

Math 235: Calculus Lab

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Whitman College

Week 1

What is Calculus Lab all about?

- ▶ How to use Maple to help us do mathematics.

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- ▶ How to use $\text{\LaTeX}$ to help us communicate mathematics.

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- ▶ How to use Maple to help us do mathematics.
- ▶ How to use $\text{\LaTeX}$ to help us communicate mathematics.
- ▶ General info about computer, experience with Linux OS.

You may run all of this on your own computer- More later!

How will the lab run?

- ▶ Each week, meet for 50 min (be on time!)
Some group work.
- ▶ Expectation: Abt 2 hrs outside of class/week (avg).
- ▶ Help: Lab consultants staff lab in evening.
- ▶ Check the lab schedule (it will also be posted online).

How will the lab be graded?

- ▶ Weekly assignments. (Together, counts as 1 lab)
- ▶ Some “labs”: Mini projects that may take a couple of weeks. (Equally weighted)
- ▶ A short talk using “Beamer” (software for presentations; 20% total)

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Save Friday, May 16th for presentations (this would normally be our final exam time).

To start today, we should go through the handout and set up the desktop:

- ▶ Be able to log in and out.
- ▶ Change your password
- ▶ Modify the Launchpad (to include Terminal, Firefox, Maple, TeX-maker).
- ▶ You might also look at the operating system for a few minutes:
 - ▶ Dash Home (Button on upper left)
 - ▶ System Settings (Button on upper right)
 - ▶ Ubuntu Software Center
 - ▶ “Ubuntu One” is the cloud.

Introduction to $\text{\LaTeX}$

- ▶ Not WYSIWYG
- ▶ Designed for mathematics; you type typesetting commands.
- ▶ Process for creating a LaTeX document:
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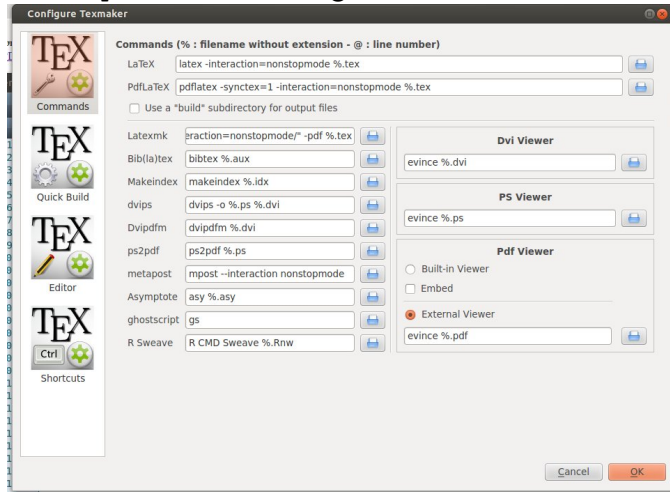
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- ▶ We'll use TeX-Maker as our editor.

First, let's take a look at TeX-maker.

Go to Options -> Configure Texmaker



Configure Texmaker



Commands



Quick Build



Editor



Shortcuts

Quick Build Command

- ☐ LaTeX + dvips + View PS
- ☐ LaTeX + View DVI
- ☒ PdfLaTeX + View PDF
- ☐ LaTeX + dvi2pdf + View PDF
- ☐ LaTeX + dvips + ps2pdf + View PDF
- ☐ LaTeX + Asymptote + LaTeX + dvips + View PS
- ☐ PdfLaTeX + Asymptote + PdfLaTeX + View Pdf
- ☐ LatexMk + View PDF

☐ User : (% ; filename without extension)

`ex %aux|latex -interaction=nonstopmode %tex|latex -interaction=nonstopmode %tex|xdvi %dvi`

wizard

(the commands must be separated by '|')

☐ Don't launch a new instance of the viewer if the dvi/ps/pdf file is already opened

Cancel

OK



Now we'll put together our first document- Follow along from the handout.

The following is about as short as a LaTeX document can possibly be:

```
\documentclass[12pt]{article}  
\usepackage{graphicx,fullpage}
```

```
\begin{document}
```

```
Our      text goes  
here
```

```
\end{document}
```

Save as Example0.tex (MUST include the .tex), compile by pressing the arrow to the left of Quick Build
Note the preamble.
The white space was irrelevant.

Now for a larger example.

Open a new page, copy/paste from the PDF file online.

```
\documentclass[12pt]{article}
\usepackage{graphicx,fullpage}
```

```
\begin{document}
```

You can see from the figure that the function $y=\sin(x)$ is not one to one, but the function $y=\sin(x)$, $-\pi/2 \leq x \leq \pi/2$ is one to one.

Therefore, the inverse exists and is given by:

$$\sin^{-1}(x)=y \quad \Longleftrightarrow \quad \sin(y)=x$$

$$\text{and } -\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$$

```
\end{document}
```

Save as Example01.tex, then select the arrow to the left of Quick Build

Other things to try:

- ▶ `displaymath`:

In a line of text, try `\frac{2}{x^2+1}*` versus
`\displaystyle\frac{2}{x^2+1}*`

- ▶ Big parentheses/delimiters:

`$$`

`\left[ \frac{2}{x^2+1} \right]`

`$$`

- ▶ Aligning things using an “array”. Here’s an example:

$$f(x) = \begin{cases} f_1(x) & \text{for } x < 1 \\ f_2(x) & \text{for } x \geq 1 \end{cases}$$

\$\$

`f(x)=\left\{ \begin{array}{ll}`

`f_1(x) & \mbox{ for } x<1\\`

`f_2(x) & \mbox{ for } x\geq 1`

`\end{array}\right.`

\$\$

Now continue working through the handout.

HOMEWORK:

- ▶ Be sure to finish the handout.
- ▶ Watch the videos; linked from class website.
- ▶ Read through the primer on writing mathematics.