

**Instructor:** Henry Towsner  
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**Office:** MS 5634  
**Office Hours:** Wednesday, 1:00-3:00; Friday, 10:30-11:30  
**Course Website:** <http://www.math.ucla.edu/~hpt/3a.2.10f/>  
**Midterm Exams:** October 20th and November 17th

1. Textbook

- (a) The textbook for this class is C. Neuhauser, *Calculus for Biology and Medicine*, 3rd Ed., Prentice Hall.
- (b) Since this is a new edition, it may be cheaper to obtain a used copy of the second edition. The editions are fairly similar, so this should not be a problem. However there may be small differences, particularly when it comes to homework problems. *If you purchase the older edition, it is your responsibility to make sure you are doing the right homework problems.*
- (c) The bookstore also sells a solutions manual, which includes detailed solutions to some of the problems from the textbook. This book is purely for your benefit as a study aid, if you find it useful.

2. Using the textbook

- (a) This course will cover part of chapter two, and chapters three through five of Neuhauser
- (b) An approximate course schedule is available online at <http://www.math.ucla.edu/ugrad/courses/math3abc/3Aoutline.shtml>
- (c) You should make sure to read the material being covered *in addition to* attending lecture. Some people find it more useful to read the textbook before the lecture, some find it more useful to read the textbook after. Figure out which works for you.

3. Lectures

- (a) Math classes often require different notetaking strategies than other subjects, and (for the 70% of you who are entering college), college classes require different notetaking strategies than high school courses
- (b) Math courses need to make a lot of use of the board to write down technical matter—formal definitions, intermediate steps simplifying an equation, and so on. But, for example, formal definitions are already in your textbook, so it may not be efficient to copy the same thing word for word during lecture!
- (c) Conversely, not everything important will be written on the blackboard. Some of the most important parts of lecture are the informal explanations: why is the definition the way is, what trick do we use

at this step of a problem, how do we know which method is appropriate. These informal ideas often don't get written on the blackboard, but that doesn't mean they aren't important.

- (d) Often we'll have to work an equation during lecture for a number of steps. Don't worry if you don't follow every last step right on the spot. But do make sure you can fill in the steps with a little bit of thought on your own; if, after thinking about it for a bit on your own, you still can't figure out what's going on, make sure to ask me or someone else to be sure you understand it.
- (e) Relatedly, when I'm solving an equation on the blackboard, especially a sample problem, I try to do as much each step as I want you to be able to do on your own (see "Background Skills", below). For example, from one equation to the next I might factor out one term while cancelling a second. Many students, especially at the beginning of the course, have difficulty recognizing that the two equations mean the same thing, and that's fine. In your own work, you should write as many intermediate steps as need to get the answer without making mistakes. However being able to make several simplifications at once, and most especially, the ability to have some idea what the result of a simplification looks like without having to write it down is valuable skill, and the lecture is a chance to practice that skill.
- (f) The converse to the above: sometimes when working a problem, I make a mistake, often the same mistakes you're prone to make in your own work, like forgetting a negative sign or miscopying a number. If you think that's happened, don't hesitate to ask!

#### 4. Homeworks

- (a) Generally there will be a homework assignment each week; it will typically be assigned on Monday and due in class the following Monday. (There may be some exceptions around exams.)
- (b) *NO LATE HOMEWORKS WILL BE ACCEPTED* If you do not anticipate being able to make it to class, find a friend to turn it in for you, or drop it off at my office, MS 5634. (Slip it under the door, or in the container on the door, if I'm not in.)
- (c) Every homework should include: your name, student ID, and your section. If your homework has multiple pages it **MUST BE STAPLED**. If any of these directions are not followed, the homework might get misplaced, or damaged, or lost, and if that happens it will be treated as if you didn't turn it in.
- (d) The two lowest homework grades will automatically be dropped.
- (e) You are encouraged to work on the homework in groups, figuring out the right approach and comparing answers. However you must write up your solutions independently of each other.

- (f) A homework assignment will consist of both “starred” and “unstarred” problems. The unstarred problems will mostly be odd numbered problems which have answers in the back of the textbook. The starred problems will usually be even numbered problems (or problems not from the textbook) which do not.
- (g) Only the starred problems will be graded, and only the starred problems need to be turned in.
- (h) Don’t assume that only doing the assigned is sufficient. The textbook generally has whole blocks of problems, of which the corresponding homework assignment will only choose a couple. If, after doing an unstarred problem, you’re still not comfortable enough to get the starred one right, do some of the other unstarred ones!

## 5. Exams

- (a) There will be two midterm exams and one final exam.
- (b) The midterms will be on Wednesday, October 20th and Wednesday, November 17th.
- (c) The midterms will be fifty minutes long, and will take place during the class period.
- (d) The final exam will be on Tuesday, December 7th, from 8:00-11:00, in a location to be announced.
- (e) At each exam, you are allowed to bring *one* 3”x5” notecard. You may write whatever you want (on both sides) of the notecard.
- (f) NO CALCULATORS WILL BE PERMITTED DURING EXAMS
- (g) There will be no make-up exams. However (see the grading policy below), if you do miss a midterm, we’ll drop it from your grade.
- (h) Typically, I aim to have the median score on an exam be between 50% and 70%, and I try to make the midterms long enough that only a few students finish. So don’t be discouraged if you can’t get all the questions on an exam.
- (i) I aim for the final exam to be around the length of two midterms, which means I expect it to take a bit more than two hours for most people.

## 6. Grading

- (a) There will be two grading schemes for the course. The first is:  
Homework 20%, Midterms 45%, Final Exam 35%  
The second is:  
Homework 20%, Higher Midterm 30%, Final Exam 50%
- (b) Your grade will be based on whichever method gives you the higher score. (We’ll just pick the better score automatically once everything’s graded)

- (c) Note that even if you struggle with one midterm, if you do better on the final we'll just drop it
  - (d) All the values will be averaged together and then curved. The math department issues a breakdown of what the overall curve should look like, which I will follow unless the situation is quite exceptional. A bit over 20% of the class will get some kind of  $A$ , and a bit over 50% will get an  $A$  or  $B$ .
7. (a) Most of you are familiar with some family of rules for simplifying answers. In this class we have a very simple rule for what you have to simplify: nothing, unless the problem specifically tells you to
- (b) The following are all acceptable forms for answers in this class:  $\frac{1}{\sqrt{2}}$ ,  $\frac{3x}{7y+2} - \frac{2xy}{7y^2+2y}$ ,  $6 + \frac{4}{8} + 2$
- (c) That doesn't mean to never simplify. Simplifying complicated equations is sometimes *useful*, especially in the middle of a problem, where it may mean doing a lot less work in the rest of the problem; but it's a matter of experience and judgement to know when it's easier to simplify, and when it's easier not to. But the final form of your answer, in either a homework assignment or an exam, can have square roots on the bottom, can have uncanceled terms, can have uncombined terms, and so on.

#### 8. Background Skills

- (a) Calculus builds heavily on previous math classes you've taken. Many of you may be rusty on some of those methods; if so, you'll want to use the start of the quarter, when things are going slowly, to brush up on them.
- (b) Some things to make sure you remember: what a function is, what the vertical line test is, what the inverse of a function is. What the exponential and logarithm functions are, what their graphs look like, and what their basic properties are (for instance, how could you simplify  $e^{\ln x}$ ,  $e^{xy}e^{-x}$ , and  $(\ln xy) - (\ln y)$ ). The six trig functions, what they mean, what their graphs look like; the inverse trig functions and what their graphs look like; the major identities for trig functions, like adding angles, doubling angles, and so on.
- (c) Many of you have taken some amount of calculus before. Fortunately, studies have been done on the difference in grades between freshmen calculus students who have taken calculus before, and those who haven't. Answer: none at all.
- (d) For those of you who haven't taken calculus before, this means you shouldn't worry that it's a disadvantage, because it isn't.
- (e) For those of you have, don't get too comfortable. A lot of the material will look familiar, but we may cover it differently or in more depth than you saw it before.

## 9. Learning Calculus

- (a) Many students think of math as being about learning a bunch of algorithms: given a problem, identify the right formula, plug in numbers, write down the answer. Math classes, including this one, have an element of that, because the only way to get used to the way mathematics behaves is to work through lots of examples. But that's the smaller part of the class, and students who focus only on that will find the class extremely difficult.
- (b) Mathematics is ultimately about ideas. The purpose of this class is for you to *understand* the basic ideas of calculus. You should learn what derivatives, integrals, and other important ideas we introduce *mean*, and be able to apply them even to *novel* situations.
- (c) This means it's not enough to just do the homework. In a college level math class, you should be actively *thinking* about the ideas. You need to be asking yourself why we use the methods we use. You should understand why every formula we use works; when you don't understand one, it's your responsibility to make sure that gets fixed.
- (d) For some problems we cover in this class (and even more so in 3B), there won't be a simple algorithm you can plug in to find out the answer. You might have several different possible approaches, and there may be no way to find the right one other than by good judgement, or by continuing to try different things until one of them works. Some problems may require a little bit of ingenuity to figure out the right answer. Don't be surprised or discouraged; this is what makes calculus a topic worth learning. If everything could be done by a computer program, we'd just teach you how to use the computer program and skip all the rest!

## 10. Help

- (a) Those of you entering college will find that you have much more responsibility for your own education than you did before. If you're struggling in this class, *you* have to be proactive about getting the help you need.
- (b) However, there is a lot of help available.
- (c) I'll hold regular office hours on Wednesday from 1:00-3:00 and Friday from 10:30-11:30. My office is MS 5634; since the Mathematical Sciences building is hard to navigate, the easiest way to find it is to follow the signs to the "visualization portal". My office is across the hall from that.
- (d) Even when I don't have scheduled office hours, I'm often in my office and available to answer questions. Any time my office door is cracked open, that means I'm available.

- (e) Inevitably, in a large class, there will be a few students who have conflicts with the scheduled office hours. I'm happy to schedule extra times to meet with students who can't make the main office hours. Send me an e-mail, or talk to me about it after lecture.
- (f) You also have sections, where you meet with your TA once a week. These will be more focused on practical issues about solving problems than the class.
- (g) And, your TA will announce their own office hours.
- (h) The SMC (Student Math Center) is located in MS 3974, and is open from 10:00 to 3:00 Monday through Thursday. Graduate students are there to provide additional help.

#### 11. Disability Accommodations

- (a) If you have a disability that requires some kind of accommodation, you should contact the Office for Students with Disabilities as soon as possible. They can be a little slow processing requests, especially at the start of the year, and you'll want to make sure yours gets through before the first midterm.