

Truth Table:

Propositions

Definition. A *proposition* is a sentence that is either true (T) or false (F), but not both.

Examples: Which of the following are propositions?

2

- The Alamo is located in San Antonio.
- UTSA is the best school in the world.
- It is warm in San Antonio

Negation

Definition. Let *p* be a proposition. The *negation* ("not") of *p*, denoted by $\neg p$, has the opposite truth value than the truth value of p. Read $\neg p$ as: "not p" or "It is not the case that p".

Examples: Negate the following:

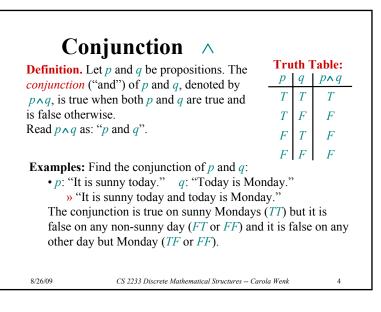
- "The Alamo is located in San Antonio."
 - » "The Alamo is not located in San Antonio"
 - or "It is not the case that the Alamo is located in San Antonio"
- · Today is Monday

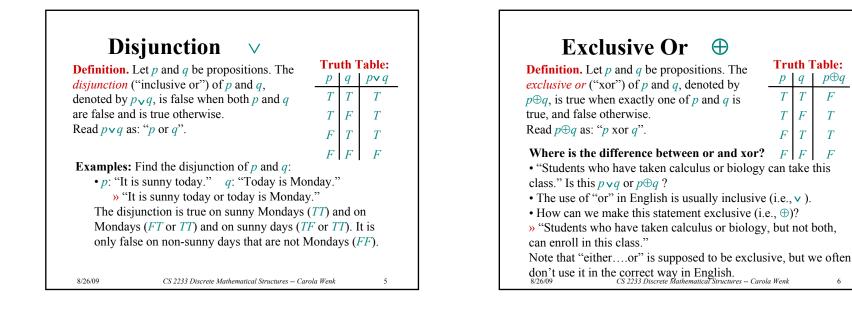
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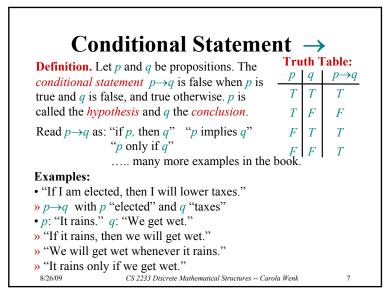
» "Today is not Monday" or "It is not the case that today is Monday"

CS 2233 Discrete Mathematical Structures -- Carola Wenk

3







Biconditional Statement ↔

Definition. Let p and q be propositions. The <i>biconditional statement</i> ("iff") $p \leftrightarrow q$ is true	Truth Table:		
	p	<i>q</i>	$p \leftrightarrow q$
when p and q have the same truth value, and	Т	Т	Т F F Т
false otherwise.	Т	F	F
Read $p \leftrightarrow q$ as: " <i>p</i> if and only if <i>q</i> "	F	Т	F
" <i>p iff q</i> "	F	F	Т
Example:"You can take the flight if and only if you buy a ticket."			

 $p \oplus q$

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6

