

## MTH 309

### Additional Problems for Sections 1.1 and 1.3

Show that the following propositions are tautologies.

1.

$$((p \rightarrow q) \wedge \neg q) \rightarrow \neg p$$

2.

$$(((p \wedge q) \rightarrow (s \leftrightarrow t)) \rightarrow [r \vee u]) \wedge \neg[r \vee u] \rightarrow \neg[(p \wedge q) \rightarrow (s \leftrightarrow t)]$$