Quiz 3

MATH 100:11 Mathematical Concepts
Instructor: Tara Taylor

October 27, 2011

Name: SOLUTIONS

This quiz is double-sided!

1. Find the negation of the following statements: [3]

   (a) Every student in our class will pass Math 100.

   Some students in our class will not pass Math 100

   (b) Some quizzes are easy.

   All quizzes are not easy

   or No quiz is easy

   (c) It is October and there is no snow. $\sim(p \wedge q) \equiv \sim p \vee \sim q$

   It is not October or there is snow

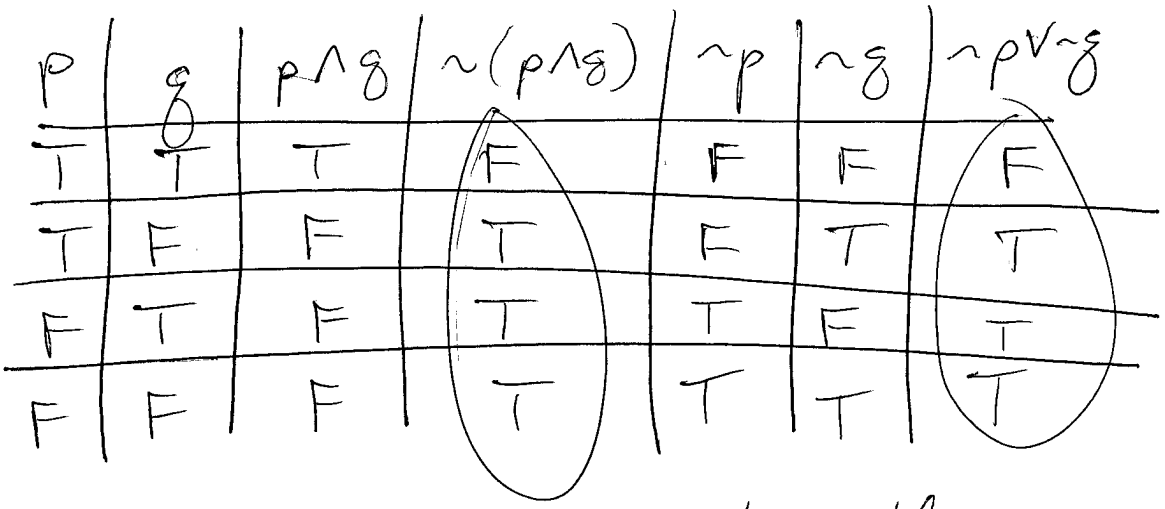
2. Let p be true, q be false and r be true. Find the truth values of [3]

   (a) $\sim q \vee \sim p$ $\quad \sim F \vee \sim T = T \vee F = T$

   (b) $\sim [(p \vee \sim r) \wedge (\sim q)]$

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

3. Construct a truth table to prove that $\sim (p \wedge q)$ is logically equivalent to $\sim p \vee \sim q$. Explain. [3]



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

$\sim(p \wedge q)$ & $\sim p \vee \sim q$ always have the same truth value so they are equivalent

4. Find the number of rows that there would be in the truth table for

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

Don't actually make the table! [1]

basic: p, q, s, r, t 5

So $2^5 = 32$ rows