

Section 3.2 Truth Tables

conjunction
"and"ex 1 Draw a truth table for $p \wedge q$. p : I will do homework. q : I will cook dinner.

conjunction "and"

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

Alekis will
give you
thisdisjunction
"or"ex 2 Draw a truth table for $p \vee q$.

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

ex 3 Draw a truth table for $\sim(p \wedge q)$

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

and (arrow to $\wedge$)
 not (arrow to $\sim$)
 copied from ex 1 (arrow to the $p \wedge q$ column)

ex 4 Draw a truth table for $p \rightarrow q$

p : There is a fire.
 q : You call 911.

conditional
"if...then"

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

If there is a fire, then you call 911. (arrow to $\rightarrow$)

The conditional is a promise that says if the first thing happens then you promise to follow through by doing the second thing.

ex 5 Draw a truth table for $p \leftrightarrow q$

biconditional
"if and only if"

The biconditional is an abbreviation for:
 $(p \rightarrow q) \wedge (q \rightarrow p)$

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

↑ from ex 4

* Summary of Connectives Sheet *

ex 6 Draw a truth table for $\sim p \vee q$

p	q	$\sim p$	$\sim p \vee q$
T	T	F	T
T	F	F	F
F	T	T	T
F	F	T	T

ex 7 Draw a truth table for $\sim p \wedge \sim q$

p	q	$\sim p$	$\sim q$	$\sim p \wedge \sim q$
T	T	F	F	F
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T

Aleks will not give you these

ex 8 Draw a truth table for $q \rightarrow (\sim p \wedge q)$

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

ex 9. Draw a truth table for:
 $\sim(q \rightarrow p) \wedge r$

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

Aleks will
give you these