

Assignment ONE

▼ Let p and q be the propositions:

p: You drive over 65 miles per hour.

q: You get a speeding ticket.

Write these propositions using p and q and logical connectives (including negations).

- You do not drive over 65 miles per hour.
- You drive over 65 miles per hour, but you do not get a speeding ticket.
- You will get a speeding ticket if you drive over 65 miles per hour.
- If you do not drive over 65 miles per hour, then you will not get a speeding ticket.
- Driving over 65 miles per hour is sufficient for getting a speeding ticket.
- You get a speeding ticket, but you do not drive over 65 miles per hour.
- Whenever you get a speeding ticket, you are driving over 65 miles per hour.

My Answer:

a. $\sim p$

b. $p \wedge \sim q$

c. $p \rightarrow q$

d. $\sim p \rightarrow \sim q$

e. $p \rightarrow q$

f. $q \wedge \sim p$

g. $q \rightarrow p$

▼ Construct a truth table for each of these compound propositions.

a) $p \rightarrow \sim p$

p	$\sim p$	$\sim p \wedge p$	$p \rightarrow \sim p$
T	F	F	F
F	T	T	T

b) $p \leftrightarrow \sim p$

p	$\sim p$	$p \leftrightarrow \sim p$
T	F	F
F	T	F

c) $p \oplus (p \vee q)$

p	q	$p \vee q$	$p \oplus (p \vee q)$
T	T	T	F
T	F	T	F
F	T	T	T
F	F	F	F

d) $(p \wedge q) \rightarrow (p \vee q)$

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

e) $(q \rightarrow \sim p) \leftrightarrow (p \leftrightarrow q)$

p	q	$\sim p$	$q \rightarrow \sim p$	$p \leftrightarrow q$	$q \rightarrow \sim p \leftrightarrow p \leftrightarrow q$
T	T	F	F	T	F
T	F	F	T	F	F
F	T	T	T	F	F
F	F	T	T	T	T

f) $(p \leftrightarrow q) \oplus (p \leftrightarrow \sim q)$

p	q	$\sim q$	$p \leftrightarrow q$	$p \leftrightarrow \sim q$	$(p \leftrightarrow q) \oplus (p \leftrightarrow \sim q)$
T	T	F	T	F	T
T	F	T	F	T	T
F	T	F	F	T	T
F	F	T	T	F	T