

Solution: Quiz 1

- Determine whether the following argument form is valid or not by using the truth table.

If it is Friday, then I am happy. If I am not happy, then it rains or it is not Friday. It rains. Therefore, I am not happy or it is Friday.

Solution Let p be “It is Friday”; q be “I am happy,” and r be “It rains.”

If it is Friday, then I am happy.	$p \rightarrow q$
If I am not happy, then it rains or it is not Friday.	$\sim q \rightarrow (r \vee \sim p)$
It rains.	r
\therefore Therefore, I am not happy or it is Friday.	$\therefore \sim q \vee p$

Truth table:

						Premises		Conclusion		
p	q	r	$\sim p$	$\sim q$	$r \vee \sim p$	$p \rightarrow q$	$\sim q \rightarrow (r \vee \sim p)$	r	$\sim q \vee p$	
T	T	T	F	F	T	T	T	T	T	←-- critical row
T	T	F	F	F	F	T	T	F		
T	F	T	F	T	T	F	T	T		
T	F	F	F	T	F	F	F	F		
F	T	T	T	F	T	T	T	T	F	←-- critical row
F	T	F	T	F	T	T	T	F		
F	F	T	T	T	T	T	T	T	T	←-- critical row
F	F	F	T	T	T	T	T	F		

Notice that the columns 7, 8 and 9 are the premises and the critical rows are rows 1, 5 and 7 . Since there is a critical row (row 5) that has false conclusion, then this argument is **invalid**. ■