21-10-2008

Recap

* Logical statements
  - Variables
  - connectives: $\vee$, $\wedge$, $\oplus$, $\neg$
  - parenthesis: ( ) $\Rightarrow$ $\Leftrightarrow$
* Truth Table
* Laws: DeMorgan

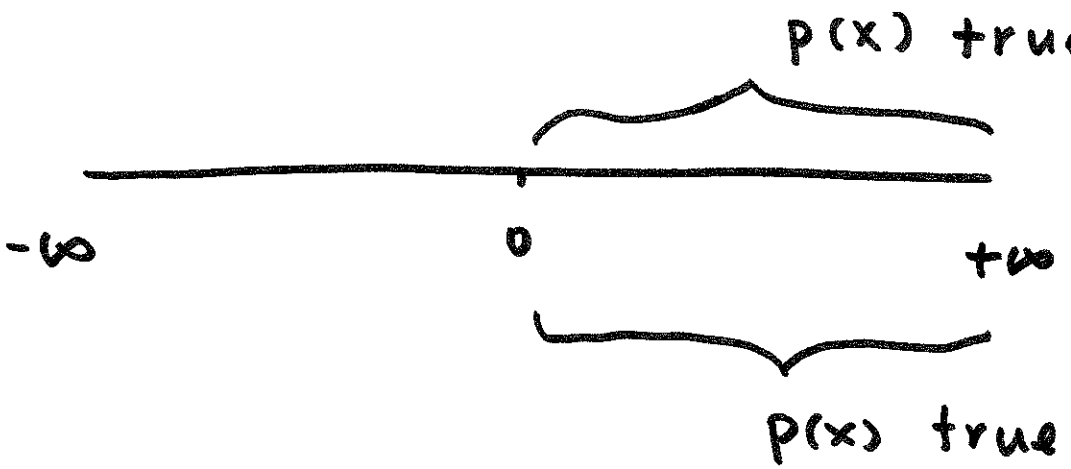
Today:

* Last ingredients of logical statements

  Quantifiers: $\forall$, $\exists$

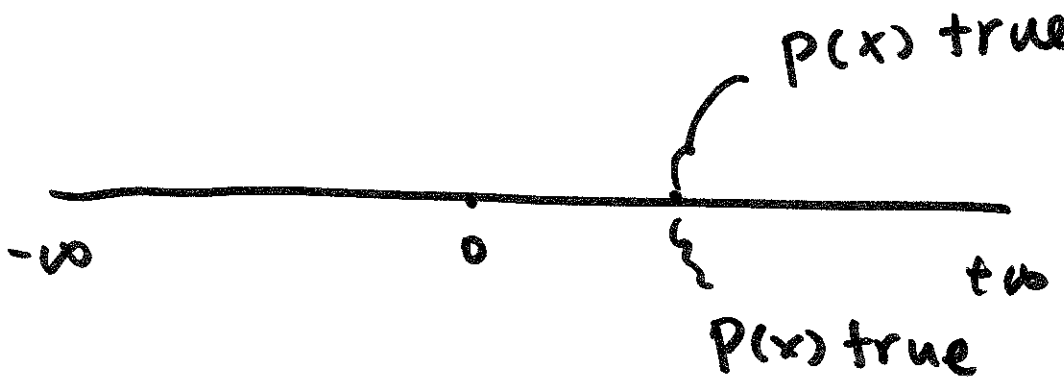
Statements & Universes

$\forall x \in \mathbb{R}^+ \; (P(x))$



$\forall x \in \mathbb{R} \; ((x>0) \Rightarrow P(x))$

$\exists x \in \mathbb{R}^+ \; (P(x))$



$\exists x \in \mathbb{R} \; ((x>0) \wedge P(x))$

$\exists x \in \mathbb{R} \; ((x>0) \Rightarrow P(x))$

true regardless of P

$P \Rightarrow q$ true when P false

$U = \{ u_1, u_2, u_3 \}$

$\forall x \in U \; p(x)$

$= p(u_1) \wedge p(u_2) \wedge p(u_3)$

$\exists x \in U \; p(x)$

$= p(u_1) \vee p(u_2) \vee p(u_3)$

$\neg \forall x \in U \; p(x) = \exists x \in U \; \neg p(x)$

$\neg (p(u_1) \wedge p(u_2) \wedge p(u_3))$

$= \neg p(u_1) \vee \neg p(u_2) \vee \neg p(u_3)$

De Morgan's Law