Fall 2025

CSCI 2011 Assignment 1: Propositional Logic

Due Tuesday 9/16/2025 at 11pm

Answer all 6 questions worth 2.5 points each for a total of 15 points

Question1:

16. Let p, q, and r be the propositions

p: You get an A on the final exam.

q: You do every exercise in this book.

r: You get an A in this class.

Write these propositions using p, q, and r and logical connectives (including negations).

a) You get an A in this class, but you do not do every exercise in this book.

b) You get an A on the final, you do every exercise in this book, and you get an A in this class.

c) To get an A in this class, it is necessary for you to get an A on the final.

d) You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class.

e) Getting an A on the final and doing every exercise in this book is sufficient for getting an A in this class.

f) You will get an A in this class if and only if you either do every exercise in this book or you get an A on the final.

Question 2:

20. Determine whether each of these conditional statements is true or false.

a) If $1 + 1 = 3$, then unicorns exist.

b) If $1 + 1 = 3$, then dogs can fly.

c) If $1 + 1 = 2$, then dogs can fly.

d) If $2 + 2 = 4$, then $1 + 2 = 3$.

Question 3:

22. For each of these sentences, determine whether an inclusive or, or an exclusive or, is intended. Explain your answer.

a) Experience with C++ or Java is required.

b) Lunch includes soup or salad.

c) To enter the country you need a passport or a voter registration card.

d) Publish or perish.

Question 4

30. State the converse, contrapositive, and inverse of each of these conditional statements.

a) If it snows tonight, then I will stay at home.

b) I go to the beach whenever it is a sunny summer day.

c) When I stay up late, it is necessary that I sleep until noon.

Question 5:

30. Show that $\neg p \to (q \to r)$ and $q \to (p \lor r)$ are logically equivalent.

Question 6:

10. For each of these compound propositions, use the conditional-disjunction equivalence (⬀ **Example 3**) to find an equivalent compound proposition that does not involve conditionals.

a) $\neg p \to \neg q$
b) $(p \lor q) \to \neg p$
c) $(p \to \neg q) \to (\neg p \to q)$