

Sabbatical (Spring 2002) Report
Manny Cabral

In an academic year and including the summer terms, I teach approximately 66 % (6 sections out of 9) of the Calculus I and Calculus II courses offered at LCC. Being one of the principal Math 205 and Math 206 faculty, I am aware of the need that students at this level have for additional resource materials on many difficult topics. During my sabbatical, I created over 80 mathematical documents (see attached) for both the Calculus I and Calculus II sequences. Also developed were six new animations which highlight various problem types on the topic of related rates, one of the major application sections on the derivative.

Initially I planned on working with a new software program called Calculus Wiz. It was a highly promising tool and mathematica based software program. While it can serve as a good student tool for some review and overview of topics, I found it too limiting in terms of the more involved kind of demonstrations that I wished to create. Thus, I purchased a complete version of Graphing Calculator 3.1. While it is a broad usage mathematics program, I was able to adapt the mathematical and function based animation program to suit my needs. These animations, while simple, were very complex and time consuming to set up using various low and upper end functions and piecewise functions with restricted domains. Over a period of several months, I had created nearly fifteen animations, and then my computer's hard disk crashed. I was able to reconstruct six of them and plan to recreate the rest, time and energy permitting in the near future.

In Fall 2002 and Spring 2003, I used my ongoing calculus courses as the testing ground for my new collection of resource materials. I have to admit that the results in my classes gradewise were way beyond my own expectations. My four sections of Calculus I and II achieved the highest overall final grade averages of all calculus courses I have taught before. I can honestly attribute much of the student success to the more detailed and student friendly nature of the calculus supplements with which they were provided.

Students personally informed me that they shared these handouts with their peers at UH Manoa, and one Calculus II student

said that he had sent one particular handout on derivative/integral formulas to his brother on the mainland. The mainland brother's comment was "why don't the faculty here give us handouts like this which we can really use?" Needless to say, comments like these have certainly confirmed the usefulness of these new products.

Initially, I planned on concentrating on the Calculus I materials only, but decided to expand my efforts fairly evenly across both Calculus I and II. I am attaching a folder of all the various materials I have created. Many were done using the equation editor and MSWORD, while others were created using EXCEL spreadsheets and the GRAPHING CALCULATOR 3.1 or a combination of all of the mentioned. Since the majority of the LCC calculus students come through my classes, they had access to these materials both Fall and Spring semesters. I plan on creating a few more documents before I distribute my initial collection to the math lab for general purpose use.

My sabbatical was most valuable to me personally, but even more importantly it was valuable to my students who have since benefited from these new resource materials. My future goals are to continue to refine and augment my current collection and to work more diligently on creating new animations, which are the more time intensive projects.

Sincerely,

Manny Cabral, May 2003

Attachment Folder