Expected Learning Outcome (LO): Students will be able to

LO 2: apply set algebra

LO 3: apply elementary logic to solve problems.

Do all of the following problems. Each problem is worth 5 points. The TA/grader will pick 10 of these problems randomly and grade only those 10 problems. **You must write the answers to the questions in the same order in which they appear here.**

1. Using truth tables, prove the following logical equivalences.
   
   (a) \( \neg(p \land q) \equiv \neg p \lor \neg q \)
   
   (b) \( \neg(p \lor q) \equiv \neg p \land \neg q \)
   
   (c) \( (p \rightarrow q) \land (p \rightarrow r) \equiv p \rightarrow (q \land r) \)
   
   (d) \( (p \rightarrow q) \lor (p \rightarrow r) \equiv p \rightarrow (q \lor r) \)

Section 1.7: 10, 14, 20, 26, 32

Section 1.8: 2, 4, 14, 16

Section 2.1: 10, 24, 26, 32 (parts a and d only), 44

Additional problems for your to practice. Do not turn in solutions to these problems.

Pick some of the logical equivalences in table 6 and 7 and prove them using truth tables

Read Examples 12 and 13 in Section 1.6.

Section 1.7: 9, 13, 19, 27, 33, 35

Section 1.8: 7, 9, 13, 19

Section 2.1: 4, 5, 12, 14, 17, 20, 33