

Math 107, Spring 2015: Midterm I Study Guide

The first midterm exam will take place on Monday 2 March. **There will be two different rooms for the exam and these will be announced soon.** It will be 50 minutes long, starting *promptly* at 10:00am, and 11am, respectively. **You will *not* be allowed to use a calculator, notes or books of any kind.**

The exam will cover sections §7.3, 7.4, 12.1, 12.2 and 12.3. This week we will just wrap up 12.3 and do more examples. On Friday, we will just review.

If you have any questions or concerns, please email me or come to see me. I will have my usual office hours, but also extra office hours on Friday afternoon. I will announce the exact time and place soon.

Study guide

You should be comfortable with all the examples from class and the homework questions you had to do on the previous homework assignments and the current one that you have to hand in on Friday. In addition to these, I will give you some practice problems on the material that we will be discussing this week on Monday. You will not have to hand those in. It would probably be a very good idea to do the current homework early, so that you have time over the next week to ask questions about it, to do the practice questions I will give on the newer material where I think you need more practice, and also to review your old homework and figure out where you are having trouble.

If by any chance you have not done the homework by yourself until now, I advise you to redo it all by yourself now.

Syllabus

Here are some things you should be comfortable with.

- integrals of rational functions
 - what a rational function is;
 - how to recognize an improper rational function and use long division to write it as the sum of a polynomial and a proper rational function;
 - how to write down the partial fraction decomposition of a proper rational function (make sure you really understand how this works in general);
 - how to integrate rational functions (for this you have to be comfortable with integration techniques, so all the practice from the examples from class and homework

is crucial; I suggest you review from class and homework how to do the integrals of the functions that show up a lot such as $\frac{1}{x}$ and $\frac{1}{1+x^2}$)

- improper integrals
 - what kinds of improper integrals there are;
 - the limit definitions of all of them (you have understand which limit you have to take for each kind of improper integral, so trying to understand the definitions first is a very good idea)
 - which improper integrals are defined as a sum of limits (and know that these are convergent only if both limits in the sum exist)
 - how to compute improper integrals straight from the limit definition
 - when you can apply the comparison test and be able to use it to decide whether an improper integral is convergent or divergent.
- probability:
 - the multiplication principle;
 - what permutations and combinations are and the difference between;
 - what a sample space and an event is and how to set these up in examples;
 - what properties a probability function satisfies, including the 3 propositions we have proved in class (we will see examples this week of how they come in in practice to make probability computations easier);
 - how to calculate the probability of an event when all the outcomes in the sample space are equally likely;
 - what conditional probability is;
 - what independent events are (we will talk about this this week);
 - how to compute the probably of two events both happening;
 - Bayes's formula (you do not have to memorize the general formula, but you should be able to use it in examples) – I will give you practice questions on this after Monday's class when I will do examples of it.