the opposite truth value as P. So if P is true, then ¬P is fulse, if P is false, then ¬P is true.
Summarize this in a truth tuble:

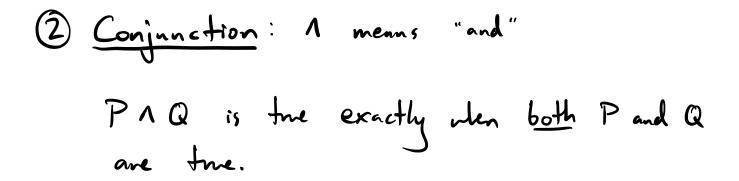
 P
 ¬P

 T
 F

 F
 T

Ex: What is  $\neg(\neg P)$ ? Make another truth table:  $\frac{P | \neg P | \neg(\neg P)}{T | F | T}$ F | T | F

So P and  $\neg(\neg P)$  always have the same finith value. We say they are <u>logically equivalent</u> and write  $P \equiv \neg(\neg P).$ "is logically equivalent to"



Ρ	Q	PAQ
T	T	Т
Т	F	F
F	Т	F
F	F	F

Ex: 2 is even and 3 is odd. T 2 is even and 3 is even. F 2 is odd and 3 is odd. F