Math 260 Assignments for Spring 2026

for Tuesday, January 20

1. Read the syllabus carefully and browse the web page for this course.

for Wednesday, January 21

1. Read Section 1.1 through Example 1.2, making note of any questions that arise.

for Friday, January 23

1. Read Section 1.1. Although some of the terms here may be new to you, they are not difficult and we will use them quite a bit in the next few weeks. There is no need to memorize all of these terms (especially those in Theorem 1.3) but you certainly need to be familiar with the connectives, truth tables, and the language associated with conditional statements (such as converse and contrapositive).
2. This is the first of many reading assignments. You need to learn how to read mathematics textbooks and (eventually) articles in mathematical journals; this is an important aspect of being prepared for higher mathematics. This type of reading is an acquired skill and takes plenty of patience to learn. You cannot skim, you cannot gloss over details, you may need to pause to think or write out some details, you may need to read a sentence or paragraph multiple times before it is clear, or you may get completely stumped. If you do get stuck at some point, do not just quit reading; put a question in the margin and keep going, trying to make as much sense as you can of what follows. Sometimes your questions will be answered later (either in the text or with a flash of insight). However, if your questions are not resolved, it is important that you ask for help. Also, you need to be certain that you are not fooling yourself into thinking that you actually understand when you really do not.
3. Do exercises 1, 2a, 2d, 3h, 3k (the letters on exercise 3 refer to the parts of Theorem 1.3), 4, and 5 in Section 1.1. We can discuss the reading and exercises in class if necessary.
4. Turn in solutions for exercises 5a and 5d from Section 1.1. (Note that the instructions to consider different universes are relevant for exercise 5a: real numbers versus complex numbers.) Write your solutions very carefully and provide reasons for your answers of true or false. Your solution should include the original statement, along with the converse and the contrapositive, all written clearly. This is your first opportunity to show me the quality of your written work so it would be in your best interest to get off to a good start.
5. In the reading and in the exercises, you will notice that some sequences and series appear. These concepts are covered in Math 126 (Calculus II), but many students have difficulty understanding them. It is not imperative that you review sequences and series for this course, but you should take the time to understand the simple examples that appear from time to time in this textbook.

for Monday, January 26

1. Read Section 1.2. Remember to read carefully and to make certain you understand each and every statement. For this section, you should probably pause to reflect at times and create further examples. If you have any questions, write them down and ask them in class, via email, or during office hours.
2. You should work on all of the exercises in this section; each exercise should only take a few minutes.
3. Turn in solutions for exercises 2, 5, and 6d from Section 1.2. For exercises 2 and 5, you should include the verbal statement along with the symbolic statement. This means that you need to copy some version of the exercise before writing the solution. For exercise 6d, you will need a complete sentence or two, along with an algebraic equation, for your explanation. Once again, think about how you are writing and presenting mathematics.

for Tuesday, January 27

1. We will not meet as a class on this day.

for Wednesday, January 28

1. Read Section 1.3 carefully and ponder the implications of quantifiers and their negations. Read the biography of De Morgan; you should be "nerdy" enough (in a good way :)) to determine the year in which he was born. Do you have friends or relatives who can make a similar claim?
2. Be prepared to discuss exercises 1, 2, 3, 4, and 7 in Section 1.3. This means that you should do the exercises and be able to explain your solution to other students in the class.
3. Turn in solutions for exercises 7b, 7c, and 7e from Section 1.3. You do not have to use symbols and quantifiers to negate these definitions but you may use them if you find them helpful. Really work on the wording of the negations to make sure they are clear and be certain that only simple sentences are negated. Since the terms in 7c are probably unfamiliar, you do not need to give any examples, but you should provide examples for the other two definitions. This means to give an example that illustrates the definition and one that illustrates the negation of the definition. In fact, it is a good idea to come up with a variety of examples to help clarify the concept. The purpose of these definitions is not so much that you grasp them fully but that you are exposed to some common terms from higher mathematics and that you can work with them symbolically even if you are unclear as to their meaning.

for Friday, January 30

1. Read Section 1.4. You may need to read very slowly in a few places and think carefully about the implications of the order of the quantifiers.
2. Be prepared to discuss exercises 1, 2, 3, and 4a–e from Section 1.4. Make sure you have clear reasons to support your answers for these exercises.
3. Turn in solutions for exercises 4b and 4e from Section 1.4, wording your negated definitions carefully. Rather than provide examples, use your negated definitions to carefully prove each of the following:
   i) the sequence $\{\sqrt[3]{n}\}$ is not bounded;
   ii) the function $f(x) = \begin{cases} \cos(\pi/x), & \text{if } x \neq 0; \\ 0, & \text{if } x = 0; \end{cases}$ is not continuous at 0.

for Monday, February 2

1. Read Sections 1.5 and 1.6. Since sets appear in almost all areas of mathematics, it is important to acquire a firm understanding of them and their associated notation. The concepts of pairwise disjoint, partition, and power set (defined in Section 1.6) are important.
2. Do exercises 1abcfg, 2, 4ef (the (e) and (f) refer to the parts of Theorem 1.10), 5, and 8 in Section 1.5 and exercises 1, 2, 3, 6, and 10 in Section 1.6. Most of these should be go quickly.
3. Turn in solutions for exercises 1.5.5, 1.6.2, and 1.6.6. Your proof for exercise 1.5.5 should look something like (as in really look like this: format, aligned = signs, reasons, etc.)

$$\begin{aligned} (A \setminus B) \cup (B \setminus A) &= (A \cap B^c) \cup (B \cap A^c) && \text{(Exercise 3)} \\ &= && \text{(Theorem 1.10 e)} \\ &\vdots && \text{(3 more steps, give reasons)} \\ &= && \text{(De Morgan's Laws)} \\ &= (A \cup B) \setminus (A \cap B) && \text{(Exercise 3)} \end{aligned}$$

for Tuesday, February 3

1. We will review Chapter 1, so be prepared to ask questions about anything that is confusing you thus far. We will also work on negating some definitions that appear in other math courses.

for Wednesday, February 4

1. Read Section 1.7 and work to understand this new concept. This is the first section in which proofs of results play a more prominent role so study them carefully.
2. Do exercises 1, 2, 3, 8, and 9 from Section 1.7. Even if a result seems "obvious", make certain you can write out the details to show how it works.
3. Turn in solutions for exercises 8 and 9a in Section 1.7. For exercise 1.7.8, be extremely thoughtful so that fractions and division do not appear in your solution; there are easy ways to prove the transitive property that do not involve fractions. The reason that no fractions should appear is due to the fact that the universe involves integers. In fact, this equivalence relation is used to **define** the rational numbers.

for Friday, February 6

1. Read the introduction to Chapter 2 and Section 2.1. Since we are beginning proofs in earnest now, read very carefully and make note of any questions or confusions that arise.
2. Be prepared to discuss exercises 1–11 from Section 2.1.
3. Turn in a carefully written two column logic proof (as in the text) for the following:

   Prove $P \Rightarrow Q$; given R, $(P \wedge R) \Rightarrow S$, $\neg Q \Rightarrow \neg T$, $S \Leftrightarrow T$.
4. Turn in solutions for exercises 8 and 12 from Section 2.1. For exercise 8, you can closely imitate the examples in the text; do include the parenthetical remarks this one (and probably only) time. There are several ways to solve exercise 12; feel free to use previous results and/or exercises in this section by referring to them by number. Most likely, you will have to rewrite your proof for this exercise at least once if you want it to read well.

for Monday, February 9

1. Read Section 2.2 carefully. Although $a|b$ is a simple notion and one that is familiar to you, it is very important that you learn how to work with this concept at a deeper level. Note that this concept does not involve fractions or rational numbers or division in the usual sense. Recall that definitions are like formulas; you need to know them inside and out. Just as you can immediately tell someone the derivative of x^2, you should be able to readily quote (essentially verbatim) the definition for $a|b$.
2. Be prepared to discuss exercises 1–8 in Section 2.2. For Exercise 2, use the definition of $n|(2n+3)$ and then some factoring to learn something about n. The proofs requested in exercise 3 should follow easily from the definitions. For exercise 4, consider using part (f) of Theorem 2.7, which is a very powerful result. Finding a has nothing to do with the proof; it is just an interesting aspect of the numbers.
3. We will spend some time reviewing for the test tomorrow.

for Tuesday, February 10

1. Our first test is scheduled for this day. It will cover all of Chapter 1 as well as Sections 2.1 and 2.2.

for Wednesday, February 11

1. There is no assignment for this day; we will cover Section 2.3 in class.