Lecture 2: Conditional sentences — Math 345

Thursday, September 23, 2010 — Jim Fowler

Textbook

This lecture discusses section 2 of the textbook.

Homework

The homework is due Tuesday, September 28, 2010.

From Section 2 of the textbook, do exercises 7, 8, and 10.

Conditional sentences

$P \Rightarrow Q$

write out truth table

Negation of conditional sentence

$\neg(P \Rightarrow Q)$ is equivalent to $P \wedge \neg Q$

Converse of conditional sentence

the converse of $P \Rightarrow Q$ is $Q \Rightarrow P$.

Biconditonal sentences

Show that $P \Leftrightarrow Q$ is the same as $P \Rightarrow Q$ and $Q \Rightarrow P$.

Quick survey of understanding

Examples with numbers

e.g., $x^2 = 1$

Tautologies

a tautology is a proposition which is true, no matter the truth values of the propositions it is built from.

formally, a proposition P is a tautology if it is logically equivalent to "true."
example: $P \vee \neg P$.
example: $P \wedge Q \Rightarrow P$.

Conditional proof

How do you prove a statement like $P \Rightarrow Q$?

Modus Ponens

If P holds and $P \Rightarrow Q$ holds, then Q holds.