Homework 1

To show that $p \oplus q \equiv (p \wedge \neg q) \vee (\neg p \wedge q)$ using truth table, where $\oplus$ is the XOR conjunction, we write the truth table below:

p	q	$\neg p$	$p \wedge \neg q$	$\neg p \wedge q$	$(p \wedge \neg q) \vee (\neg p \wedge q)$	$\neg q$	$p \oplus q$
True	True	False	False	False	False	False	False
True	False	False	True	True	False	True	True
False	True	True	False	False	True	True	True
False	False	True	True	False	False	False	False

Problem 1 *Given the truth table above, write the truth table for $p \vee q \wedge s$ and its negation*

p	q	s	$p \vee (q \wedge s)$	$\neg(p \vee (q \wedge s))$
T	T	T	T	F
T	T	F	T	F
T	F	T	T	F
T	F	F	T	F
F	T	T	T	F
F	T	F	F	T
F	F	T	F	T
F	F	F	F	T