UCSB: MATH 8
SECTION ONE
TA: SETH ALTHAUSER
EMAIL: ALTHAUSER@MATH.UCSB.EDU

Name:

Problem 1

Make truth tables for the following formulas:

(a) $\neg P \vee Q$.

(b) $(S \vee G) \wedge (\neg S \vee \neg G)$.

(c) $\neg[P \wedge (Q \vee \neg P)]$.

Solution

Problem 2

Use truth tables to help you find simpler formulas equivalent to these formulas below:

(a) $\neg(\neg P \wedge \neg Q)$.

(b) $(P \wedge Q) \vee (P \wedge \neg Q)$.

(c) $\neg(P \wedge \neg Q) \vee (\neg P \wedge Q)$.

Solution

Problem 3

Use truth tables to determine which of the following are equivalent:

$$\neg(P \wedge Q), \qquad \neg P \wedge \neg Q, \qquad \neg P \vee \neg Q.$$

Solution

Problem 4

In this exercise we will the symbol $\oplus$ to mean *exclusive or.* In other words, $P \oplus Q$ means "P or Q, but not both."

(a) Make a truth table for $P \oplus Q$.

(b) Find a formula using only the connectives $\wedge$, $\vee$, and $\neg$ that is equivalent to $P \oplus Q$. Justify your answer using a truth table.

Solution

Problem 5

Find formulas involving the connectives $\wedge$, $\vee$ and $\neg$ that have the following truth tables:

(a)

P	Q	???
F	F	T
F	T	F
T	F	T
T	T	T

(b)

P	Q	???
F	F	F
F	T	T
T	F	T
T	T	F

Solution