

Math 321

Applications of Prop. Logic

① Symbols \Rightarrow english why? to study
what was said.

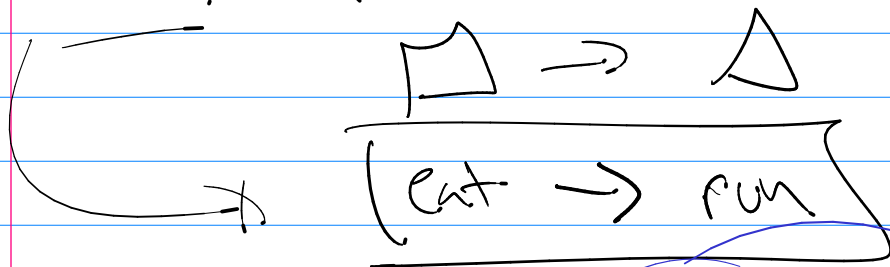
② eat : "Mark eats pie"

run : "Mark runs quickly"

$\neg \text{eat} \vee \neg \text{run}$: "It is not the case that
 Mark eats pie or Mark runs quickly"

Mark doesn't eat pie or runs quickly.

Mark eating pie is suff. for him to run quickly



eat	run	$\neg \text{eat}$	$\neg \text{eat} \vee \text{run}$
T	T	F	T
T	F	F	F
F	T	T	T
F	F	T	T

Ex) For hiking to be safe, it is necessary and not sufficient that berries not to be ripe and for bears not to be seen.

$$(safe \rightarrow (\neg ripe \wedge \neg bears)) \wedge \neg ((\neg ripe \wedge \neg bears) \rightarrow safe)$$

safe: "hiking safe"
 ripe: "ripe berries"
 bears: "seen bears"

table

System Specifications

P_1 : "
 P_2 : "
 ...
 P_n : "

Set of
Statements

Goal: $P_1 \wedge P_2 \wedge \dots \wedge P_n$ is not always false

Consistent

(not a contradiction)

$p \times q$, $\neg p$, $p \rightarrow q$

p	q	$p \times q$	$\neg p$	$p \rightarrow q$	$(p \times q) \wedge (\neg p) \wedge (p \rightarrow q)$
T	T	T	F	T	F
T	F	F	F	F	F
F	T	F	T	T	T
F	F	F	T	T	F

Logic Puzzle

Knight (always tells truth)

Knave (always tells lies)

spy (either)