

1.7 Deductive Structure (also see samples & examples in OTB)

1) State the converse, inverse and contrapositive of the following conditional statement:

$$P \rightarrow Q$$

"If it is Tuesday, then it is cloudy."

Start with the Conditional:

($P = Q$) Let $p =$ If it is Tuesday Let $q =$ then it is cloudy

Converse:

($Q = P$) If it is cloudy, then it is Tuesday

Inverse:

($\sim p = \sim q$) If it is not Tuesday, it is not cloudy

Contrapositive:

($\sim q = \sim p$) If it is not cloudy, then it is not Tuesday.

Write a concluding statement for 2 & 3.

The Law of Syllogism

For these exercises, REMEMBER Theorem #3: "If a conditional statement is true, then the contrapositive of the statement is also true." The two statements are "logically equivalent!" ($p \rightarrow q \leftrightarrow \sim q \rightarrow \sim p$)

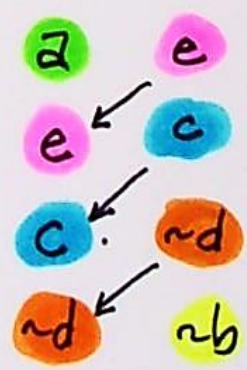
2)

$$a \rightarrow e$$

$$c \rightarrow \sim d$$

$\sim d \rightarrow \sim b$ $b \rightarrow d$ $\text{Thm 3 } b \rightarrow d$

$$e \rightarrow c$$



What can we Conclude:

$$a \rightarrow \sim b$$

or

$$b \rightarrow \sim a$$

3)

$$b \rightarrow f$$

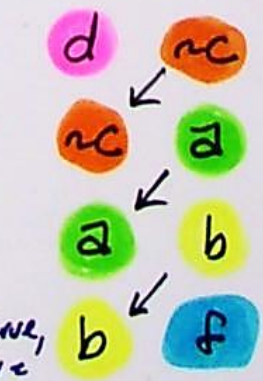
$$\sim c \rightarrow a$$

$$c \rightarrow \sim d$$

$$a \rightarrow b$$

$$d \rightarrow \sim c$$

If a conditional is true, then the contrapositive is also true!



$d \rightarrow f$
or
 $\sim f \rightarrow \sim d$

