

Math 1303 - Math in the Liberal Arts

Quiz #2 - 2005.08.29

Solutions

1. Use a truth table to determine whether or not the following two statements are equivalent:

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

First we begin with the truth table for the statement $\sim q \rightarrow (p \wedge r)$:

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

Next we compute the truth table for $\sim (p \vee r) \rightarrow q$:

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

Notice that the final column in the above two tables do not match, thus the two statements are not equivalent.