CSci 1302 Assignment 3

Due Wedn., September 28st in class

Problem 1 (20 points). Prove the following using deductive proofs (not truth tables).

1. $(p \vee q) \rightarrow r$
   $\therefore \sim r \rightarrow \sim p$

2. $\sim (p \rightarrow q)$
   $p \rightarrow r$
   $\therefore r$

3. $p \wedge \sim r$ (use proof by contradiction)
   $q \rightarrow r$
   $\therefore \sim (p \rightarrow q)$

4. $(p \wedge q) \leftrightarrow r$
   $\therefore (r \rightarrow p) \wedge (r \rightarrow q)$

5. $(p \vee q) \leftrightarrow r$
   $\therefore (p \rightarrow r) \wedge (q \rightarrow r)$

Problem 2 (6 points). Which of the following two arguments are valid (if any)? Justify your answer the following way: use deductive proofs or truth tables to prove a valid argument; show at least one row of the truth table to disprove an invalid argument.
You might want to guess at the answer first, and then check your intuition.

A. $(p \vee q) \rightarrow s$
$(q \vee r) \rightarrow s$
$\therefore q \rightarrow s$

B. $(p \wedge q) \rightarrow s$
$(q \wedge r) \rightarrow s$
$\therefore q \rightarrow s$

Problem 3 (4 points). Exercises 6 and 8 p. 55.