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LaTeX Quick Start

A first guide to document preparation

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Contents

Introduction

The purpose of this guide is to get you started using the LaTeX document formatting system. In a few short sessions you will be able to format professional looking documents. PCTeX for Windows will be used to illustrate the basics of using LaTeX.

If you do not use PCTeX you can still use this guide. It is easy to adapt the instructions here to other LaTeX systems, such as WinEdt, TeXShop, and MiKTeX.

What's in this bundle

The guide you are now reading is part of a bundle. This bundle is composed of:

- a printed copy of this guide
- instructional videos
- sample documents and files, and
- a 30-day trial version of the PCTeX system [**13**].

This guide presents easily understood techniques for writing LaTeX documents. The videos demonstrate most of the document construction techniques contained in the guide. Both the guide and videos make use of the included documents and files. See page 136 for more details.

The guide at a glance

Chapter 1: First things first shows how to install and use PCTeX, and how to use the hands-on projects that are included with each chapter.

Chapter 2: Your first article leads you step by step to make a complete LaTeX document. This first hands-on project includes making a title, sections, simple math, graphics, and a bibliography.

Chapter 3: Your first presentation shows how to make a slide presentation. The final document includes a title slide, a contents slide, bulleted lists, and graphics.

Chapter 4: Text markup basics introduces the basics of LaTeX markup, including LaTeX's special characters, quotes, dashes, font changes, and more.

Chapter 5: LaTeX document formatting introduces techniques for changing a document's appearance using classes and styles. This chapter also covers the basics of cross-referencing.

Chapter 6: Math markup basics introduces typing mathematics in LaTeX. Using a hands-on project you will learn the basic elements of formatting math expressions.

Chapter 7: Writing a math article will guide you through writing an American Mathematical Society (AMS) math article. Using a hands-on project, you will add markup to text to create a title, abstract, definitions, theorems, proofs, graphics, and a bibliography.

Chapter 8: Tables and figures introduces techniques for formatting tables and graphics.

Chapter 9: Bibliography and Index shows how to use an external BibTeX database for managing references, and how to create an index for a book or large document.

Chapter 10: Finding and fixing errors presents techniques for tracking down and correcting LaTeX errors.

The Appendices contain summaries of LaTeX markup, math symbols, available fonts, and more.

CHAPTER 1

First things first

The goal of this guide is to show how to write basic LaTeX documents. LaTeX has an immense number of commands and capabilities, however in this guide we will present a basic set only. The material presented in this guide is all you will need to create nearly any straightforward document.

What is LaTeX?

LaTeX is a document formatting system. It was designed to format high-quality text, mathematics, and scientific material. It can be used for books, articles, posters, and even for poems and recipes.

It starts with a *source document*, which contains ordinary text, and formats it into a *typeset document*. For example, if you type the following into your source document

```
The \emph{secret} formula is $x = y^{2} + z_{2}$.
```

it will show up in your typeset document as

The *secret* formula is $x = y^2 + z_2$.

You can see how `\emph` emphasizes the word "secret", and if you look carefully you'll see that the math expression is easy to type as well. We'll talk more about how all this works later.

More about LaTeX

LaTeX is based on Donald Knuth's TeX typesetting program [**7**]. LaTeX was originally developed by Leslie Lamport [**9**], and is currently maintained by the LaTeX Project [**10**]. LaTeX is used worldwide for producing documents containing technical and mathematical material, and high quality formatted text in many languages. It is available on most computer platforms.

PCTeX Installation

This Quick Start Guide bundle contains a free 30-day evaluation copy of PCTeX. To install PCTeX from a CD-ROM follow the installation instructions on page 136. See the Support page at `http://pctex.com` for download installation.

The PCTeX user interface

The PCTeX user interface is illustrated by loading, formatting, and viewing a sample document in the following sections.

Are you using another LaTeX system?

If you do not use PCTeX you can still use this guide. It is easy to adapt the instructions here to other LaTeX systems, such as WinEdt, TeXShop, and MiKTeX.

Quick Start installation

If you are using PCTeX the files needed are already installed, and you may skip this section.

If you are not using PCTeX you must install the project files. The project files and other resources used in this guide can be found at `http://pctex.com/LQS.html`. The project files are in `LaTeXQuickStart.zip`. Unzip this file and it will create a folder (directory) called `LaTeXQuickStart`. Navigate to this folder or directory to load the projects for each chapter, as described below.

Loading project documents

Project files. Each chapter in this guide has a project file that you will work through as you read the material. This will give you a hands-on feel for the topics in the guide. For example, in Chapter 2, *Your first article*, you will use the project "`pancake`" to create a complete LaTeX document including math, graphics, and a bibliography.

At the head of each chapter is a project list that looks like this:

Project:	**welcome**
Start with:	`welcomeStart.tex`
Save as:	`welcome.tex`
Reference:	`welcomeFinal.tex`
Modes:	`LaTeX DVI`

When you begin a new chapter, load the *Start with* file into PCTEX and save it in a work area using the *Save as* name. This will be your main project file for the current chapter. Here's how to do this for the *welcome* example.

Using PCTEX. To load a project choose `Help>>LaTeX Quick Start`, and then choose *welcome*.

If you are using PCTEX you may skip to the next section, "Ready to go", on page 6.

Not using PCTEX. If you are using another LATEX system, follow the directions below. You will have to adapt them for the LATEX system you are using.

Step 1: Load the project document. From the project list above, open the **Start with:** document, `welcomeStart.tex`. To do this:

- Choose `File>>Open`. This will display the **Open** dialog box seen in Figure 1.1.
- Navigate to the `welcomeStart.tex` file in the `LaTeXQuickStart` folder.
- Click `Open`.

The file should now be loaded as shown in Figure 1.2.

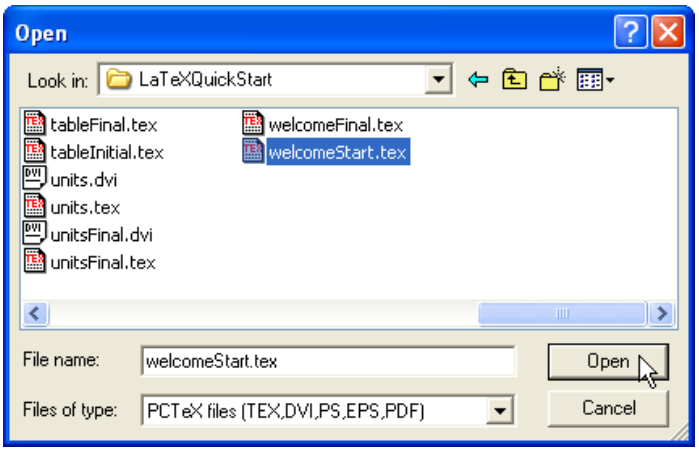


Figure 1.1: **Step 1 —** Open the **Start with** file

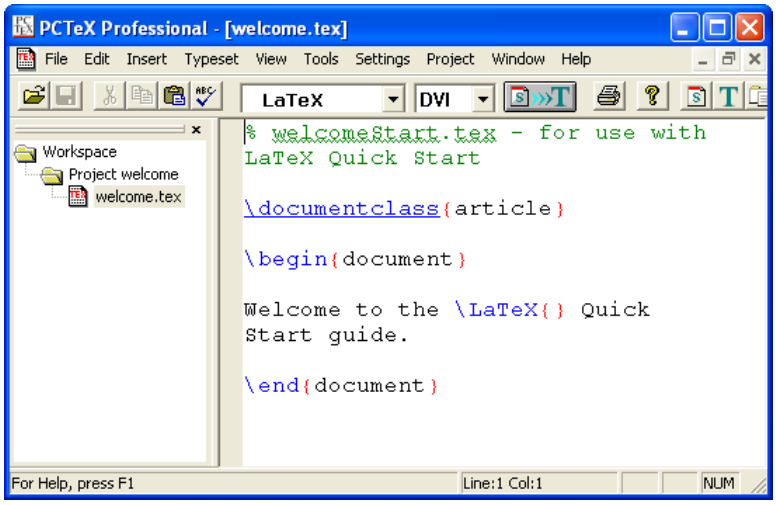


Figure 1.2: The `welcome.tex` file in the PCTEX editor.

Step 2: Save your file. The project list shows that the file is to be saved as `welcome.tex`. To do this, choose `File>>Save As`, enter the `File name: welcome.tex`, and for the `Save in:` folder navigate to `LaTeXQuickStart`. Now click `Save`. The file `welcome.tex` is now the *Project Document* for this chapter.

Step 3: Select the modes. Once you have loaded the project file select the modes. In the example above, the modes are `LaTeX` and `DVI`. These are selectable on the PCTEX Tool Bar (LaTeX DVI).

Step 4: Load the reference document. To load the reference document, follow the steps shown in *Loading the project document* above. Load the **Reference:** document from the project list. For the `welcome` project load `welcomeFinal.tex`.

Ready to go

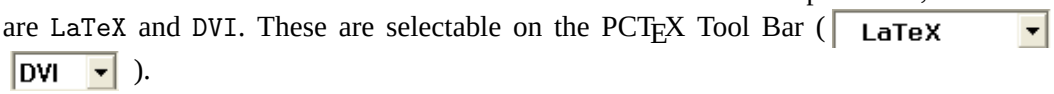
Once you have loaded the project you are ready to begin working through the chapter.

Notice that the PCTEX interface shows a list of projects on the left side of the screen. Click on a project in this list to make it the current project. For example, in the *welcome* project,

- To view the document you will be working on, click **project** `welcome`.
- To view the reference document, click **project** `welcomeFinal`.

The *reference* document, `welcomeFinal.tex` for example, shows the final version of the project. That is, once you have worked through the chapter and changed the project document, the reference document shows how it should look. This is useful if you get stuck on a topic and want to see how to proceed. Be sure to try the material on your own before peeking at the reference document.

Before continuing, click on **project** `welcome` to make this the current project.

Select the modes. Check that the modes are selected. In the example above, the modes are `LaTeX` and `DVI`. These are selectable on the PCTEX Tool Bar ().

Formatting the document. To format (or typeset) your document click the typeset button (). While formatting, PCTEX will display messages in the **Output** window at the bottom of the screen. The contents of this window can be ignored for now.

Viewing the formatted document. Once PCTEX successfully completes the formatting process, the typeset file automatically appears in the PCTEX viewer. The typeset file can also be printed by choosing `File>>Print`.

Switching between views. The two buttons () to the right of the typeset button can be used to switch between the **S**ource and **T**ypeset views. Pressing the F8 key also switches from one view to the other. This method is useful for locating the corresponding point in the opposite view. Place the cursor over a word in the editor and press F8 — it will move to the point where this word occurs in the typeset view. This will work as well to go from the typeset view to the source view.

Conventions used in this guide

Markup. This guide will show you how to write LATEX *markup*. We will refer to *markup* as any LATEX command you type into your source document. It can be either text markup or math markup. LATEX markup is shown using typewriter fonts, for example

```
    The \emph{secret} formula is $x = y^{2} + z_{2}$.
Add A line that is added.
Mod A line to be modified.
```

Some markup lines in this guide are preceded with a *margin cue*. For example, the *Add* in the above markup means to *Add* this line, and *Mod* means *Modify* this line.

Formatted examples. Once LaTeX has read your text and markup it will create *formatted* or *typeset* output. The following is an example of typeset output.

The *secret* formula is $x = y^2 + z_2$.

Review or reference

Most sections end with a review or reference table of the material presented. A complete collection of the review items can be found in Appendix B.

Review

Command	Meaning
 Mode combo box	Choose the typeset mode (DVI or PDF). DVI mode documents can be viewed in PCTeX, and PDF ones need an external viewer.
 Typeset button	Formats a document.
 Zoom button	Zoom in or out on a formatted view.
 **View Document Source** button	Show the source file in the PCTeX editor.
 **View Typeset Document** button	Show the formatted file in the previewer.
F8 HotKey	Jump from the source document to the corresponding place in the formatted document, and vice versa.

CHAPTER

2

Your first article

Project:	**pancake**
Start with:	`pancakeStart.tex`
Save as:	`pancake.tex`
Reference:	`pancakeFinal.tex`
Modes:	`LaTeX DVI`

In this chapter we will create a complete LaTeX document. It's called *Kansas is Flatter Than a Pancake* and is shown in *Sample document* on page 100. You will begin with a text file that has no markup and gradually add LaTeX commands. By the end of this chapter you will have made a complete document including math, graphics, and a bibliography.

Kansas Is Flatter Than a Pancake

Mark Fonstad William Pugatch Brandon Vogt

October 2003

Getting started

Load the project files shown above. See "Loading project documents" on page 4 for instructions on loading a project.

Making a LaTeX source document. To begin making this text into a LaTeX document add markup as shown below.

Add `\documentclass{article}`
Add `\begin{document}`
`Kansas Is Flatter Than a Pancake`
`by Mark Fonstad, William Pugatch, and Brandon Vogt`
⋮
`... May/June 1995.`
Add `\end{document}`

What do these LaTeX commands do? The command

```
\documentclass{article}
```

tells LaTeX that we are making an *article* — some other document types are *book* and *report*.

The body or text of a LaTeX document lies between

```
\begin{document}
        ⋮
\end{document}
```

Format and view the document

Press the  button to format the document. The result should look like Figure 2.1. Notice that the text is justified and formatted into paragraphs but the appearance is still fairly rough. This will improve as we add more LaTeX markup.

If PCTeX reports an error, go back and check that you have entered the LaTeX markup commands correctly, then format again. If you continue to get errors, you can see the correct markup in the reference document, `pancakeFinal.tex`.

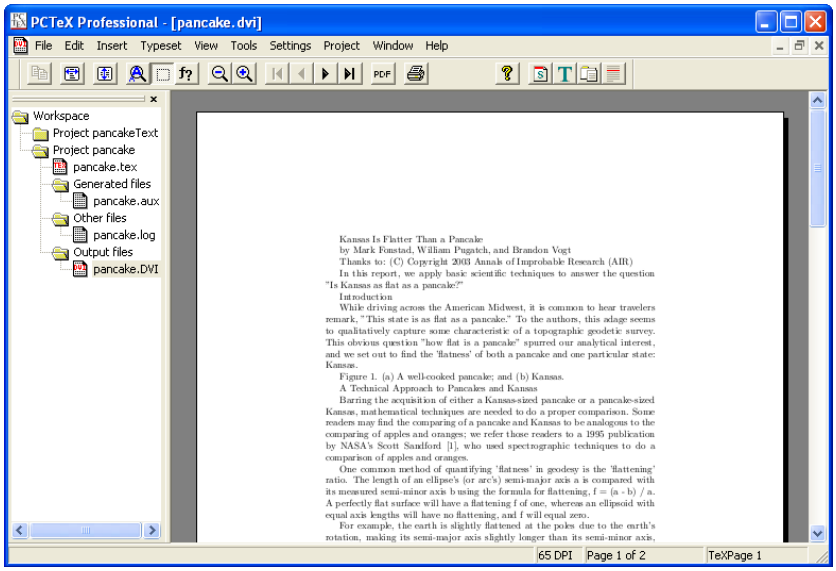


Figure 2.1: Screenshot of the formatted `pancake` project.

Review

Command	Meaning
`\documentclass{article}`	Tells LaTeX to format the document as an article.
`\begin{document}`	Starts the document body.
...	Document body goes here.
`\end{document}`	Ends the document.
 Mode combo box	Choose the typeset mode (DVI or PDF).
 Typeset button	Formats a document.
 Zoom button	Zoom in or out on a typeset DVI file.

Recovering from errors

LaTeX errors. If you discover an error, for example a spelling error, in a *formatted* document, place the cross-hairs near the error and press the F8 key. This will open the source

file and place the cursor near the location of the cross-hairs. Once you find the problem, correct it and reformat the document.

Sometimes the LaTeX system will detect an error during the formatting process and will open a warning box similar to the one in Figure 2.2. Choose `Yes`. The PCTeX screen will automatically update and appear as in Figure 2.3. Notice that PCTeX has highlighted the error in the output window at the bottom of the screen and gives some information about the error. In the example in Figure 2.3 the command `\Begin{abstract}` should be `\begin{abstract}` (LaTeX commands are case sensitive). Make the correction and reformat the document.

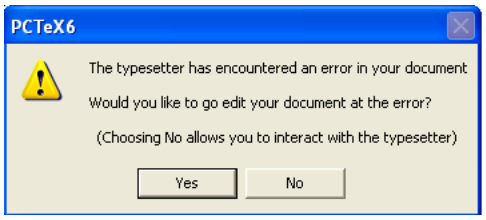


Figure 2.2: Error dialog.

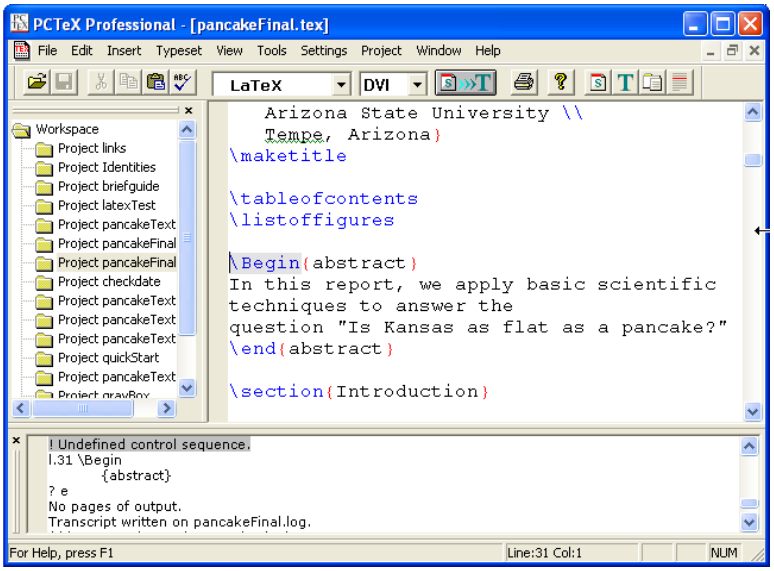


Figure 2.3: PCTeX showing an error.

For now, if you get an error and you can't see what is causing it, compare your document to the *Final reference file* in the project list at the head of the chapter. More details about recovering from errors can be found in Chapter 10.

Title and author

In this section you will format the title, author, and other *front matter* items.

Including the title, author, and date. Locate these two lines in your source document:

```
Kansas Is Flatter Than a Pancake
by Mark Fonstad, William Pugatch, and Brandon Vogt
```

Now add the LaTeX markup as shown by the *Add* and *Mod* margin cues.

```
    \begin{document}
Mod \title{Kansas Is Flatter Than a Pancake}
Mod \author{Mark Fonstad \and William Pugatch \and Brandon Vogt}
Add \date{October 2003}
Add \maketitle
```

What do these commands do? The `\title`, `\author`, and `\date` commands set these values. (If you want today's date, use `\date{\today}`.) The command `\and` separates the author names. The `\maketitle` command signals LaTeX to "format the title here."

Now, press the  button to format your document. Notice that the title is centered horizontally and in a larger font, and the author names are nicely spaced. Your formatted document should look like Figure 2.4.

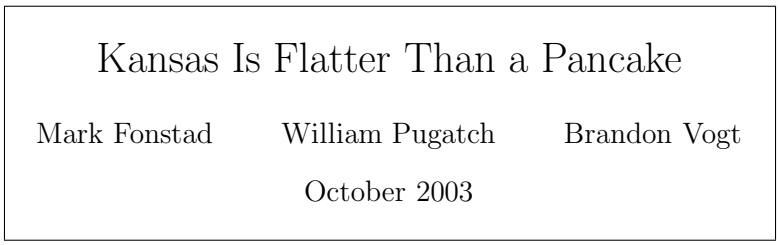


Figure 2.4: Title, author, and date

Review

Command	Meaning
`\title{`*title*`}`	Defines the document title.
`\author{`*author*`}`	Defines author information.
`\and`	Use this between multiple author names.
`\date{`*date*`}`	Defines the date (use `\date{\today}` for today's date).
`\maketitle`	Use this command in the document body to format the title, author, address, and date.

Abstracts and sections

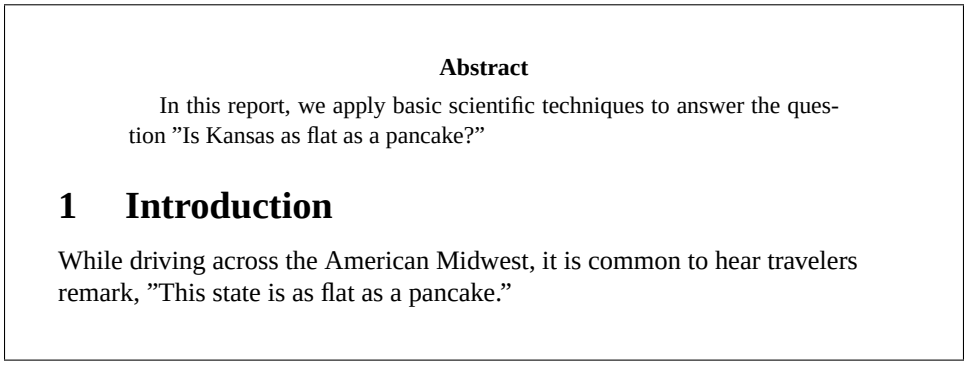


Figure 2.5: Abstract and Introduction

To format the abstract, locate the following text in the source document:

```
In this report, we apply basic scientific techniques to answer the
question "Is Kansas as flat as a pancake?"
```

The formatted abstract shown in Figure 2.5 is made by putting `\begin{abstract}` and `\end{abstract}` around the text as shown below.

Add
```
\begin{abstract}
In this report, we apply basic scientific techniques to
answer the question "Is Kansas as flat as a pancake?"
```
Add
```
\end{abstract}
```

Add the two lines indicated by the margin cues to your document and reformat.

(The opening and closing quotes in this example and throughout the formatted document are not oriented correctly. We will show how to fix this later in this chapter.)

LaTeX Tip The `\begin{abstract}` ... `\end{abstract}` is called the `abstract` *environment*. See the Glossary for more on this and other LaTeX terms.

To make a section heading in the sample above, change `Introduction` to

Mod
```
\section{Introduction}
```

Reformat your document. It should have an abstract and section heading as shown in Figure 2.5.

For you to do. Locate the following section names in your document source and convert them to `\section` commands. (Do not make `References` into a section. We will take care of this when we make the Bibliography.)

(1) A Technical Approach to Pancakes and Kansas
(2) Materials and Methods
(3) Results
(4) Conclusion

Now format your document again. All section headers should be in place.

Review

Command	Meaning
`\begin{abstract}`	Begins the abstract.
abstract text	Abstract goes here.
`\end{abstract}`	Ends the abstract.
`\section{`*section title*`}`	Starts a new section.

Graphics

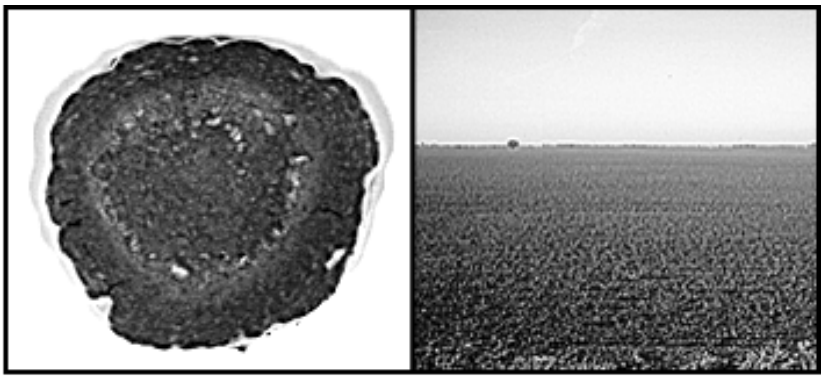


Figure 2.6: (a) A well-cooked pancake; and (b) Kansas

Graphics and figures that are in external files can by included in your LaTeX document. To include graphics you must add some markup to tell LaTeX how to place your picture.

Locate the following caption in your source document

```
Figure 1. (a) A well-cooked pancake; and (b) Kansas.
```

We will place the first figure here using the **Insert graphic** feature available in PCTeX Professional. (If you are not using PCTeX Professional, copy the LaTeX commands from `pancakeFinal.tex`, and then skip to "View the graphic in your document" below.)

In addition to inserting graphics markup in a source file, this feature provides simple controls for scaling graphics, adding captions, and a method of referencing the figure.

Next, highlight and cut the line

```
Figure 1. (a) A well-cooked pancake; and (b) Kansas.
```

which will be used later as the figure caption.

In PCTeX choose `Insert>>Graphic`. Browse to the `fig-1.gif` file in the `graphics` folder in your `LaTeXQuickStart` folder. Double click it. This opens the **Graphic Properties** dialog shown in Figure 2.7.

Scaling the graphic. Use the scaling feature in this dialog to set the `Width` of the graphic to approximately 4.5 inches. You can enter `4.5` in the `Width` field or use the slide bar.

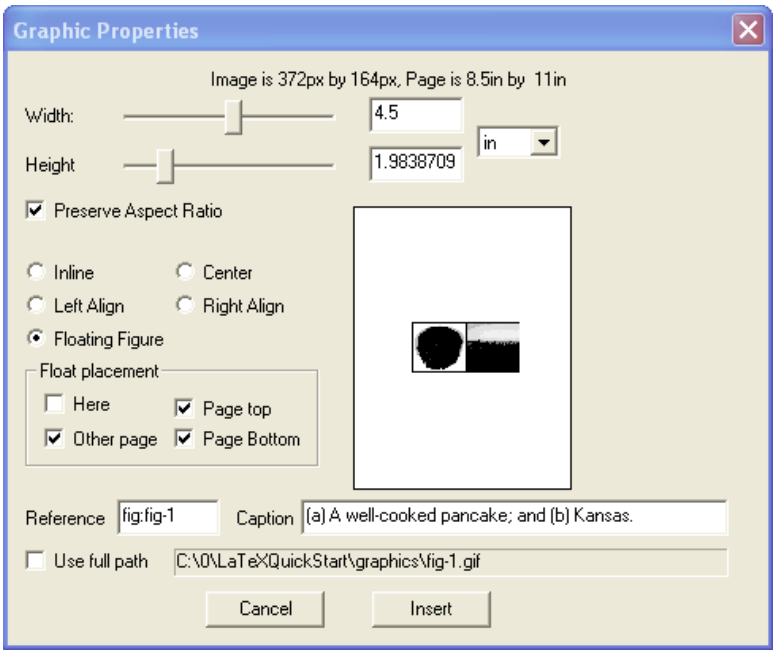


Figure 2.7: Graphic Properties dialog box.

Add a caption. Recall that we cut the caption text earlier. Now paste it into the `Caption` field. Remove the text "`Figure 1.`", since LaTeX will automatically generate a figure number. When your document is formatted, this text will appear under the graphic along with its automatically generated figure number.

Add a figure label. In the `Reference` field there is a default key based on the graphics file name, `\label{fig:fig-1}`. You can leave this as is or change it to something else. See below for how to reference this figure in your text.

View the graphic in your document. Click `Insert` when you have finished with the Insert Graphics dialog. PCTeX will insert the markup for including this figure.

The markup is complicated looking, and it's not important to understand what all the commands mean. If you want to make a change to the graphic, and you are using PCTeX Professional, click on the `\includegraphics` command and the Insert Graphics dialog will open again.

(If you are not using PCTeX Professional, see the file `pancakeFinal.tex` for the additional commands needed for the graphic to work. At the top of the file you will need to copy the `\usepackage{graphicx}` and `\graphicspath` commands as well.)

Reformat your document and notice that the figure has been added.

Floating figures. The locations of the graphics in your typeset document are determined by LaTeX. This means that figures are placed where LaTeX wants them to be, and not necessarily where *you* want them to be! This is by design and is called **floating**. Floating strategies are discussed in Chapter 8.

Referring to a figure. You will probably want to refer to figures from other places in the document. For example

```
see Figure \ref{fig:fig-1}
```

will format as

see Figure 1

For you to do. Add the remaining three figures to your `pancake.tex` file by locating the text strings below and replacing them with the indicated graphic.

- Figure 2: Pancake cross-sectional surfaces ... (`fig-2.gif`)
- Figure 3: When viewed at a scale of ... (`fig-3.gif`)
- Figure 4: Surface topography of Kansas ... (`fig-4.gif`)

Finally, add the references to Figures 2, 3, and 4 to your source file. For example, the markup for the reference to figure 2 is

```
see Figure \ref{fig:fig-2}.
```

Format your document and check that each figure has been referenced once in the text.

Review

Command	Meaning
`\begin{figure}`	Begin a floating figure environment.
`\caption{`*figure caption*`}`	Defines the caption for a *floated* figure.
`\label{`*key*`}`	The label *key* is used to cross reference the figure. For example, `\label{fig:fig-1}`.
`\end{figure}`	End a floating figure environment.
`\ref{`*key*`}`	References the figure with label *key*. For example, `\ref{fig:fig-1}`.

Marking up text

Text. Text usually does not need markup. In other words, if LaTeX does not see one of its special characters such as `\` or `$` it formats the material as straight text. Almost all formatting, such as left and right justification, and hyphenation, is done automatically by LaTeX.

Words. Words are separated by one or more spaces, or by the end of a line. LaTeX will format the following identically:

```
word separator

word     separator

word
    separator
```

Each of the above will appear as "word separator" when formatted. If you enter additional spaces between words they will not show up when formatted — one space is the same as five spaces.

Paragraphs. A new paragraph is created by inserting one or more blank lines. An extra line before each paragraph is already included in the `pancake` project file.

In your source document, the following is an example of a paragraph break in the section called "A Technical Approach to Pancakes and Kansas".

```
who used spectrographic techniques to do a comparison of apples
and oranges.

One common method of quantifying 'flatness' in geodesy is the
'flattening' ratio.
```

LaTeX Tip There are LaTeX commands for adding additional horizontal or vertical space between words or text, however these commands will not be covered in this introductory guide. If you are just beginning to use LaTeX it's best to become familiar with how the system formats text, and avoid forcing additional horizontal or vertical space. LaTeX is an expert typesetting system, so your text will look professional by default.

Quotes. Read through the Abstract and Introduction of your formatted document and notice the quotes:

"This state is as flat as a pancake"

and

find the 'flatness'.

The single and double left quotes are not oriented correctly. The correct markup for opening single and double quotes is entered as ` and `` respectively (the ` looks like a grave accent on the keyboard). Closing single or double quotes are entered as ' and '' (the ' is the apostrophe character on the keyboard). For example, the markup for the first double quoted phrase "This state is as flat as a pancake." is

```
``This state is as flat as a pancake.''
```

To typeset 'flatness' use `flatness'.

For you to do. Correct the markup for the quotes in your `pancake.tex` file and format your document. Hint: use `Edit>>Replace` to find ", and replace it with `` on the left. Clicking **Find Next** allows you to skip the occurrences of " on the right. Then use `Replace` again to replace the occurrences of " on the right with ''. Similarly for single quotes, '.

Review

Command	Meaning
`` `a´ ``	Single quotes, as in ‘a’.
`` ``Knuth´´ ``	Double quotes, as in “Knuth”.
space	Separates words.
blank line	Starts a new paragraph.

Marking up simple mathematics

A key feature of LaTeX is its mathematical typesetting. LaTeX is an expert math typesetting system, and the appearance and spacing of math expressions and symbols is textbook perfect.

Locate the section called “A Technical Approach to Pancakes and Kansas” in your project source. In the following we will add markup to the math expressions so that they format as shown in Appendix A.

Inline math. In the third paragraph locate the text

```
giving a global f of 0.00335.
```

Add LaTeX math markup as shown here

```
giving a global $f$ of $0.00335$.
```

When formatted it will appear as

giving a global f of 0.00335.

This is called *inline math*, since it appears in the same line as the surrounding text. Compare this to *displayed math* in the following section.

Displayed math. In the second paragraph locate the math expression

```
formula for flattening, f = (a - b) / a. A perfectly flat
```

Add the LaTeX math markup as shown

```
formula for flattening,
\[ f = \frac {(a - b)} {a}.
\]
A perfectly flat
```

When formatted this will appear as displayed math.

formula for flattening,

$$f = \frac{(a - b)}{a}.$$

A perfectly flat

Displayed math mode interrupts a text paragraph, formats equations so that they are centered horizontally, and then resumes the paragraph.

The markup `\[` and `\]` tells LaTeX to format whatever is between them in *displayed math* format.

For you to do. In your document, replace math variables such as `a`, `b`, `f`, and the above equation, using LaTeX math markup.

Numeric expressions will also benefit from LaTeX markup. For example, in the source document, enclosing the number 0.00335 (as we did already) and the ratio $1 : 250,000$ in dollar signs will improve the typeset appearance of these expressions.

Review

Command	Meaning
`$ ... $`	Inline math, for example `$ a + b $`
`\[ ... \]`	Displayed math, for example `\[ \frac {a - b} {b} \]`
`$\frac {x} {y}$`	Typesets as $\frac{x}{y}$

Creating a bibliography

A command called `\thebibliography` is used to format a bibliography. Locate the following text in your source document:

```
References

1. "Comparing Apples and Oranges," S.A. Sandford, Annals of
Improbable Research, vol. 1, no. 3, May/June 1995.
```

Remove the word `References` and add the following markup:

```
\begin{thebibliography}{9}
\bibitem{Sand95} S.A. Sandford, \emph{``Comparing Apples and
    Oranges''}, Annals of Improbable Research, vol. 1, no. 3,
    May/June 1995.
\end{thebibliography}
```

The `{9}` following `\thebibliography` is a placeholder. It is used if no more than nine references appear in your article. (If there are more than 9 but less than 100 references, use `{99}`.) The command `\bibitem` begins a new bibliography entry, and the label enclosed in braces is used to cite this reference — to refer to the reference above use `\cite{Sand95}`. Add this to your project file by replacing

```
we refer those readers to a 1995 publication
by NASA's Scott Sandford [1],
```

with

```
we refer those readers to a 1995 publication
by NASA's Scott Sandford \cite{Sand95},
```

For you to do. Replace the `References` section in the article with a bibliography. Reformat your project and note that LaTeX has added a *References* section.

Review

Command	Meaning
`\begin{thebibliography}{9}`	Begin the **References** section.
`\bibitem{`*key*`}`	Insert a new reference item with label `<key>`. For example, `\bibitem{Sand95}`.
`\end{thebibliography}`	End the **References** section.
`\cite{`*key*`}`	Cite the reference with label `<key>`. For example, `\cite{Sand95}`.

Congratulations!

You have formatted a complete LaTeX article. It should be similar to the one in Appendix A.

More about LaTeX

For more information on the topics in this chapter, see these other LaTeX guides:

- *More Math Into LaTeX* [**3**] — even though it has "Math" in the title it's a general-purpose guide as well, good for beginners and advanced users.
- *A Guide to LaTeX* [**8**] — a guide for the beginning and advanced user.
- *LaTeX: A Document Preparation System* [**9**] — a general-purpose guide, written by the original LaTeX designer.
- *The LaTeX Companion* [**12**] — at 1,090 pages, it has everything for the advanced user.

LaTeX Tip The web has a rich source of LaTeX information. In your favorite web search engine type "latex quotes" to learn how to format quotation marks, for example.

APPENDIX

E

LaTeX Font samples

LaTeX can use a wide variety of typefaces, both free and commercial. There is an excellent catalog of font samples online at The LaTeX Font Catalogue [**5**]. It shows type samples and the LaTeX markup needed to use each font.

The default typeface for LaTeX is Computer Modern, which is used in this guide for math examples and for typewriter-like text. The text of the guide is in the Times typeface.

Computer Modern. This typeface was designed by Donald Knuth in the late 1970's. Computer Modern has a full set of text and math fonts, and a set of *extensible* math characters that produces large parentheses, brackets, and other symbols. It has specially designed first and second order superscripts and subscripts, which gives math expressions a classic typeset appearance.

Personal TeX, Inc. offers two additional typefaces, *MathTime* and Lucida®.

MathTime. These math fonts were developed by Michael D. Spivak to match the Times text typeface. Initially developed for use in his own publications, they have since been used in numerous books and journals. Like Computer Modern fonts, *MathTime* has a full set of math symbols, extensible characters, and specially designed first and second order superscripts and subscripts.

Lucida®. These typefaces were designed by Charles Bigelow and Kris Holmes, and include a full set of text and math fonts. They have been widely licensed for use in books, journals, and other publications. They are used in the *LaTeX Companion* series of books, for example [**12**].

Samples of these three typefaces are shown on the following pages. For more information on these fonts see `http://pctex.com`.

LaTeX Text and Math Fonts

Slison N. Dyson

July 17, 2001

Abstract

This sample article uses the Computer Modern typefaces.

LaTeX can typeset paragraphs containing text, sometimes *emphasized* and sometimes **bold**, and can include inline math such as $x^n + y^n = z^n$.

Theorem 1. *When Ω does not involve t, so that the Euler equations are actually*

$$\frac{\partial\Omega}{\partial x}\big(\omega(t),\omega'(t)\big) - \frac{d}{dt}\left(\frac{\partial\Omega}{\partial y}\big(\omega(t),\omega'(t)\big)\right) = 0$$

for ω and Ω from $\mathbb{R}^2$ to $\mathbb{R}$, the extremals for our problem satisfy

$$\Omega - \omega'\frac{\partial\Omega}{\partial y} = \text{constant}.$$

Proof. This follows from *Beltrami's identity*,

$$\frac{d}{dt}\left(\Omega - \omega'\frac{\partial\Omega}{\partial y}\right) = \omega'\left[\frac{\partial\Omega}{\partial x} - \frac{d}{dt}\frac{\partial\Omega}{\partial y}\right].$$

□

Formatting math is a snap.

$$F(f,\epsilon) = \left(\sqrt{\frac{\displaystyle\int_a^b f(x)\,dx + \alpha^{\beta^\gamma}\delta^{\varepsilon^\zeta}\eta^{\theta^\kappa} + Aa\mathbf{Aa}\widetilde{\boldsymbol{Aa}+\mathfrak{Aa}\mathcal{A}}\ \mathbb{A}}{\displaystyle\int_a^b f(x^2)\,dx + \lambda^{\mu^\nu}\xi^{\pi^\rho}\phi^{\psi^\omega} + Zz\mathbf{Zz}\widehat{\boldsymbol{Zz}+\mathfrak{Z}\mathfrak{z}\mathcal{Z}}\ \mathbb{Z}}} + 1\right)^{2+\epsilon}$$

[Note: The Computer Modern fonts were designed by Donald Knuth and are the original typefaces used with TeX and LaTeX.]

LaTeX Text and Math Fonts

Slison N. Dyson

July 17, 2001

Abstract

This sample article uses the *MathTime* typefaces.

LaTeX can typeset paragraphs containing text, sometimes *emphasized* and sometimes **bold**, and can include inline math such as $x^n + y^n = z^n$.

Theorem 1. *When Ω does not involve t, so that the Euler equations are actually*

$$\frac{\partial\Omega}{\partial x}\big(\omega(t),\omega'(t)\big) - \frac{d}{dt}\left(\frac{\partial\Omega}{\partial y}\big(\omega(t),\omega'(t)\big)\right) = 0$$

for ω and Ω from $\mathbb{R}^2$ to $\mathbb{R}$, the extremals for our problem satisfy

$$\Omega - \omega'\frac{\partial\Omega}{\partial y} = \text{constant}.$$

Proof. This follows from *Beltrami's identity*,

$$\frac{d}{dt}\left(\Omega - \omega'\frac{\partial\Omega}{\partial y}\right) = \omega'\left[\frac{\partial\Omega}{\partial x} - \frac{d}{dt}\frac{\partial\Omega}{\partial y}\right].$$

□

Formatting math is a snap.

$$F(f,\epsilon) = \left(\sqrt{\frac{\displaystyle\int_a^b f(x)\,dx + \alpha^{\beta^\gamma}\delta^{\varepsilon^\zeta}\eta^{\theta^\kappa} + \widetilde{Aa\mathbf{Aa}\boldsymbol{Aa} + \mathfrak{A}\mathfrak{a}\mathcal{A}a\mathbb{A}\mathbb{a}}}{\displaystyle\int_a^b f(x^2)\,dx + \lambda^{\mu^\nu}\xi^{\pi^\rho}\phi^{\psi^\omega} + \widetilde{Zz\mathbf{Zz}\boldsymbol{Zz} + 3\mathfrak{z}\mathcal{Z}\mathfrak{z}\mathbb{Z}\mathbb{z}}}} + 1\right)^{2+\epsilon}$$

[Note: The *MathTime* fonts were designed by Michael Spivak to be used with Times and other standard fonts. This example uses Times text fonts and *MathTime* math fonts.]

LaTeX Text and Math Fonts

Slison N. Dyson

July 17, 2001

Abstract

This sample article uses the Lucida® typefaces.

LaTeX can typeset paragraphs containing text, sometimes *emphasized* and sometimes **bold**, and can include inline math such as $x^n + y^n = z^n$.

Theorem 1. *When Ω does not involve t, so that the Euler equations are actually*

$$\frac{\partial\Omega}{\partial x}(\omega(t), \omega'(t)) - \frac{d}{dt}\left(\frac{\partial\Omega}{\partial y}(f(t), f'(t))\right) = 0$$

for ω and Ω from $\mathbb{R}^2$ to $\mathbb{R}$, the extremals for our problem satisfy

$$\Omega - \omega'\frac{\partial\Omega}{\partial y} = \text{constant}.$$

Proof. This follows from *Beltrami's identity*,

$$\frac{d}{dt}\left(\Omega - \omega'\frac{\partial\Omega}{\partial y}\right) = \omega'\left[\frac{\partial\Omega}{\partial x} - \frac{d}{dt}\frac{\partial\Omega}{\partial y}\right].$$

□

Formatting math is a snap.

$$F(f,\epsilon) = \left(\sqrt{\frac{\int_a^b f(x)\,dx + \alpha^{\beta^\gamma}\delta^{\varepsilon^\zeta}\eta^{\theta^\kappa} + Aa\mathbf{A}\mathbf{a}\boldsymbol{A}\boldsymbol{a}\widetilde{\mathfrak{A}\mathfrak{a}\mathcal{A}}\ \mathbb{A}}{\int_a^b f(x^2)\,dx + \lambda^{\mu^\nu}\xi^{\pi^\rho}\phi^{\psi^\omega} + Zz\mathbf{Z}\mathbf{z}\boldsymbol{Z}\boldsymbol{z}\widetilde{\mathfrak{Z}\mathfrak{z}\mathcal{Z}}\ \mathbb{Z}}} + 1\right)^{2+\epsilon}$$

[Note: The Lucida® fonts were designed by Charles Bigelow and Kris Holmes, and include both text and math fonts.]