2.1

3) A) This number is even or odd. $p \vee q$
This number is not even $\sim p$
therefore, this number is odd q
B) My mind is shot or logic is confusing $p \vee q$
My mind isn't shot $\sim p$
Therefore, logic is confusing q

10) Let p be the statement "DataEndFlag is off" q the statement "Error = 0," and the r statement "Sum < 1,000"
A) DataEndFlag is off, Error = 0, sum < 1,000
$p \wedge q \wedge r$
C) DataEndFlag is off, Error $\sim$ 0 sum $\geq$ 1,000
$p \wedge \sim q \wedge \sim r$

25) Hal is a math major & Hal's sister is a cs major
$p \wedge q$
$\sim \vee \sim$
Hal isn't a math major or Hal's sister isn't a cs major

36) $1 > x \geq -3$
$1 \leq x$ or $x < -3$

41) $(p \wedge \sim q) \wedge (\sim p \vee q)$

Truth Table

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

2.2

20) Negations

A) If P is a sq, then P is a rect

$\sim$ (P q)

$P \wedge \sim q$

D) If N is prime, then n is odd or n is 2)

$\sim$ (P $\rightarrow$ (q $\vee$ r))

$\sim(p \rightarrow (q \vee r)) = p \wedge \sim(q \vee r)$

$= p \wedge \sim q \wedge \sim r$

22) Contrapositives

A) $\sim q \rightarrow \sim p$

D) $\sim(q \vee r) \rightarrow \sim p$

31) $p \rightarrow (q \rightarrow R) = (p \wedge q) \rightarrow R$

p	q	r	$p \rightarrow (q \rightarrow R)$	$\leftrightarrow$	$(p \wedge q) \rightarrow R$
T	T	T	T	T	T
T	T	F	F	T	F
T	F	T	T	T	T
T	F	F	T	T	T
F	T	T	T	T	T
F	T	F	T	T	T
F	F	T	T	T	T
F	F	F	T	T	T

48) $(p \vee \sim q) \Rightarrow (r \vee q)$

use $p \rightarrow q \equiv \sim p \vee q$

$\sim(p \vee \sim q) \vee (r \vee q)$

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

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

$\sim(\sim(\sim p \wedge q) \wedge (\sim r \wedge \sim q))$