# Mathematica for Vector Calculus: Getting Started with the Computer (Math Dept Labs Version)

This document will provide you with the basic information to aid you in logging into the computer and starting Mathematica on the computer. It will also explain how to download the first lab assignment, which will introduce you to Mathematica and explain how to use basic commands.

## Logging Onto the Computer

The first thing that you must do in lab is to login to your account with the username and password given to you by your instructor. To do this, type in your username at the `Username` prompt, hit return and then type in your password at the `Password` prompt and hit return. You should now have a screen with a toolbar on the left hand side and a shell window in the middle. This shell window is where you can enter commands; whenever you are asked to type something at the prompt, you should type it in this window.

Once you have logged in, you should immediately change your password by typing

```
passwd
```

at the prompt. You will be asked for your old password, then asked to type your new password twice. You should change it to something that you remember, although simple passwords will be rejected by the system. A good password should contain punctuation symbols, numbers, and/or capital letters.

If you forget your password, neither your TA nor your lecturer can reset it; we'll have to send you to the Systems Staff's office.

You are now ready to explore Mathematica.

## Getting In and Out of Mathematica

**Running Mathematica.** To run Mathematica type `mathematica` at the prompt in a shell window. This will open a Mathematica notebook in which you can enter Mathematica commands, receive Mathematica output responses, type in text, etc.

You can use Mathematica in this lab whenever it is open. You may also use it in any IT computer lab; see their website (www.itlabs.umn.edu) for a current list of their facilities. Your instructor for this course is from the math department, and therefore in most cases will not be able to answer questions about IT Labs.

To exit Mathematica, select **Quit** from the **File** menu.

## An Introductory Mathematica Notebook

**Getting a Mathematica Notebook.** Your first laboratory assignment will be to work through Lab 1A, which contains a brief introduction to Mathematica. You can download the Mathematica file (called a "notebook") using the web browser Mozilla. To start the browser, either type `mozilla` at a command prompt.

Alternatively, you can click on the large Netscape icon in the toolbar to run that browser. We encourage you to run Mozilla instead; Netscape is essentially an older version of Mozilla, and some of the web pages in this course may not display

correctly with Netscape. (That said, if something doesn't work with Mozilla... try it with Netscape!)

Next, type in the URL

`http://www.math.umn.edu/math2374`

Scroll down and click on the link for Lab 1A. This will bring the file (which is named `Lab_1A.nb`) up as a page on Mozilla. In order to use it as a Mathematica notebook, you will need to save it to a file. Under the **File** menu, select **Save As**. Then select **OK** in the pop up box. The file `Lab_1A.nb` should now be in your home directory.

To confirm that you have copied the file `Lab_1A.nb` into your directory, type:

`ls`

at the shell prompt. This lists all of the files in your directory. You should see `Lab_1A.nb` in this directory.

Before you start reading the lab, you must also download the file `math2374.nb` from the same web page. This file contains code to make the labs work properly. Instructions for using it are in Lab 1A.

Now you can open the notebook in Mathematica by choosing **Open** under the **File** menu. If you choose **New** under the same menu you can open another notebook where you can type commands while reading the lab. The most important thing that you should remember is that Mathematica is **VERY SYNTAX SENSITIVE**. If you get an error, most likely you have made a mistake in your syntax. Check capitals and parentheses very carefully.

**Saving a Mathematica Notebook.** When it comes time to end your Mathematica Session, you may want to save your notebook with any changes that you have made. Since saving Graphics output takes up a tremendous amount of disk space you should **NOT** save notebooks which have graphics output. You only have a certain amount of disk space for your account; if you use too much, then you will not be able to login. We can help you fix this, but you will likely lose some of your data.

To save a notebook without output you must first select **Delete All Output** from the **Kernel** menu and then you can save the notebook by using the **File** menu and selecting **Save As**. The next time that you open your notebook, you can easily restore the output by evaluating the entire notebook.

**Printing.** You are not required to print anything out in this course. All graphs and calculations should be carefully transferred to your lab write up by hand. Make sure you take very good notes (clearly label all graphs, etc.) while you are in the lab so that your lab write up will be understandable. If you do wish to use printouts from Mathematica, your TA should be able to help.