

# Logic and Critical Thinking Homework #1

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Your Name: \_\_\_\_\_

Student ID#: \_\_\_\_\_

1. Construct truth-tables for the following WFFs.

a.  $\sim(\sim P \ \& \ \sim Q)$

b.  $\sim(P \rightarrow \sim Q)$

c.  $(\sim P \vee Q)$

d.  $((P \rightarrow Q) \rightarrow P) \rightarrow P$

e.  $(P \ \& \ (\sim Q \ \& \ R))$

*Example:*

If I asked you to write a truth table for  $\sim(\sim P \vee \sim Q)$ , you would write:

P	Q	$\sim$	( $\sim$	P	$\vee$	$\sim$	Q)
T	T	<b>T</b>	F	T	F	F	T
T	F	<b>F</b>	F	T	T	T	F
F	T	<b>F</b>	T	F	T	F	T
F	F	<b>F</b>	T	F	T	T	F

I'm asking you to write out the full truth-table, and I want you to indicate the truth-table for the WFF as a whole under the main connective. Here, since the main connective is " $\sim$ ," I've put those truth-values in **bold**. You can circle them, or draw an arrow to them, or whatever you like.

*Please complete this part of the assignment on a separate sheet of paper.*

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2. Write a WFF at the top that has the truth-table indicated.

a.

P	Q	
T	T	<b>T</b>
T	F	<b>T</b>
F	T	<b>F</b>
F	F	<b>T</b>

b.

P	Q	
T	T	<b>F</b>
T	F	<b>T</b>
F	T	<b>T</b>
F	F	<b>F</b>

c.

P	Q	
T	T	<b>F</b>
T	F	<b>F</b>
F	T	<b>T</b>
F	F	<b>F</b>

d.

P	Q	
T	T	<b>T</b>
T	F	<b>T</b>
F	T	<b>T</b>
F	F	<b>T</b>

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e.

P	Q	
T	T	<b>T</b>
T	F	<b>T</b>
F	T	<b>T</b>
F	F	<b>F</b>

EXAMPLE:

If I gave you this:

f.

P	Q	
T	T	<b>F</b>
T	F	<b>F</b>
F	T	<b>T</b>
F	F	<b>T</b>

Then you might write this:

f.

P	Q	$\sim P$
T	T	<b>F</b>
T	F	<b>F</b>
F	T	<b>T</b>
F	F	<b>T</b>

There are lots of other good answers to question f. You could have also written:

$$(\sim(P \ \& \ Q) \ \& \ (P \ \rightarrow \ Q))$$