Problem Set: Tautology and Contradiction

1. Show that $(p \vee q) \vee (\neg p)$ is a Tautology

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

$(p \vee q) \vee (\neg p)$ All truth table values are "T"

2. Show that $(\neg p \vee q) \wedge (p \wedge \neg q)$ is a Contradiction

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

$(\neg p \vee q) \wedge (p \wedge \neg q)$ All truth table values are "F"

3. Let t be a tautology and c be a contradiction
Show that $p \vee t \equiv t$ and $p \wedge c \equiv c$.

p	t	$p \vee t$
T	T	T
T	T	T
F	T	T
F	T	T

"$p \vee t$" and "t" contain same values

p	c	$p \wedge c$
T	F	F
T	F	F
F	F	F
F	F	F

"$p \wedge c$" and "c" contain same values