

Math 112 - Quiz 5

September 29, 2016

Name key

Score _____

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

1. (4 points) Determine whether $(p \rightarrow q) \vee (p \vee q)$ is a tautology, a self-contradiction, or neither.

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

It is a
TAUTOLOGY.

2. (4 points) Show that $\sim(p \rightarrow q)$ is logically equivalent to $p \wedge \sim q$.

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

Same TRUTH TABLE

$$\Rightarrow \sim(p \rightarrow q) \equiv p \wedge \sim q$$

3. (2 points) Determine the truth value of the following statement: "A triangle has four sides if and only if $5^2 = 13$." Briefly explain your reasoning.

THE STATEMENT
IS TRUE : $F \leftrightarrow F$ IS T.