

1. (5 points) Construct a truth table for the statement: $(p \wedge (\sim q)) \vee (q \rightarrow r)$

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

2. (1 point each) Given the statements: p : I spent time studying, and q : I got a good grade on the exam

(a) Write the conditional statement relating p to q in words.

$(p \rightarrow q)$: If I spent time studying then I got a good grade on the exam.

(b) Write the converse in words.

$(q \rightarrow p)$: If I got a good grade on the exam then I spent time studying.

(c) Write the inverse in words.

$(\sim p \rightarrow \sim q)$: If I did not spend time studying then I did not get a good grade on the exam.

(d) Write the contrapositive in words.

$(\sim q \rightarrow \sim p)$: If I did not get a good grade on the exam then I did not spend time studying.

(e) Indicate which of these statements above are logically equivalent to each other. You do not need to prove your answer.

(a) and (d) are logically equivalent.

(b) and (c) are logically equivalent.