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Section 1.1

12c. If q, then not r; if q is true then r is not.

This gives: if you miss the final examination, you do not pass the course

12f. You have the flu and you miss the final examination or you don't miss the final examination and you pass the course

14a $p \wedge \bar{q}$

14e $(p \wedge q) \rightarrow r$

Section 1.3

10 a) $[\bar{p} \wedge (p \vee q)] \rightarrow q$

$(\bar{p} \wedge p) \vee (\bar{p} \wedge q) \rightarrow q$

$\bar{p} \wedge q \rightarrow q$

p	q	$\bar{p} \wedge q$	$(\bar{p} \wedge q) \rightarrow q$
0	0	0	1
0	1	1	1
1	0	0	1
1	1	0	1

T

b)

p	q	r	$p \rightarrow q$	$q \rightarrow r$	$(p \rightarrow q) \wedge (q \rightarrow r)$	$p \rightarrow r$	$(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow (p$
0	0	0	1	1	1	1	1
0	0	1	1	1	1	1	1
0	1	0	1	0	0	1	1
0	1	1	1	1	1	1	1
1	0	0	0	1	0	0	1
1	0	1	0	1	0	1	1
1	1	0	1	0	0	0	1
1	1	1	1	1	1	1	1

T

10 c.

P	q	P→q	P∧(P→q)	P∧(P→q)→q
0	0	1	0	1
0	1	1	0	1
1	0	0	0	1
1	1	1	1	1

→ T

d)

P	q	r	P∨q	P→r	q→r	(P∨q)∧(P→r)∧(q→r)	(P∨q)∧(P→r)∧(q→r)→r
0	0	0	0	1	1	0	1
0	0	1	0	1	1	0	1
0	1	0	1	1	0	0	1
0	1	1	1	1	1	1	1
1	0	0	1	0	1	0	1
1	0	1	1	1	1	1	1
1	1	0	1	0	0	0	1
1	1	1	1	1	1	1	1

→ T

24 d)

$\forall x\, P(x)$ where x = "People" of domain ~~all people~~ Students

and $P(x)$ = X Can Solve Quad. eq's.

$\forall x\,(S(x) \rightarrow P(x))$ where x = "People" of domain all people,

$S(x)$ = x is in your class and $P(x)$ = X can Solve quadratic equations

24 e)

$\neg(\forall x\, R(x))$

$\exists x\, \neg R(x)$

$R(x)$ = wants to be rich

x = people where domain is students in your class

For a Domain of all people it will be:

$\exists x\, \neg(S(x) \rightarrow R(x))$ Where $S(x)$ = x is in your class

$\exists x\,(S(x) \wedge \overline{R(x)})$ = "There exists a person who is in your class and does not want to be rich."

12 b) $\neg C(\text{Rachel}, \text{Chelsea})$

12 e) $\forall x \left(C(\text{sanjay}, x) \oplus (x = \text{Joseph}) \right)$

30 c) $\neg \exists y (Q(y) \wedge \forall x \neg R(x,y))$

$\forall y [(\neg Q(y)) \vee (\exists x R(x,y))]$

30 e) $\neg \exists y (\forall x \exists z T(x,y,z) \vee \exists x \forall z U(x,y,z))$

$\forall y (\exists x \forall z \neg T(x,y,z) \wedge \forall x \exists z \neg U(x,y,z))$