Directions

1. **This is an INDIVIDUAL assignment; do your own work!** Submitting answers created by other people is NOT doing your own work.

2. **Start early!** Getting help is much easier n days before the due date/time than it will be n hours before.

3. The questions that have section numbers are found in the Rosen text, available via D2L. Note that “(w,z)” is asking you to complete parts w and z only, not parts x and y.

4. Write complete answers to each of the following questions, in accordance with the given directions. Create your solutions as a PDF document such that each question is on a separate page; all parts of a multi-part question may be on the same page. Show your work, when appropriate, for possible partial credit.

5. If you have questions about any aspect of this assignment, help is available from the class staff via piazza.com and our office hours.

6. When your answers are ready to be turned in, do so on gradescope.com. Be sure to assign pages to problems after you upload your PDF. Need help? Visit https://help.gradescope.com/ and search for “Submitting an Assignment.”

7. **Solutions submitted after the first five minutes of class on the due date will not be accepted.**

---

1. (4 points) Section 1.5, 32(b,d)

2. (4 points) For the English statement below, first convert the statement to logic, then use Generalized and/or regular De Morgan's Laws to move the negation as far inside the expression as possible, and finally express the result as a conversational English sentence that also keeps the negation 'inside.' Your result should mean the same as the original, but cannot have the same wording.

   - There do not exist any students who adore CSc 245.

3. (10 points) Using our logical constructions for “exactly one” and “exactly two” expressions, convert these English sentences to logic such that the meanings are preserved.

   (a) Exactly one astronaut was the first to step on the Moon.
   (b) At most two donuts are frosted. (Reminder: “At most two” is half of the ”exactly two” expression.)
   (c) Precisely two planets have orbits within Earth’s orbit.

(Continued . . .)
4. (2 points) Determine the form (deductive or inductive) of these short arguments.

(a) The last eight Congresses haven’t passed a real budget. The next one won’t, either.
(b) It’s September in Tucson. If you don’t eat your ice cream sandwich quickly, the ice cream will melt all over your hand.

5. (4 points) Section 1.6, 4(a,e)
6. (4 points) Section 1.6, 10(c,e)
7. (4 points) Section 1.6, 14(b,d)
8. (6 points) Section 1.6, 16(c,d)
9. (2 points) Section 1.6, 18
10. (2 points) Section 1.6, 20(a)
11. (4 points) Section 1.6, 28
12. (4 points) Section 1.6, 30