Sec. 1.1

T, F, T, F

10

a) I didn't buy a lottery tckt this week

b) I bought a lottery ticket Or I won the million dollar Jackpot

c) If I buy a lottery ticket this week, then I will win the million Dollar Jackpot.

d) I bought a lottery ticket and I won the million dollar Jackpot

e) I will win the million dollar Jackpot if and only if I buy a lottery ticket.

f) If I do not buy a lottery ticket, I will not win the million Dollar Jackpot.

g) I did not buy a lottery ticket this week, and I did not win the million dollar Jackpot

h) I did not buy a lottery ticket this week, or I bought a ticket and won the million dollar Jackpot.

19.

a) F

b) T

c) T

d) T

24.

a) If you ask the bosses car, then you will get promoted.
b) If there are winds from the south, there will be a spring thaw.

29.

a)

Conv, I will ski tomorrow if it snows today.
Inv, if it doesn's snow today, I won't ski tomorrow
Cont, I won't ski tomorrow if it doesn't snow today.

b)

Conv, If there is going to be a quiz, I will come to class
Inv, I will not come to class if there is not going to be a quiz
Cont, If there is not going to be a quiz, I will not come to class

c)

Conv, If a positive integer has no divisors other than 1 and itself, it is a prime
Inv, A positive integer is not a prime if it has divisors other than 1 and itself.
Cont, If a positive integer has divisors other than 1 and itself, it is not a prime.

31.

a) 2^7

b) 2^4

c) 2^6

d) 2^4

34.

a)

p	~p	p→~p
T	F	F
F	T	F

b)

p	~p	p⊕~p
T	F	F
F	T	F

c)

p	q	p∨q	p⊕(p∨q)
T	T	T	F
T	F	T	F
F	T	T	T
F	F	F	F

d)

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

e)

p	q	~p	q→~p	p↔q	(q→~p)↔(p↔q)
T	T	F	F	T	F
T	F	F	T	F	F
F	T	T	T	F	F
F	F	T	T	T	T

f

p	q	~q	p↔q	p↔~q	(p↔q)⊕(p↔~q)
T	T	F	T	F	T
T	F	T	F	T	T
F	T	F	F	T	T
F	F	T	T	F	T

§ 1.3

1.

a)

p	p∧T
T	T

F	F

b)

p	p ∨ F
T	T
F	F

c)

p	p ∧ F
T	F
F	F

d)

p	p ∨ T
T	T
F	T

e)

p	p ∨ p
T	T
F	F

f)

p	p ∧ p
T	T
F	F

8

a) Kwame will not take a job in industry and go to graduate school.

b) Yoshiko Doesn't know Java or calculus

c) James is not younger

(thing)

d) Rita will hit more to Oregon and Washington.

11.

a) $p \wedge q \rightarrow p$

p	q	$p \wedge q$	$p \wedge q \rightarrow p$
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	T

∴ $p \wedge q \rightarrow p$ always T

b) $p \rightarrow p \vee q$

p	q	$p \vee q$	$p \rightarrow p \vee q$
T	T	T	T
T	F	T	T
F	T	T	T
F	F	F	T

∴ $p \rightarrow p \vee q$ always T

c) $\sim p \rightarrow (p \rightarrow q)$

p	q	$\sim p$	$p \rightarrow q$	$\sim p \rightarrow (p \rightarrow q)$
T	T	F	T	T
T	F	F	F	T
F	T	T	T	T
F	F	T	T	T

∴ $\sim p \rightarrow (p \rightarrow q)$ always T

T	T	T	T	T
T	F	T	T	T
F	T	T	T	T
F	F	T	T	T

$\therefore \sim P \to (P \to Q)$ always T

d) $P \wedge Q \to (P \to Q)$

P	Q	$P \wedge Q$	$P \to Q$	$P \wedge Q \to (P \to Q)$
T	T	T	T	T
T	F	F	F	T
F	T	F	T	T
F	F	F	T	T

$\therefore P \wedge Q \to (P \to Q)$ always T

e) $\sim(P \to Q) \to P$

P	Q	$\sim(P \to Q)$	$\sim(P \to Q) \to P$
T	T	F	T
T	F	T	T
F	T	F	T
F	F	F	T

$\therefore \sim(P \to Q) \to P$ always T

f) $\sim(P \to Q) \to \sim Q$

P	Q	$\sim(P \to Q)$	$\sim Q$	$\sim(P \to Q) \to \sim Q$
T	T	F	F	T
T	F	T	T	T
F	T	F	F	T
F	F	F	T	T

$\therefore \neg(p \to q) \to \neg q$ always $\top$