Math 112 - Quiz 6

March 21, 2018

Name __key__

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (6 points) Use truth tables to show that $\sim(p \land q)$ is logically equivalent to $\sim p \lor \sim q$.

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

p	q	$\sim p$	$\sim q$	$\sim p \lor \sim q$
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

IDENTICAL TRUTH TABLES

$$\Longrightarrow \quad \sim(p \land q) \equiv \sim p \lor \sim q$$

2. (1 point) The problem above establishes one of DeMorgan's two laws. State the other one of DeMorgam's laws.

$$\sim(p \lor q) \equiv \sim p \land \sim q$$

3. (3 points) Use DeMorgan's laws to negate each statement.

(a) He does not have a car, and he does not have a bike.

HE HAS A CAR OR HE HAS A BIKE.

(b) She eats in the cafeteria, or she eats at Taco Bell.

SHE DOES NOT EAT IN THE CAFETERIA AND
SHE DOES NOT EAT AT TACO BELL.