

Fall 2011
Math 371
Advanced Calculus
Black 139, 9:00 - 9:50 MTThF

Instructor: Dr. Jim Bisgard

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Office Hours: MTThF 10:00 - 10:50, W 9:00 - 9:50, and by appointment.

Required Text: Bryant, Victor; Metric Spaces: Iteration and Application; Cambridge University Press

There is also a course pack, which consists of Chapter 1 of Ken Ross' book. If you are enrolled in Math 471, you already have this chapter, and so do not need to buy the course pack.

Course Goals: The goal of Math 371 is to approach the real numbers from an axiomatic point of view. What does this mean? Basically, we will make a list of some basic properties of the real numbers (the axioms), and then we will see what properties must follow. For example, why is $\frac{1}{(\frac{1}{x})} = x$? As it turns out, it will follow from our axioms. In addition, we will see what property distinguishes the real numbers from the rational numbers, as well as explore some of the consequences of this property. (Among them, we will prove that $\lim_{n \rightarrow \infty} \frac{1}{n} = 0$.) Next, we will explore the idea of metric space, again from the axiomatic point of view. In addition, we will give some applications of metric spaces (using iteration).

1. Number systems and their axioms (naturals, integers, rationals, reals and complexes)
(However, we won't build the real numbers up from scratch!)
2. What distinguishes reals from rationals?
3. What is a metric space?
4. Closed, Complete, Compact
5. Fixed Points

1 Grades/Exams/Homework

- Grades

Grades will be calculated using the following weighting system:

Homework: 50%;

Exams: 50% total, broken up as follows: 25% for the mid-term and 25% for the final.

- Homework

You'll get a homework assignment every Tuesday (except the first week!) which will be due on the Thursday of the following week. You may use/ask/talk to whatever/whoever you'd like, as long as you say what resources you used. However, you must write your solutions up in **your own words** to hand in. **DO NOT** wait until the day before homework is due to start working on it. There won't be a large number of problems, but they will take some time to do!

- Exams

There will be two exams: a mid-term and a final. They will be take-home exams, and you'll have a week to work on them. In contrast to the homework, I want you to work by yourself on the exams. The mid-term will be handed towards the end of October, and the Final Exam will be handed out on December 1 and due Wednesday, December 7.

- Expectation for Homework and Exams

Your homework and exams should be written up neatly and legibly, using complete sentences where appropriate. (For example, I don't expect you to write $(a + b)^2 = a^2 + 2ab + b^2$ using complete sentences!)

2 Legalese/Fine Print

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Bouillon 205 or dssrecept@cwu.edu or 963-2171.