CSci 1302 Assignment 3
Due Wed., Sept. 20 in class

Problem 1 (6 points). Exercises 10, 11, 12 p. 41.

Problem 2 (6 points). Exercises 42, 44 p. 43.

Problem 3 (20 points). Prove the following using deductive proofs (not truth tables).

1. \((p \lor q) \rightarrow r\)

\[ \therefore \sim r \rightarrow \sim p \]

2. \(\sim (p \rightarrow q)\)

\[ p \rightarrow r \]

\[ \therefore r \]

3. \(p \land \sim r\) (use proof by contradiction)

\[ q \rightarrow r \]

\[ \therefore \sim (p \rightarrow q) \]

4. \((p \land q) \leftrightarrow r\)

\[ \therefore (r \rightarrow p) \land (r \rightarrow q) \]

5. \((p \lor q) \leftrightarrow r\)

\[ \therefore (p \rightarrow r) \land (q \rightarrow r) \]

Problem 4 (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 the answer first, and then check your intuition.

A. \((p \lor q) \rightarrow s\)

\[ (q \lor r) \rightarrow s \]

\[ \therefore q \rightarrow s \]

B. \((p \land q) \rightarrow s\)

\[ (q \land r) \rightarrow s \]

\[ \therefore q \rightarrow s \]