Due Monday, September 18

These are the problems from the textbook assigned as homework #1 for the benefit of students who don’t have a copy of the book. The assignment is

Section 1.1: 1bce, 2a (explain), 4, 10a
Section 1.2: 6, 10c
Section 1.3: 1ce, 5cd

Section 1.1:
1. Construct a truth table for each of the following compound statements:
   (b) \((p \land q) \lor ((\neg p) \rightarrow q)\)
   (c) \(\neg (p \land (q \lor p)) \leftrightarrow p\)
   (e) \((p \rightarrow (q \rightarrow r)) \rightarrow ((p \land q) \lor r)\)
2. (a) If \(p \rightarrow q\) is false, determine the truth value of \((p \land (\neg q)) \lor ((\neg p) \rightarrow q)\). Explain your reasoning.
4. Determine the truth value for
   \[ [p \rightarrow (q \lor (\neg r))] \lor [r \leftrightarrow ((\neg s) \lor q)] \]
   when \(p, q, r,\) and \(s\) are all false.
10. (a) Show the statement \(p \rightarrow (q \rightarrow r)\) is not logically equivalent to the statement \((p \rightarrow q) \rightarrow r\).

Section 1.2
6. Prove that the statements \((p \land (\neg q)) \rightarrow q\) and \((p \land (\neg q)) \rightarrow \neg p\) are logically equivalent. What simpler statement is logically equivalent to both of them?
10. (c) Express the statement \(p \rightarrow q\) in disjunctive normal form.

Section 1.3
1. Determine whether or not each of the following arguments is valid:
   (c) \(p \rightarrow q\)  \(r \rightarrow q\)  \(r \rightarrow p\)  \(\neg p\)
   (e) \(p \rightarrow (\neg q)\)  \(r \rightarrow q\)
5. Determine the validity of each of the following arguments. If the argument is one of those listed in the text, name it.
   (c) If I stay up late at night, then I will be tired in the morning. I am not tired this morning.
       I did not stay up late last night.
   (d) If I stay up late at night, then I will be tired in the morning. I did not stay up late last night.
       I am not tired this morning.