Homework 2

1) a I

p	q	r	¬p	¬q	p ∨ ¬q	q ∧ ¬q	r → q ∨ ¬q	p ∨ ¬q ∨ (r → q ∧ ¬q)
T	T	T	F	F	T	F	F	T
T	T	F	F	F	T	F	T	T
T	F	T	F	T	T	F	F	T
T	F	F	F	T	T	F	T	T
F	T	T	T	F	F	F	F	T
F	T	F	T	F	F	F	T	T
F	F	T	T	T	T	F	F	T
F	F	F	T	T	T	F	T	T

1) a II

p	q	r	p ∨ q	p ∨ r	r ∧ (p ∨ r)	p ∨ q ∧ r ∧ (p ∨ r)
T	T	T	T	T	T	T
T	T	F	T	T	F	F
T	F	T	T	T	T	T
T	F	F	T	T	F	F
F	T	T	T	T	T	T
F	T	F	T	F	F	F
F	F	T	F	T	T	F
F	F	F	F	F	F	F

1.b) Truth table 1.a I) Tautology
" " 1.a II) Neither

1.c) Not equivalent b/c their result doesn't match or not the same.

2) p = Barbara
q = Stew
r = Anne

a) $p \wedge \sim q$

b) $r \rightarrow \sim p \vee \sim q$

c) $\sim q \leftrightarrow p$

d) $q \wedge \vdash \sim p$

3.a)

A	B	C	$\bar{B}C$	$A + B\bar{C}$	$(A + \bar{B}C) + B$	$(A + \bar{B}C + B)\bar{B}$
1	1	1	0	1	1	0
1	1	0	0	1	1	0
1	0	1	1	1	0	0
1	0	0	0	1	0	0
0	1	1	0	0	0	0
0	1	0	0	0	0	0
0	0	1	1	1	0	0
0	0	0	0	0	0	0

contradiction

3.b) $(A + \bar{B}C + B) \cdot \bar{B}$

$A\bar{B} + \bar{B}C + B\bar{B}$ double negation rule

$A\bar{B} + BC + B\bar{B}$ Complements rule

$A\bar{B} + (BC + 0)$ Identity rule

$A\bar{B} + BC$

3.c) $A \cdot \bar{B} + BC$

A	B	C	$\bar{B}$	$A\bar{B}$	BC	$A \cdot \bar{B} + BC$
1	1	1	0	0	1	1
1	1	0	0	0	0	0
1	0	1	1	1	0	1
1	0	0	1	1	0	1
0	1	1	0	0	1	1
0	1	0	0	0	0	0
0	0	1	1	0	0	0
0	0	0	1	0	0	0

No they are not equivalent b/c their result doesn't ~~match~~ match