CALCULUS

LECTURE NOTES BY JAMES S. COOK

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1. INTRODUCTION TO MY NOTES

I typically lecture fairly close to the content of these notes. These notes are intended to be supplemented by your text. In other words, make sure to understand these notes before you spend a great deal of time in the text. These notes tend to focus more on the examples and methods I think are most important for you to learn. The text is to fill whatever gap I may leave in these notes, and to provide homework problems.

Let me alert you to some common mathematical shorthands I may use without thinking at various points in lecture.

Notation	**Meaning of Notation**
§	section
∃	there exists
∄	there does not exist
w.r.t.	with respect to
l.h.s.	left hand side
r.h.s.	right hand side
$x \in B$	the element x is inside the set B
$A \implies B$	A implies B
$A \iff B$	A and B are equivalent statements
∴	therefore
∀	for all
≡	definition
≈	approximately
eqⁿ	equation
solⁿ	solution
$\mathbb{N}$	natural numbers; 1,2,3,…
$\mathbb{Q}$	rational numbers
$\mathbb{R}$	real numbers
$\mathbb{C}$	complex numbers
$\mathbb{Z}$	integers
$\mathbb{R}^2$	the Cartesian plane

These notes are the second version of my lecture notes. The first version was hand written. These are fairly close to those notes but I hope to improve upon those notes. I have borrowed from a variety of sources. Primarily I have followed James Stewart's *Calculus and Concepts* or his *Calculus* text. However, in dealing with certain technical issues I consult a number of

calculus texts to gain perspective on how calculus authors approach the subject. My intention is that these lecture notes go beyond the typical calculus text in both in terms of sophistication and breadth. However, I make every effort to provide numerous basic examples for the struggling student. Calculus is for the most part centuries old, but I am convinced there is a better way to teach the subject. I believe that there are as many approaches to the topic as there are students, I hope I have not inadvertently left you out in my approach. I am always interested in constructive criticism. If something is bugging you, let me know as soon as possible so I can fix it before the course is done (if possible).

Often my colleagues have questioned the wisdom of posting my lecture notes before I lecture. Some fellow teachers assume that this means that the attendance falls precipitously with this practice. I have not found this is the case. The truth is that no matter how long I prepare these notes my students always bring new questions. The discussion surrounding such questions may well be more useful than anything in these notes, so if you miss class regularly then that puts you at a disadvantage. Also, I write these notes with the intention of leaving no stone unturned. This is not to say that my tests will reflect the sophistication of certain parts of my notes. In lecture I make a special effort to prepare you for my tests, I try to point the student to the parts of my notes which are of central importance. Besides all this, I also have been known to offer bonus points in class for especially insightful questions and or comments. So, come to class if you can.

All of this said, I will try to alert you to the fact that certain examples are challenge examples.