Math 100 Assignment 3 Nov 3, 2011 (1)

Do any two from each section

3.1: 26, 30, 46, 48, 54
3.2: 18, 26, 48, 56, 62
3.3 30, 38, 59 58, 60, 68

each question worth 2 points
total asst /12

3.1 26. No rain fell in Southern California today.

Negation: Some rain fell in S.C. today

30. Some people have all the luck

Negation: All the people have not all the luck
or Nobody has all the luck

46. $\sim p \wedge \sim q$: She does not have green eyes and he is not 48 years old.

48 $\sim(p \vee q)$: It is not true that she does have green eyes or he is not 48

or: $\sim p \wedge q$: She does not have green eyes and he is 48
(but we hadn't done De Morgan's laws yet)

54. Either Jack plays the tuba or Chris collects videotapes, and it is not the case that both Jack plays the tuba and Chris collects videotapes

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

3.2 18. $\sim[(\sim p \wedge \sim q) \vee \sim q] = \sim[(\sim F \wedge \sim T) \vee \sim T] = \sim[(T \wedge F) \vee F]$

$= \sim[(F) \vee F] = \sim F = T$

truth value is T

26. $(\sim r \wedge \sim q) \vee (\sim r \wedge q)$

$= (\sim F \wedge \sim F) \vee (\sim F \wedge F) = (T \wedge T) \vee (T \wedge F)$

$= T \vee F = T$ truth value is T

48. $p \vee \sim q$:

p	q	~q	p ∨ ~q
T	T	F	T
T	F	T	T
F	T	F	F
F	F	T	T

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

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

62. I am not going or she is going

Negation: I am going and she is not going

3.3 30. $(s \wedge p) \rightarrow m$

If she has a snake for a pet and he trains ponies, then they raise monkeys

38 The play is cancelled and if it rains then I do not ride my bike.

$p \wedge (r \rightarrow \sim b)$

50. $(\sim p \wedge \sim q) \rightarrow (p \wedge \sim r) = (\sim F \wedge \sim T) \rightarrow (F \wedge \sim F)$

$= (T \wedge F) \rightarrow (F \wedge T) = F \rightarrow F = T$

truth value is T

58. $(\sim q \rightarrow \sim p) \rightarrow \sim q$

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

not a tautology

60 $(p \wedge q) \rightarrow (p \vee q)$

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

is a tautology

68. IF Ella reaches that note, she will shatter glass.

neg: Ella reaches that note and she does not shatter glass.