Math 2534   Solution Quiz 1   Name:

Show all work and be neat. No INK. No electronic devices of any kind.

Problem 1: (20pts) Prove the following Identity and justify all assertions.
Theorem: For all propositions p and q, \[(p \land q) \land \sim q \equiv q\]

Proof:
\[\sim (p \land q) \land \sim q \rightarrow q \equiv\]
\[\sim \sim (p \land q) \land \sim q \equiv\]
\[\sim (p \land q) \lor \sim q \equiv\]
\[\sim (p \land q) \lor q \equiv\]
\[q \lor q \equiv\]
\[q \equiv\]

Therefore \[\sim (p \land q) \land \sim q \rightarrow q \equiv q\]

Problem 2: (30pts) Put the following arguments into symbolic argument form and determine if the argument is valid. Briefly justify your conclusions.

Define R to be the statement “It rains”.
Define B to be the statement “We go bird watching”.

A) If it rains we will not go bird watching. We did go bird watching, therefore it did not rain.

Argument form:
\[R \rightarrow \sim B\]
\[B\]
\[\therefore \sim R\]

This is a valid argument by the Contrapositive Law That \[R \rightarrow \sim B \equiv B \rightarrow \sim R\]

B) If it rains we will not go bird watching. We did not go bird watching, therefore it did rain.

Argument form:
\[R \rightarrow \sim B\]
\[\sim B\]
\[\therefore R\]

This argument is not valid. It is the converse error which means that the necessary condition does not determine the sufficient condition.
Pledge your work here:__________________________________________________________
___________________________________________________________________________