Instructions

Submit solutions to the required problems below (p. 2) to the `Problem Set 11` slot on D2L by 11:59 pm on Wednesday, April 16. No late work will be accepted, and no work will be accepted via email. Please format your solutions as follows; submissions that do not follow these guidelines will receive a score of 0.

1. Submit only a single pdf to D2L. Use a scanning app (such as CamScanner) or a pdf editor (such as `combinepdf.com`) to assemble your work.

2. Scans should be legible and clearly and consistently lit; photographs of work that include background material (your desk, your legs) are unacceptable.

3. Submit problems in the order that they are assigned, clearly number your problems, and distinguish between successive problems, e.g., by drawing a line across your page to indicate a break between problems or starting new problems on new pages.

4. Check that you have submitted the correct assignment to the correct D2L slot by downloading your submission and making sure that you can open the resulting pdf and that all pages open in the correct orientation (portrait, not upside-down).

Here are some tests for sufficient "detail" in your solutions.

Test for detail 1. *If you return to these solutions sometime in the future (say, while studying for an exam), you should be able to understand your former work completely with minimal effort from the future you.*

Test for detail 2. *If you show these solutions to a classmate who has paid attention in class up to the time of the assignment but not attempted the assignment, that classmate would also be able to understand your work completely with minimal effort from them.*

Test for detail 3. *If you return to your work an hour after you have written it and try to read it aloud, your narration should be complete enough, your notation clear enough, and your calculations thorough enough that you have no hesitation or confusion.*

Additional recommended problems are listed on p. 3. Solving these problems is essential for your long-term mastery of course material and may also help with short-term difficulties on the required problems.

Required Problems to Submit to D2L

- Day 35 in the daily log: Problem 35.4
- Day 36 in the daily log: Problems 36.3, 36.11, 36.12
- Day 37 in the daily log: Problem 37.13
- Section 6.1 in the textbook: 2, 3, 4, 9, 10, 21, 32 [assume that $\mathbf{u}$ is an eigenvector for 0, $\mathbf{v}$ is an eigenvector for 3, and $\mathbf{w}$ is an eigenvector for 5]

Candidates for Vocabulary Questions

The quiz will ask you to give definitions, examples, and, possibly, nonexamples, of any of the vocabulary listed at the start of each day in the daily log from Days 1 through 37. Not every day has required vocabulary, and not all definitions and terms within the daily log are candidates for the quiz. To encourage review of vocabulary for the final exam, I will be asking more questions about concepts from earlier in the course, as well as more current ones.

I have specified in the daily log which terms need nonexamples; not all do. You can probably find easy examples and (as needed) nonexamples within the daily log and the textbook, and I encourage you to memorize the ones that you find simplest and most meaningful and accessible. Your definitions should be so precise that I should be able to use them to decide whether any mathematical object I ever encounter does or does not meet the properties under consideration.

Here is how this might look in practice. Suppose that this was Calculus I and one of the vocabulary terms was "continuous function." I might phrase the question as "What does it mean for a function f on the interval (a, b) to be continuous at the point x_0 in (a, b)? I hope that your precise answer would be that $\lim_{x\to x_0} f(x) = f(x_0)$. I might then ask you for an example of a continuous function defined on the interval $(0, 1)$, and I hope you would take the easy way out and say something like $f(x) = 0$ with the added remark that all constant functions are known to be continuous. Last, I might ask you for an example of a function that is not continuous (discontinuous) on $(0, 1)$—this is the *nonexample*—and there you probably would go piecewise, say $f(x) = 0$ for $0 < x < 1/2$ and $1/2 < x < 1$ and $f(1/2) = 1$. You would wrap up that nonexample by stating that since $\lim_{x\to(1/2)^-} f(x) = \lim_{x\to(1/2)^-} 0 = 0$ and $\lim_{x\to(1/2)^+} f(x) = \lim_{x\to(1/2)^+} 0 = 0$, the limit $\lim_{x\to 1/2} f(x)$ exists and equals 0, but $f(1/2) = 1 \neq 0$. That is, $\lim_{x\to 1/2} f(x) \neq f(1/2)$, and so f cannot be continuous at 1/2.

Recommended Problems for Extra Practice

- All (!)- and ($\star$)-problems in the daily log

- Section 6.1 in the textbook: 1, 5, 6, 8 [for (b), consider the cases $\lambda = 0$ and $\lambda \neq 0$ separately], 11, 25