Discrete Math	Section	02
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Homework 1	Name	Cho, Youngkwan

HW 1-1

- show that $(p \wedge q) \to (p \vee q)$ is tautology.

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

Always true

HW 1-2

p	q	r	¬p	¬q	¬r	$p \vee \neg q$	$q \vee \neg r$	$r \vee \neg p$	$p \vee q \vee r$	$\neg p \vee \neg q \vee \neg r$	Q
T	T	T	F	F	F	T	T	T	T	F	F
T	T	F	F	F	T	T	T	F	T	T	F
T	F	T	F	T	F	T	F	T	T	T	F
T	F	F	F	T	T	T	T	F	T	T	F
F	T	T	T	F	F	F	T	T	T	T	F
F	T	F	T	F	T	F	T	T	T	T	F
F	F	T	T	T	F	T	F	T	T	T	F
F	F	F	T	T	T	T	T	T	F	T	F

$(p \vee \neg q) \wedge (q \vee \neg r) \wedge (r \vee \neg p) \wedge (p \vee q \vee r) \wedge (\neg p \vee \neg q \vee \neg r)$

HW 1-3

$P(x,y): x \cdot y = 0$
$Q(s,y): x/y = 1$

1. $\forall x \forall y \, P(x,y) = false$
2. $\forall x \exists y \, P(x,y) = true$
3. $\exists x \forall y \, P(x,y) = true$
4. $\exists x \exists y \, P(x,y) = true$

5. $\forall x \forall y \, Q(x,y) = false$
6. $\forall x \exists y \, Q(x,y) = false$
7. $\exists x \forall y \, Q(x,y) = false$
8. $\exists x \exists y \, Q(x,y) = true$

HW 1-4

1. $\forall x \forall y \, (a(x,y) \rightarrow b(x,y))$

2. $\forall x \forall y \, (a(x,y) \rightarrow a(y,x))$

3. $\forall x \exists y \, P(x,y)$

4. $\exists y \forall x \, P(x,y)$

5. $\exists x \exists y \, P(x,y)$

6. $\forall P(x,x)$

$a(x,y) = x$ and y are brothers
$b(x,y) = x$ and y are siblings
$P(x,y) = x$ loves y