

The Conditional and Biconditional

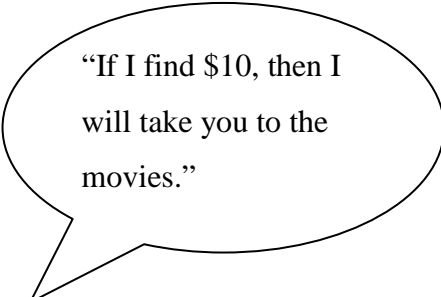
(Section 2.4)

The objectives for this section include:

1. Compute truth tables for conditionals and biconditionals.
2. Write the converse, inverse, and contrapositive of a conditional.
3. Use alternative words to write conditionals.
4. Identify equivalent forms of the conditionals.

Conditional

P	Q	$P \rightarrow Q$



“If I find \$10, then I will take you to the movies.”

Conditional is **false only when first statement (_____) is true and the second statement (_____) is false.** *Think of it as when you have been lied to the statement is false.*

Biconditional a conditional that must be true both ways (original and converse result in both true)

P	Q	$P \rightarrow Q \wedge Q \rightarrow P$	$P \leftrightarrow Q$
T	T		
T	F		
F	T		
F	F		

Biconditional is **true only when _____**.

Complete **Quiz Yourself 11** on p. 107

p	q	$(p \wedge q) \rightarrow (\sim p \vee q)$
T	T	
T	F	
F	T	
F	F	

Tautology is a statement that is always true so that when a truth tables' final column is completed it is all TRUES.

2. Class Practice

Assume that p represents a false statement, q is a true statement, and r is a false statement. Determine the truth value of each statement.

a. $\sim(p \vee q) \rightarrow q$

b. $(p \wedge q) \leftrightarrow \sim r$

3. Class Practice

p	q	$(p \vee q) \rightarrow \sim q$
T	T	
T	F	
F	T	
F	F	

Name	Symbols
Converse	$q \rightarrow p$
Inverse	$\sim p \rightarrow \sim q$
Contrapositive	$\sim q \rightarrow \sim p$

The **conditional statement** $p \rightarrow q$ has the following:

Converse- A *conman* does a switch

Inverse is the opposite, the additive inverse of 5 is -5

Contrapositive does both switch and take the opposite.

4. Class Practice-Write in words the converse, inverse, and contrapositive

If know the material, then you will do well in the course.

Converse- _____

Inverse- _____

Contrapositive- _____

Complete **Quiz Yourself 12** on p. 108

If the price of CDs increases, then people will burn them illegally.

5. Class Practice	Given statement	Rewritten in if...then form
When <i>if</i> is located half way in a statement often the then is not part of the original sentence. It can be rewritten with if starting your sentence as that is your hypothesis.	Today is Wednesday if you have confirmation.	
The <i>only if</i> \neq <i>if</i> as the <i>only if</i> is the condition which is first part of the sentence forming the conclusion.	I will go to school only if I have class.	
<i>p</i> is <i>sufficient</i> for <i>q</i> with the sufficient condition being the hypothesis.	To live in Minnesota, it is sufficient to live in Moorhead.	
<i>q</i> is <i>necessary</i> for <i>p</i> with the necessary condition being the conclusion.	To graduate from MSUM, it is necessary to complete a Math course.	

Complete **Quiz Yourself 13** on p. 110



Assignment Due Monday:

Read pp. 105-111

Complete #1, 4, 5, 7, 9, 15, 19, 25, 29, 31, 32, 39, 41, 47, 48, 49, 55 on pp. 111-113

Complete Handout over Section 2.4