Foundations of Real Analysis
MATH 6101–090
Fall Semester 2006

Classroom: Fretwell 107
Time: Monday 5:00–7:45 PM

Professor: Dr. David Royster
Office: COED 227
Office Hours: Monday 4:00 – 4:45, or by appt
Office Phone: 704–687–8817
email: droyster@email.uncc.edu
URL: http://education.uncc.edu/droyster

Class Homepage: http://education.uncc.edu/droyster/courses/fall06
Class Homework Discussion Page: http://edukate.uncc.edu/droyster/discussion

Text: *No text required. Notes will be distributed by the web*.

Other: You will want to have access to a TI Graphing Calculator. It can be an 83, 83+, 84, 84+, 89, 200 or Voyage. If you want to insist on using an 85 or an 86, I can usually assist you. If you insist on an HP or a Casio, you may be out in the stream in your own boat.

Number of Class Meetings in the Semester: 15 classes

Prerequisites: Consent of the Department

Objective: "Axiomatic and historical development of the real and complex numbers; rigorous development of limits and continuity of functions, intermediate and extreme value theorems." Basically, we will study the mathematics that underpins Algebra II and Precalculus that you may teach in high school.

Tests: We will have homework, classwork and a final. The schedule indicates that as of now they don't have the least idea about how they are going to arrange the final exam schedule, but I am guessing that it will be Monday, December 11 from 6:00 – 8:00 PM. We are required to meet during this time by University policy.

Grades: Your course grade will be determined by the homework, the classwork, and the final.

Purpose: We are going to take a look at the fundamental mathematics that provides the foundation for the courses you teach in high school. We will be looking at the real and complex numbers, decimal notation (maybe not even in base 10), sequences and series of real numbers, and FUNCTIONS – polynomial, exponential, logarithmic, trigonometric and beyond! We will be asking questions such as "Is 0.99999… = 1?", "Are all functions 'nice functions'?", "What are some of the properties of the real numbers that make things work the way that they do?"

We will proceed up to the edge of the "Calculus Precipice" – but won't jump until next semester.

Class Policies: There are several policies to which you must pay heed.

i) Attendance is extremely important in a class of this level. If you feel that you do not need to attend this class, you are in the wrong classroom—go find a course in which you will be challenged and in which you will learn something new.

ii) You are allowed one unexcused absence and one excused absence in this course. Any absences beyond this will have an impact on your grade for the course.

iii) You have been given a day-by-day course syllabus. You NOW KNOW when we have class and when we do not have class. I expect you to be here on all days that we have class.

iv) I will not accept late homework. If for some reason you miss a class and it is excusable, see me as soon as possible to discuss the situation.

v) Academic dishonesty will be punished severely. Be cognizant of the *Code of Student Academic Integrity*.

vi) Be on time to class and remain until dismissed. Do not leave in the middle of class.

Inclement Weather Policy: The UNC Charlotte Weather Hotline is (704) 687–2877. In the event that we have *inclement weather*[1] but the University does not close or cancel classes, and I have to cancel the class, a message to that effect will be left on my voicemail (704–687–4543) and I will email every member of the class (if I have access to email).

If you feel that travel during *inclement weather* would be hazardous, then try to inform me as soon as safely possible. You will be given the opportunity to make up any work missed or due on that day. As always, each student is responsible for any work missed and will be expected to get the notes from another student or the web.

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[1] Snow, ice storm, high and dangerous winds – not heavy frost.

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Instructions for Homework Page Discussion

1. Open your web browser and point it to: http://edukate.uncc.edu/droyster/discussion
   You will see the following screen.
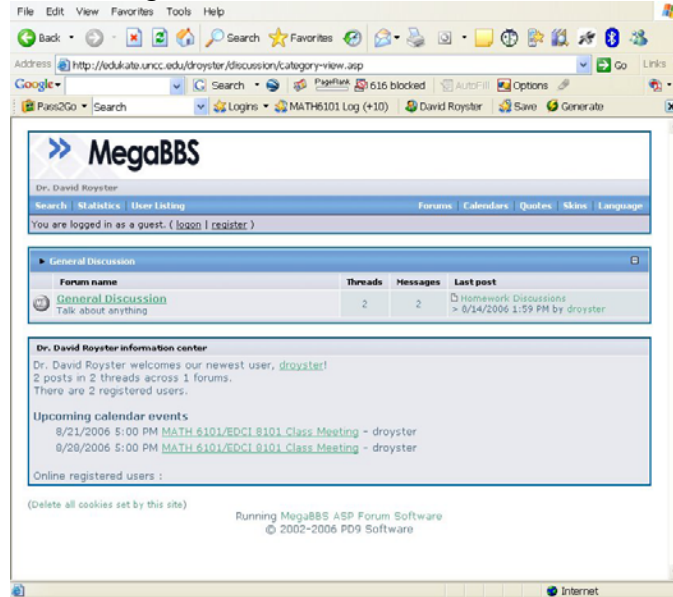
2. The first time you go to the webpage you need to register, so click the register link in the top left corner. This will bring you to the following page.
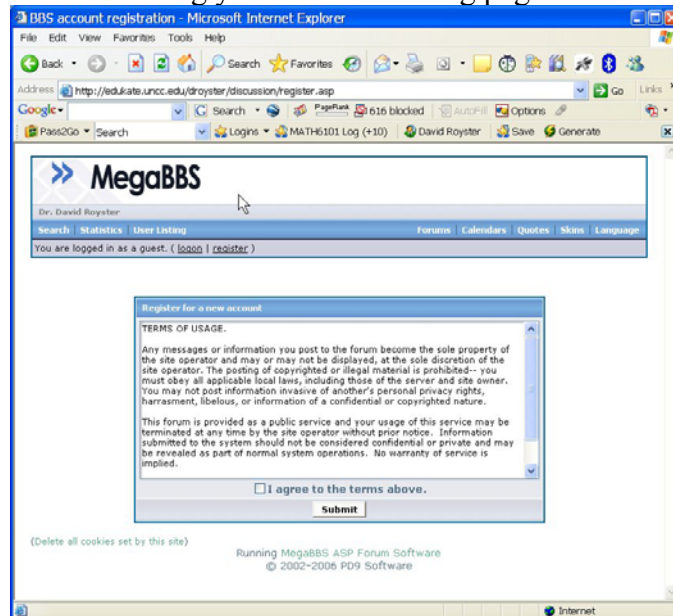
3. You need to click on the "I agree to the terms above" and then click on Submit.
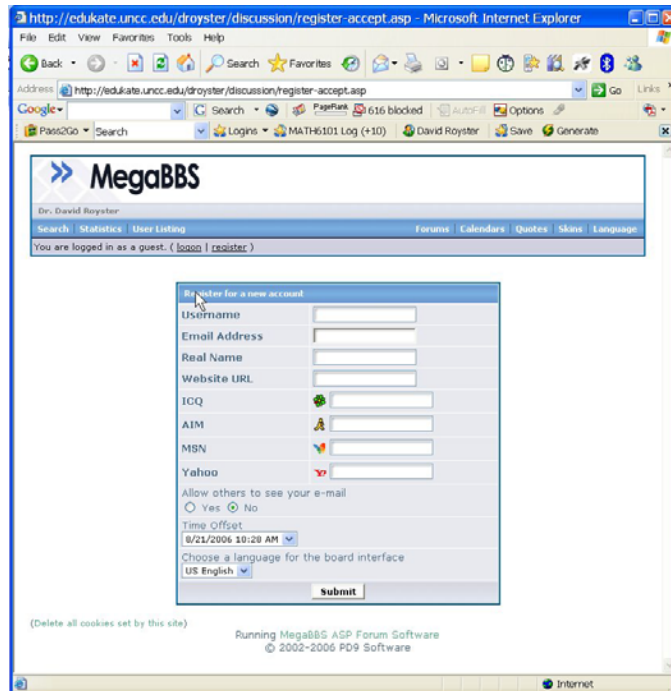
4. You need to choose and input a Username, and complete the blanks for Email Address and Real Name. We do not need the remaining information, so you may leave it blank. When you click on Submit, you will see the following screen:
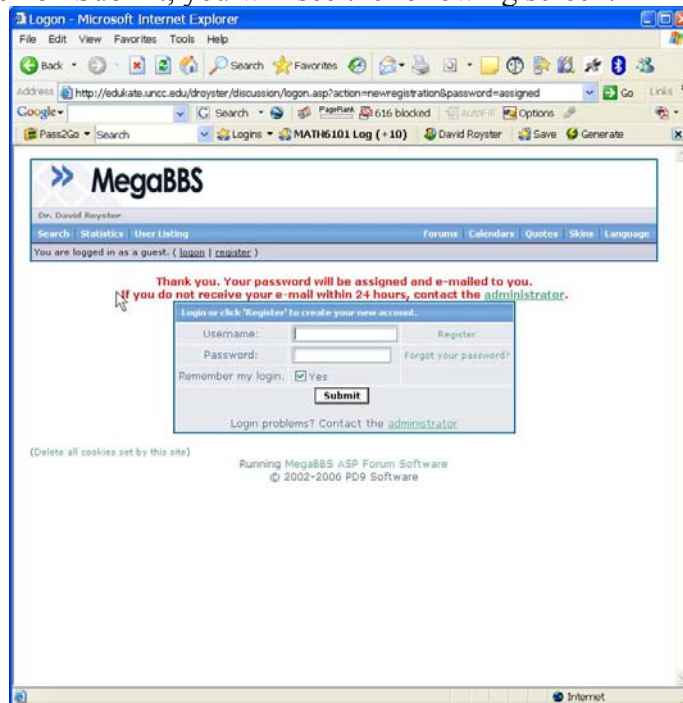
5. I will receive the notification and will add you to the list as soon as I get the request. The password will be emailed back to you. Once you logon to the system, you will be able to change your password to something that you want.
6. We will discuss all homework problems online via this BBS. This will allow everyone to see everything that has been asked and answered regarding the homework problems. If

we have a discussion offline, I will ask that the person (or persons) involved log onto the BBS and add the discussion to the list.

There are no questions about the material that you should feel uncomfortable in putting on the BBS. We are all here to learn and we learn in many different ways and through many different questions. Questions that are personal in nature (such as requesting grades or asking about how points were allocated) should not be discussed here and we will deal with those separately.

We will have to come to some agreement about the manner in which we type mathematics in the BBS. We will discuss this in class and we will modify it as we need to during the course. While using the Rich Text Editor will allow you to insert some symbols($\leq \geq \sum \infty \sqrt{} \approx \neq \prod \cap \partial$ B Γ Δ E Z H Θ Λ Ξ Π Σ Φ Ψ Ω α β γ δ ε ζ η ι κ λ μ ν ξ ο π ρ ς σ τ υ φ χ ψ ω) and subscripts, x_2, and superscripts, x^2; it does not allow us to input other mathematical symbols. Also, some readers may not like the symbols that the Rich Text Editor uses.

Typing Mathematical Symbols

Let us begin by using the following convention when typing mathematics into emails and posts:

a^b	`a^b`		$\int f(x)dx$	`Int(f(x),x)`
a_n	`a_n`		$\int_a^b f(x)dx$	`Int(f(x),x=a..b)`
α	`alpha`		$\sum x_n$	`Sum(x_n,n)`
β	`beta`		$\sum_{k=1}^{n} z_k$	`Sum(z_k,k=1..n)`
π	`pi`		$\sqrt{x}$	`sqrt(x)`
∞	`infty`		$\sqrt[p]{z}$	`root(p,z)`
$\leq$	`lte` or `<=`		$\prod_{k=1}^{n} x_k$	`Product(x_k,k=1..n)`
$\geq$	`gte` or `>=`			
$\neq$	`ne` or `><`			

We will add others as needed.