An Introduction to Mathematical Document Preparation with LaTeX

Ray Cheng

What is LaTeX?

- Written by Leslie Lamport.
- LaTeX is a programming language for high quality mathematical document preparation.
- It is based on TeX, created by Donald Knuth.
- LaTeX is not a text editor or word processor.
- There are many software programs that run LaTeX; they include freeware.
- Not to be confused with "latex."

Command File vs. Output FIle

```
To begin, assume that (\ref{EQN7}) holds, and further decompose
$\mu$ as follows
\begin{eqnarray*}
  d\mu_{1}(\eis) &=& u_{1}(\eis)\,d\sigma(\eis) + d\eta_{1}(\eis)\\
  d\mu_{2}(\eit) &=& u_{2}(\eit)\,d\sigma(\eit) + d\eta_{2}(\eit)\\
  d\lambda_{R}  &=& v_{R}\,d(\lambda_{R,1}\times\sigma) + d\xi_{R}\\
  d\lambda_{T}  &=& v_{T}\,d(\sigma\times\lambda_{T,2}) + d\xi_{T},
\end{eqnarray*}
where $\lambda_{(\cdot),j}$ is the $j$th marginal measure of
$\lambda_{(\cdot)}$.  We
substitute these into the definitions of $\chi_{a}\,d\mu$, $\chi_{b}\,d\mu$,
$\chi_{c}\,d\mu$, and  $\chi_{d}\,d\mu$, and impose consistency.  This
forces the
following identifications:
\begin{eqnarray*}
  \chi_{a}w_{R}u_{2}\dss &=& \chi_{a}w_{T}u_{1}\dss\\
  \chi_{a}w_{R}\,d(\sigma\times\eta_{2}) &=& 0\\
  \chi_{a}w_{T}\,d(\eta_{1}\times\sigma) &=& 0\\
  \chi_{b}w_{R}u_{2}\dss &=& \chi_{b}w_{T}u_{1}\dss\\
  \chi_{b}w_{R}\,d(\sigma\times\eta_{2}) &=&
        \chi_{b}w_{T}v_{2}\,d(\sigma\times\lambda_{T,2})\\
  \chi_{c}w_{R}u_{2}\dss &=& \chi_{c}w_{T}u_{1}\dss\\
  \chi_{c}w_{T}\,d(\eta_{1}\times\sigma) &=&
        \chi_{c}w_{R}v_{R}\,d(\lambda_{R,1}\times\sigma)\\
  \chi_{b}\,d\xi_{T} &=& 0\\
  \chi_{c}\,d\xi_{R} &=& 0\\
  \chi_{d}\,d\xi_{R} &=& \chi_{d}\,d\xi_{T}\\
  \chi_{d}w_{R}u_{2}\dss &=& \chi_{d}w_{T}u_{1}\dss\\
  \chi_{d}w_{R}\,d(\sigma\times\eta_{2}) &=&
        \chi_{d}w_{T}v_{T}\,d(\sigma\times\lambda_{T,2})\\
  \chi_{d}w_{T}\,d(\eta_{1}\times\sigma) &=&
  \chi_{d}w_{R}v_{R}\,d(\lambda_{R,1}\times\sigma).
\end{eqnarray*}
```

To begin, assume that (10) holds, and further decompose μ as follows

$$\begin{aligned}
d\mu_1(e^{is}) &= u_1(e^{is})\,d\sigma(e^{is}) + d\eta_1(e^{is})\\
d\mu_2(e^{it}) &= u_2(e^{it})\,d\sigma(e^{it}) + d\eta_2(e^{it})\\
d\lambda_R &= v_R\,d(\lambda_{R,1}\times\sigma) + d\xi_R\\
d\lambda_T &= v_T\,d(\sigma\times\lambda_{T,2}) + d\xi_T,
\end{aligned}$$

where $\lambda_{(\cdot),j}$ is the jth marginal measure of $\lambda_{(\cdot)}$. We substitute these into the definitions of $\chi_a\,d\mu$, $\chi_b\,d\mu$, $\chi_c\,d\mu$, and $\chi_d\,d\mu$, and impose consistency. This forces the following identifications:

$$\begin{aligned}
\chi_a w_R u_2\,d\sigma_2 &= \chi_a w_T u_1\,d\sigma_2\\
\chi_a w_R\,d(\sigma\times\eta_2) &= 0\\
\chi_a w_T\,d(\eta_1\times\sigma) &= 0\\
\chi_b w_R u_2\,d\sigma_2 &= \chi_b w_T u_1\,d\sigma_2\\
\chi_b w_R\,d(\sigma\times\eta_2) &= \chi_b w_T v_2\,d(\sigma\times\lambda_{T,2})\\
\chi_c w_R u_2\,d\sigma_2 &= \chi_c w_T u_1\,d\sigma_2\\
\chi_c w_T\,d(\eta_1\times\sigma) &= \chi_c w_R v_R\,d(\lambda_{R,1}\times\sigma)\\
\chi_b\,d\xi_T &= 0\\
\chi_c\,d\xi_R &= 0\\
\chi_d\,d\xi_R &= \chi_d\,d\xi_T\\
\chi_d w_R u_2\,d\sigma_2 &= \chi_d w_T u_1\,d\sigma_2\\
\chi_d w_R\,d(\sigma\times\eta_2) &= \chi_d w_T v_T\,d(\sigma\times\lambda_{T,2})\\
\chi_d w_T\,d(\eta_1\times\sigma) &= \chi_d w_R v_R\,d(\lambda_{R,1}\times\sigma).
\end{aligned}$$

Paragraph Mode vs. Math Mode

```
In paragraph mode, what you type is almost what you
get. Any extra spaces are ignored. Paragraph
indentation is automatic.

To start a new paragraph, skip a line.
```

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To start a new paragraph, skip a line.

The Backslash \

```
\LaTeX commands are generally preceded by the backslash
character.  You can use such commands to generate
special characters, such as \$, \&, \%, \{ and \}.  You
can also use it to generate accents and foreign letters:
\oe, \aa, \o, \`o, \^o, \"o, etc.
```

LaTeXcommands are generally preceded by the backslash character. You can use such commands to generate special characters, such as \$, \&, \%, \{ and \}. You can also use it to generate accents and foreign letters: œ, å, ø, ò, ô, ö, etc.

Cast of Characters

\S	§
\dag	†
\ddag	‡
\P	¶
\copyright	©
\pounds	£
\OE	Œ
\ae	æ
\AE	Æ
!‘	¡
?‘	¿
\O	Ø
\L	Ł
\ss	ß
\SS	SS

\’o	ó
\~o	õ
\=o	ō
\.o	ȯ
\u{o}	ŏ
\v{o}	ǒ
\H{o}	ő
\t{oo}	o͡o
\c{o}	ǫ
\d{o}	ọ
\b{o}	o̲
\r{o}	o̊

Accents in Action

```
A \L\o ndoner, a Par{\"i}sian, and a N\"{e}w Y{\~o}rker
are c{\AA}ptured by c{\ae}nnibal\ss. ‘‘We’re g\={o}ing to
kill y\‘{o}u, eat your fl{\ae}sh, and make can\.{o}es out
of your sk\"{i}ns,’’ expl{\AE}ned the $\hbar$ead cannibal.
‘‘But b\^{e}cause we are a civilized p\t{eo}ple, we wi\l\l\
permit you to sel\u{e}ct your mean\ss\ of execution.’’
```

A Łøndoner, a Parïsian, and a Nëw Yõrker are cÅptured by cænnibalß. “We’re gōing to kill yòu, eat your flæsh, and make canȯes out of your skïns,” explÆned the *ħ*ead cannibal. “But bêcause we are a civilized pe͡ople, we wiłł permit you to selĕct your meanß of execution.”

Getting Spaced

```
If you want to add horizontal \hspace{0.5in} space,
you can do it with a special command.  Similarly,
notice how the command \vspace{0.5in}

adds vertical space between lines.
```

If you want to add horizontal space, you can do it with a special command. Similarly, notice how the command

adds vertical space between lines.

Getting Spaced, Part Deux

```
You can add space this way:
A\ B, A\ \ B, A\ \ \ B, A\ \ \ \ B.

You can add a thin space, too:
A\,B
```

You can add space this way: A B, A B, A   B, A   B.
You can add a thin space, too: A B

Sizes and Styles

```
You can get {\bf boldface}, {\it italic}, {\large
large} and {\small small} type by using special
commands and curly braces.
```

You can get **boldface**, *italic*, large and small type by using special commands and curly braces.

A Matter of Scale

```
{\tiny Your text here.}\\
{\scriptsize Your text here.}\\
{\footnotesize Your text here.}\\
{\small Your text here.}\\
{\normalsize Your text here.}\\
{\large Your text here.}\\
{\Large Your text here.}\\
{\LARGE Your text here.}\\
{\huge Your text here.}
```

{\tiny Your text here.}\\
{\scriptsize Your text here.}\\
{\footnotesize Your text here.}\\
{\small Your text here.}\\
{\normalsize Your text here.}\\
{\large Your text here.}\\
{\Large Your text here.}\\
{\LARGE Your text here.}\\
{\huge Your text here.}

Lining it Up

```
\begin{center} You can center the text, \end{center}
\begin{flushleft} \ldots or left-justify it, \end{flushleft}
\begin{flushright} \ldots or right-justify it.\end{flushright}
```


You can center the text,

. . . or left-justify it,

. . . or right-justify it.

Quoted Text

```
Thank you for submitting your work.  The referee
has completed his report of your paper, and writes
\begin{quote}
    The manuscript purports to contains proofs of
    numerous results, some already well known,
    others outright false.  The proofs themselves
    are nonsensical.  Throughout the text there are
    numerous misspellings, recipes for various
    casseroles, and the instructions for building
    some kind of spaceship.  This clearly fails to
    be a work of serious scholarship, and has no
    place in a research journal.
\end{quote}
Accordingly, I regret that we are unable to accept
your manuscript for publication.  Let me mention in
passing, however, that your recipe for Fiesta Chili
Mac is To. Die. For.
```

Thank you for submitting your work. The referee has completed his report of your paper, and writes

> The manuscript purports to contains proofs of numerous results, some already well known, others outright false. The proofs themselves are nonsensical. Throughout the text there are numerous misspellings, recipes for various casseroles, and the instructions for building some kind of spaceship. This clearly fails to be a work of serious scholarship, and has no place in a research journal.

Accordingly, I regret that we are unable to accept your manuscript for publication. Let me mention in passing, however, that your recipe for Fiesta Chili Mac is To. Die. For.

Bullet Lists

```
\begin{itemize}
  \item 50 Rounds 38 Special PMC 132 grain FMJ
  \item 20 Rounds 9mm 124 grain JSP
  \item 20 Rounds .40 S\&W LRN
  \item 50 Rounds .357 Magnum 180 grain LFN
  \item 50 Rounds 44 Long Colt 230 grain LFN
\end{itemize}
```

- 50 Rounds 38 Special PMC 132 grain FMJ
- 20 Rounds 9mm 124 grain JSP
- 20 Rounds .40 S&W LRN
- 50 Rounds .357 Magnum 180 grain LFN
- 50 Rounds 44 Long Colt 230 grain LFN

Customized Bullets

```
\begin{itemize}
    \item[$\spadesuit$]  Tidy up parlor
    \item[$\heartsuit$]  Borrow table
    \item[$\diamondsuit$]  Make tea and sandwiches
    \item[$\clubsuit$]  Put Rottweiler in basement
\end{itemize}
```

- ♠ Tidy up parlor
- ♡ Borrow table
- ♢ Make tea and sandwiches
- ♣ Put Rottweiler in basement

Numbered Lists

```
\begin{enumerate}
    \item  Make list
     \begin{enumerate}
      \item Naughty
      \item Nice
     \end{enumerate}
    \item  Check it twice
\end{enumerate}
```

1. Make list
    (a) Naughty
    (b) Nice
2. Check it twice

Descriptive Lists

```
\begin{description}
    \item[Soup] Rag\^{o}ut of Farro and fresh mushrooms
    \item[Appetizer] Grilled Spanish Octopus with green
          olive and Chorizo pur{\'e}e
    \item[First Course] Duck confit en cro\^{u}te,
          drizzled in Marsala demi-glace
    \item[Dessert]  Twinkies and Old Milwaukee
\end{description}
```

Soup Ragôut of Farro and fresh mushrooms

Appetizer Grilled Spanish Octopus with green olive and Chorizo purée

First Course Duck confit en croûte, drizzled in Marsala demi-glace

Dessert Twinkies and Old Milwaukee

Put it on your tab

```
\begin{tabbing}
\hspace*{1cm}\= \hspace{4cm} \= \hspace{4cm}\= \kill \\
 \> {\bf Name} \> {\bf Year} \> {\bf Major} \\
 \> Smith \>  Senior \> Math \\
 \> Jones \>  Junior \> Physics\\
 \> Miller \> 7th Year \> 16C U/W B-W
\end{tabbing}
```

Name	**Year**	**Major**
Smith	Senior	Math
Jones	Junior	Physics
Miller	7th Year	16C U/W B-W

Benign Neglect

```
\LaTeX will ignore anything in a line after a
percent sign.  % blah blah blah
%
%  Use this to leave editorial notes
%  throughout your document
%
```

LaTeXwill ignore anything in a line after a percent sign.

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%   Rewrite this section
%
The proof is by induction on $N$.  For
$N = 1$ the claim is trivial.  Otherwise,
let $\tau$ be a strategy of length $N$.
For almost every fixed $x_1$, the
strategy $\tau'$ given by $\tau(x_1,\cdot)$
constitutes a strategy of length $N-1$.
By the induction hypothesis,
%
\begin{displaymath}
  V(\tau') \leq V^*_2   %  Check this step
\end{displaymath}
%
for $F$-almost every $x_1$, where
$V^*_2 = V(x_2-T^*_2, x_3-T^*_3,\ldots,
x_{N-1}-T^*_{N-1}, 0)$ is the expected
net return on the optimal strategy of
length $N-1$.
%
%  Pick up a gallon of milk on the way home
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Math Mode

```
Use Dollar signs (\$) to toggle in and out of math
mode.  Here is an example:  $a^2 + b^2 = c^2$.  If
you forget the \$, you'll get an error message.
```

Use Dollar signs ($) to toggle in and out of math mode. Here is an example: $a^2 + b^2 = c^2$. If you forget the $, you'll get an error message.

Formulas and Symbols

```
There's a way to get just about every formula or
symbol you could imagine.  Integrals can be generated
this way:  $\int_{x=a}^{x=b}\cos x \,dx = \sin b
- \sin a$.
```

There's a way to get just about every formula or symbol you could imagine. Integrals can be generated this way: $\int_{x=a}^{x=b} \cos x \, dx = \sin b - \sin a$.

\pm	$\pm$
\mp	$\mp$
\times	$\times$
\div	$\div$
\ast	$*$
\star	$\star$
\cap	$\cap$
\cup	$\cup$
\vee	$\vee$
\wedge	$\wedge$
\oplus	$\oplus$
\otimes	$\otimes$
\circ	$\circ$
\setminus	$\setminus$
\leq	$\leq$
\ll	$\ll$
\subset	$\subset$
\subseteq	$\subseteq$
\in	$\in$
\geq	$\geq$
\neq	$\neq$
\approx	$\approx$
\cong	$\cong$
\equiv	$\equiv$
\propto	$\propto$
\prec	$\prec$
\parallel	$\parallel$
\sim	$\sim$
\asymp	$\asymp$
\notin	$\notin$
\notequiv	$\not\equiv$

\leftarrow	$\leftarrow$
\Leftarrow	$\Leftarrow$
\rightarrow	$\rightarrow$
\Rightarrow	$\Rightarrow$
\leftrightarrow	$\leftrightarrow$
\Leftrightarrow	$\Leftrightarrow$
\mapsto	$\mapsto$
\hookleftarrow	$\hookleftarrow$
\leftharpoonup	$\leftharpoonup$
\leftharpoondown	$\leftharpoondown$
\longleftarrow	$\longleftarrow$
\Longleftarrow	$\Longleftarrow$
\uparrow	$\uparrow$
\Uparrow	$\Uparrow$
\nearrow	$\nearrow$
\searrow	$\searrow$
\aleph	$\aleph$
\imath	$\imath$
\jmath	$\jmath$
\wp	$\wp$
\Re	$\Re$
\Im	$\Im$
\heartsuit	$\heartsuit$
\prime	$\prime$
\emptyset	$\emptyset$
\top	$\top$
\forall	$\forall$
\exists	$\exists$
\flat	$\flat$
\sharp	$\sharp$
\neg	$\neg$

Math Displays

```
This is how to display a mathematical expression
outside of the main text.
\begin{displaymath}
   \int \frac{1}{1 + x^2}\,dx = \arctan x + c
\end{displaymath}
Notice that Dollar signs aren't needed.
```

This is how to display a mathematical expression outside of the main text.

$$\int \frac{1}{1+x^2}\,dx = \arctan x + c$$

Notice that Dollar signs aren't needed.

Arrays of Equations

```
\begin{eqnarray*}
   23^8 & \equiv & 23^6 \cdot 23^2 \mbox{\ (mod 7)}\\
      & \equiv & 1 \cdot 23^2 \mbox{\ (mod 7)}\\
      & \equiv & 23^2 \mbox{\ (mod 7)}\\
      & \equiv & (23 - 7 \cdot 3)^2 \mbox{\ (mod 7)}\\
      & \equiv & 2^2 \mbox{\ (mod 7)}\\
      & \equiv & 4  \mbox{\ (mod 7)}
\end{eqnarray*}
```

$$
\begin{aligned}
23^8 &\equiv 23^6 \cdot 23^2 \pmod 7 \\
&\equiv 1 \cdot 23^2 \pmod 7 \\
&\equiv 23^2 \pmod 7 \\
&\equiv (23 - 7 \cdot 3)^2 \pmod 7 \\
&\equiv 2^2 \pmod 7 \\
&\equiv 4 \pmod 7
\end{aligned}
$$

It's All Greek to Me

```
Greek letters are generated by typing their names,
preceded by a backslash:
\begin{displaymath}
\Phi=\oint_{S}\vec{\Upsilon}\cdot \vec{\sigma}\,d\mu
\end{displaymath}
```

Greek letters are generated by typing their names, preceded by a backslash:

$$\Phi = \oint_S \vec{\Upsilon} \cdot \vec{\sigma}\, d\mu$$

Limitless Possibilities

```
\begin{displaymath}
  \lim_{N\rightarrow\infty} \sum_{k=1}^{N}
    \frac{1}{k} \ \ = \ \ \infty
\end{displaymath}
```

$$\lim_{N\rightarrow\infty} \sum_{k=1}^{N} \frac{1}{k} \quad = \quad \infty$$

The Matrix

```
\begin{displaymath}\left[
  \begin{array}{rrr}
    a & b & c\\
    d & e & f
  \end{array}\right\}
\end{displaymath}
```

$$\left[\begin{array}{rrr} a & b & c \\ d & e & f \end{array}\right\}$$

Lay it on the Table

```
\begin{tabular}{r|c}
$k$ & $T_k$\\ \hline
1&67.6656\\
2&67.3284\\
3&66.8258\\
4&66.0693\\
5&64.9144\\
6&63.1165\\
7&60.1938\\
8&55.1250\\
9&45.0000
\end{tabular}
```

k	T_k
1	67.6656
2	67.3284
3	66.8258
4	66.0693
5	64.9144
6	63.1165
7	60.1938
8	55.1250
9	45.0000

Catch the Wave

```
\begin{displaymath}
  i\hbar \frac{\partial\psi}{\partial t}
  = -\frac{\hbar^2}{2m} \nabla^2 \psi + V\psi
\end{displaymath}
```

$$i\hbar\frac{\partial\psi}{\partial t} = -\frac{\hbar^2}{2m}\nabla^2\psi + V\psi$$

D.I.Y.

```
\newcommand{\msp}{(\mu,\Omega,\mathcal{F})}
%
Let $\msp$ be a measure space.
```

Let $(\mu, \Omega, \mathcal{F})$ be a measure space.

The Article Class of Documents

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
\documentclass[11pt,fleqn]{article}
\begin{document}
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%   Imagine your article here.
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%
\end{document}
```

The Title Page

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%              Title page
%
\title{\sc A Simple Proof\\  That All Numbers
Are Equal}
%
\author{Raymond Cheng   \\
Department of Mathematics and Statistics\\
Old Dominion University\\
Norfolk, Virginia 23529}
\date{\today}
\maketitle
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

A SIMPLE PROOF
THAT ALL NUMBERS ARE EQUAL

Raymond Cheng
Department of Mathematics and Statistics
Old Dominion University
Norfolk, Virginia 23529

November 18, 2012

The Abstract

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%               Abstract
%
\begin{abstract}
It is shown that for any commutative ring
with unit element the multiplicative
identity element coincides with the
additive identity element.  An inductive
argument then shows that the elements
of the ring itself coincide.  It is then
shown that equality persists to the
quotient field.

\vspace{.25in}
\noindent
{\small 2010 Mathematics Subject
Classification:  60G40, 91B44, 92B99\\
Keywords:  commutative ring; induction;
quotient field}  \end{abstract}
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Abstract

It is shown that for any commutative ring with unit element the multiplicative identity element coincides with the additive identity element. An inductive argument then shows that the elements of the ring itself coincide. It is then shown that equality persists to the quotient field.

2010 Mathematics Subject Classification: 60G40, 91B44, 92B99
Keywords: commutative ring; induction; quotient field

1

Sections

```
\section{Introduction}

Let $m$ and $n$ be any two integers.

\section{Results}

The difference $m-n$ is a multiple of unity.
```

1 Introduction

Let m and n be any two integers.

2 Results

The difference $m - n$ is a multiple of unity.

Theorems and Such

```
\newtheorem{mainresult}{Theorem}[section]
  \begin{mainresult}\label{Thm1A}
     If $x \perp y$, then $\|x\|^2+\|y\|^2 = \|x+y\|^2$.
  \end{mainresult}
%
\newtheorem{cheeseburger}[mainresult]{Lemma}
  \begin{cheeseburger}\label{Thm1B}
  If $x \perp y$, then $\langle x,y \rangle=0$.
  \end{cheeseburger}
%
Theorem \ref{Thm1A} follows immediately from
Lemma \ref{Thm1B}.
```

Theorem 1.1 *If $x \perp y$, then $\|x\|^2 + \|y\|^2 = \|x + y\|^2$.*

Lemma 1.2 *If $x \perp y$, then $\langle x, y\rangle = 0$.*

Theorem 1.1 follows immediately from Lemma 1.2.

Numbering Displayed Lines

```
\begin{eqnarray}
   S &=& 1 + r + r^2 +\cdots + r^n \label{first} \\
   rS &=&  r+ r^2 +\cdots + r^n + r^{n+1} \label{sec}
\end{eqnarray}
%
Subtract equation (\ref{first}) from equation
(\ref{sec}) to get
%
\begin{equation}
  S(r-1) = r^{n+1} - 1
\end{equation}
```

$$
\begin{aligned}
S &= 1 + r + r^2 + \cdots + r^n && (1)\\
rS &= r + r^2 + \cdots + r^n + r^{n+1} && (2)
\end{aligned}
$$

Subtract equation (1) from equation (2) to get

$$S(r-1) = r^{n+1} - 1 \qquad (3)$$

Footnotes

```
To make the brine, dissolve 1 Cup salt\footnote{Less
salt could be used for a longer steep.} and 1/2 Cup
dark brown sugar in 1 Gallon of water.  Let cool to
room temperature.  Immerse the turkey, breast side
down in the brine, adding approximately 1 gallon of
ice water to cover. Let steep 12 hours.\footnote{A
5 gallon cooler can hold a 15 pound bird.}  Remove
turkey from brine and rinse well with cold, fresh
water.  Discard brine.  Preheat oven to 350 degrees.
```

To make the brine, dissolve 1 Cup salt[1] and 1/2 Cup dark brown sugar in 1 Gallon of water. Let cool to room temperature. Immerse the turkey, breast side down in the brine, adding approximately 1 gallon of ice water to cover. Let steep 12 hours.[2] Remove turkey from brine and rinse well with cold, fresh water. Discard brine. Preheat oven to 350 degrees.

[1] Less salt could be used for a longer steep.

[2] A 5 gallon cooler can hold a 15 pound bird.

The Bibliography

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
%             Bibliography
%
\begin{thebibliography}{999}
%
\bibitem{SmiJon}{\sc John A.\ Smith and Bob
Jones}. Just what in heck are numbers, anyway?
{\it Int.\ J.\ Ign.\ Rants}  {\bf 12} (2005),
72--85.
%
\bibitem{Mill}{\sc L.\,H.\ Miller} {\it Dubious
Conjectures and Outright Falsehoods}.
Doublemint, New York (1988).
%
```

References

[1] John A. Smith and Bob Jones. Just what in heck are numbers, anyway? *Int. J. Ign. Rants* **12** (2005), 72–85.

[2] L. H. Miller *Dubious Conjectures and Outright Falsehoods*. Doublemint, New York (1988).

Citations

```
These results stand in contrast to the
conclusions of \cite{SmiJon}, which relied
on heuristic methods.
%
\begin{thebibliography}{999}
%
\bibitem{SmiJon}{\sc John A.\ Smith and Bob
Jones}. Just what in heck are numbers, anyway?
{\it Int.\ J.\ Ign.\ Rants}  {\bf 12} (2005),
72--85.
```

These results stand in contrast to the conclusions of [1], which relied on heuristic methods.

To Err is Human

Ppt Template.tex

Typeset | LaTeX | Macros | Tags | Templates

```
306 %
307 where $T^*_{k-1}$ satisfies $u(T^*_{k-1}) = V_{k}$.  Then the last expression simplifies to
308 %
309 \begin{eqnarray*}
310   {} & = & P\{ \tau_1 < 0,\ldots,\tau_{k-2} < 0 \} \int_{\{x \geq T^*_{k-1} \}} [u(x) - u(T^*_{k-1})] \,dF(x)\\
311    & & - P\{ \tau_1 < 0,\ldots,\tau_{k-2} < 0 \} (k-2)c\\
312    & & + P\{ \tau_1 < 0,\ldots,\tau_{k-2} < 0 \} (V_k - c)
313 \end{equnarray*}
314 %
315 We can now define
316 %
317 \begin{displaymath}
318   V_{k-1} = \int_{\{x \geq T^*_{k-1} \}} [u(x) - u(T^*_{k-1})] \,dF(x) + V_k - c
319 \end{displaymath}
320 %
```

Ppt Template console

Goto Error ^⌘E | Abort | Trash Aux Files

```
Overfull \hbox (127.5553pt too wide) in alignment at lines 261--268
 [][][] []
[7]

./Ppt Template.tex:313: LaTeX Error: \begin{eqnarray*} on input line 309 ended
by \end{equnarray*}.

See the LaTeX manual or LaTeX Companion for explanation.
Type  H <return>  for immediate help.
 ...

l.313 \end{equnarray*}

?
```

Packages

- Packages are extensions to LaTeX
- Many can be downloaded for free
- The package itself is a LaTeX command file saved in the document folder
- Packages offer additional commands, fonts, document classes, etc.

```
%
%
%
\documentclass{article}
\usepackage{fullpage,amsmath,graphics}
%
%
%
```

- "fullpage" - wider margins
- "amsmath" - more commands
- "graphics" - importing graphics

Put it to the Test

```
\documentclass[12pt,fleqn]{article}
\usepackage{fullpage}
%
\setlength{\parindent}{0in}
\setlength{\parskip}{12pt}
%
\begin{document}
%
\begin{center}
{\bf MATH 406/506 - Fall 2012 - Cheng\\
Test 3}
\end{center}
{\small \noindent Honor Pledge:  I pledge to support the
Honor System of Old Dominion University.}
%
{\bf Print Name}  \hspace{2in}{ \bf Signature} \hfill \\

(1) Find the least residue of $23^8$ (mod 7).\vspace{2.7in}

(2) Solve the following linear congruence.
  $3x \equiv 15$ (mod 18)\newpage
```

MATH 406/506 - Fall 2012 - Cheng
Test 3

Honor Pledge: I pledge to support the Honor System of Old Dominion University.

Print Name **Signature**

(1) Find the least residue of $23^8 \pmod 7$.

(2) Solve the following linear congruence. $3x \equiv 15 \pmod{18}$

By the Letter

```
\documentclass[12pt]{letter}
\name{Dr.\ Frank N.\ Bienz}
\address{Institut f\"ur Gastronomie\\
     Hamburg, Germany}
\signature{Frank N. Bienz, Ph.D.
\\ Professor}
\date{November 20, 1998}
\begin{document}
\begin{letter}{Mr.\ Tranh Sphadt\\
   Norfolk Doughnut Factory\\
   3 Glyceride Avenue\\
   Norfolk, VA 23510}
\opening{Dear Mr.\ Sphadt:}
It is my privilege to write in support of
Ms.\ Marge Arinne, who has applied for the
position of Deputy Assistant Fry-Station
Manager in your firm.  Ms. Arinne was a
student in my COOK 499 class last semester,
and achieved perfect scores on all of the
graded work.  She is a most capable and
original thinker, who will be a valuable
member of your team. I recommend her most
highly.
\closing{Yours truly,}
\end{letter}
\end{document}
```

Institut für Gastronomie
Hamburg, Germany

November 20, 1998

Mr. Tranh Sphadt
Norfolk Doughnut Factory
3 Glyceride Avenue
Norfolk, VA 23510

Dear Mr. Sphadt:

It is my privilege to write in support of Ms. Marge Arinne, who has applied for the position of Deputy Assistant Fry-Station Manager in your firm. Ms. Arinne was a student in my COOK 499 class last semester, and achieved perfect scores on all of the graded work. She is a most capable and original thinker, who will be a valuable member of your team. I recommend her most highly.

Yours truly,

Frank N. Bienz, Ph.D.
Professor

Resources

- www.latex-project.org
- www.ams.org
- H. Kopka and P. W. Daly, A Guide to LaTeX. Addison-Wesley: New York (1999).
- L. Lamport, LaTeX: A Document Preparation System. Addison-Wesley: New York (1994)
- http://www.lions.odu.edu/~hkaneko/GPD/Latex/frontpage.html

At Old Dominion University

- Ask the nice people from OCCS to install the software "MikTeX" on your office workstation.
- Do not install it yourself.
- In case of doubt, see last note.

More Symbols...

$*$ *	$\cdot$ \cdot	$\overline{\wedge}$ \doublebarwedge	$\setminus$ \smallsetminus
$+$ +	$\centerdot$ \centerdot	$\gtrdot$ \gtrdot	$\sqcap$ \sqcap
$-$ -	$\circ$ \circ	$\intercal$ \intercal	$\sqcup$ \sqcup
$\amalg$ \amalg	$\circledast$ \circledast	$\leftthreetimes$ \leftthreetimes	$\star$ \star
$\ast$ \ast	$\circledcirc$ \circledcirc	$\lessdot$ \lessdot	$\times$ \times
$\barwedge$ \barwedge	$\circleddash$ \circleddash	$\ltimes$ \ltimes	$\triangleleft$ \triangleleft
$\bigcirc$ \bigcirc	$\cup$ \cup	$\mp$ \mp	$\triangleright$ \triangleright
$\bigtriangledown$ \bigtriangledown	$\Cup$ \Cup	$\odot$ \odot	$\uplus$ \uplus
$\bigtriangleup$ \bigtriangleup	$\curlyvee$ \curlyvee	$\ominus$ \ominus	$\vee$ \vee
$\boxdot$ \boxdot	$\curlywedge$ \curlywedge	$\oplus$ \oplus	$\veebar$ \veebar
$\boxminus$ \boxminus	$\dagger$ \dagger	$\oslash$ \oslash	$\wedge$ \wedge
$\boxplus$ \boxplus	$\ddagger$ \ddagger	$\otimes$ \otimes	$\wr$ \wr
$\boxtimes$ \boxtimes	$\diamond$ \diamond	$\pm$ \pm	
$\bullet$ \bullet	$\div$ \div	$\rightthreetimes$ \rightthreetimes	
$\cap$ \cap	$\divideontimes$ \divideontimes	$\rtimes$ \rtimes	
$\Cap$ \Cap	$\dotplus$ \dotplus	$\setminus$ \setminus	

...and more symbols...

$<$ <
$=$ =
$>$ >
$\approx$ \approx
$\approxeq$ \approxeq
$\asymp$ \asymp
$\backsim$ \backsim
$\backsimeq$ \backsimeq
$\bumpeq$ \bumpeq
$\Bumpeq$ \Bumpeq
$\circeq$ \circeq
$\cong$ \cong
$\curlyeqprec$ \curlyeqprec
$\curlyeqsucc$ \curlyeqsucc
$\doteq$ \doteq
$\doteqdot$ \doteqdot
$\eqcirc$ \eqcirc
$\eqsim$ \eqsim
$\eqslantgtr$ \eqslantgtr
$\eqslantless$ \eqslantless
$\equiv$ \equiv
$\fallingdotseq$ \fallingdotseq
$\geq$ \geq
$\geqq$ \geqq
$\geqslant$ \geqslant
$\gg$ \gg
$\ggg$ \ggg
$\gnapprox$ \gnapprox
$\gneq$ \gneq
$\gneqq$ \gneqq
$\gnsim$ \gnsim
$\gtrapprox$ \gtrapprox
$\gtreqless$ \gtreqless
$\gtreqqless$ \gtreqqless
$\gtrless$ \gtrless
$\gtrsim$ \gtrsim
$\gvertneqq$ \gvertneqq
$\leq$ \leq
$\leqq$ \leqq
$\leqslant$ \leqslant
$\lessapprox$ \lessapprox
$\lesseqgtr$ \lesseqgtr
$\lesseqqgtr$ \lesseqqgtr
$\lessgtr$ \lessgtr
$\lesssim$ \lesssim
$\ll$ \ll
$\lll$ \lll
$\lnapprox$ \lnapprox
$\lneq$ \lneq
$\lneqq$ \lneqq
$\lnsim$ \lnsim
$\lvertneqq$ \lvertneqq
$\ncong$ \ncong
$\neq$ \neq
$\ngeq$ \ngeq
$\ngeqq$ \ngeqq
$\ngeqslant$ \ngeqslant
$\ngtr$ \ngtr
$\nleq$ \nleq
$\nleqq$ \nleqq
$\nleqslant$ \nleqslant
$\nless$ \nless
$\nprec$ \nprec
$\npreceq$ \npreceq
$\nsim$ \nsim
$\nsucc$ \nsucc
$\nsucceq$ \nsucceq
$\prec$ \prec
$\precapprox$ \precapprox
$\preccurlyeq$ \preccurlyeq
$\preceq$ \preceq
$\precnapprox$ \precnapprox
$\precneqq$ \precneqq
$\precnsim$ \precnsim
$\precsim$ \precsim
$\risingdotseq$ \risingdotseq
$\sim$ \sim
$\simeq$ \simeq
$\succ$ \succ
$\succapprox$ \succapprox
$\succcurlyeq$ \succcurlyeq
$\succeq$ \succeq
$\succnapprox$ \succnapprox
$\succneqq$ \succneqq
$\succnsim$ \succnsim
$\succsim$ \succsim
$\thickapprox$ \thickapprox
$\thicksim$ \thicksim
$\trianglelefteq$ \triangleleq

...and yet more symbols...

↺ \circlearrowleft	⇚ \Lleftarrow	↖ \nwarrow
↻ \circlearrowright	⟵ \longleftarrow	→ \rightarrow
↶ \curvearrowleft	⟸ \Longleftarrow	⇒ \Rightarrow
↷ \curvearrowright	⟷ \longleftrightarrow	⤖ \rightarrowtail
⇊ \downdownarrows	⟺ \Longleftrightarrow	⇁ \rightharpoondown
⇃ \downharpoonleft	⟼ \longmapsto	⇀ \rightharpoonup
⇂ \downharpoonright	⟶ \longrightarrow	⇄ \rightleftarrows
↩ \hookleftarrow	⟹ \Longrightarrow	⇌ \rightleftharpoons
↪ \hookrightarrow	↫ \looparrowleft	⇉ \rightrightarrows
← \leftarrow	↬ \looparrowright	⇝ \rightsquigarrow
⇐ \Leftarrow	↰ \Lsh	⇛ \Rrightarrow
↢ \leftarrowtail	↦ \mapsto	↱ \Rsh
↽ \leftharpoondown	⊸ \multimap	↘ \searrow
↼ \leftharpoonup	⇍ \nLeftarrow	↙ \swarrow
⇇ \leftleftarrows	⇎ \nLeftrightarrow	↞ \twoheadleftarrow
↔ \leftrightarrow	⇏ \nRightarrow	↠ \twoheadrightarrow
⇔ \Leftrightarrow	↗ \nearrow	↿ \upharpoonleft
⇆ \leftrightarrows	↚ \nleftarrow	↾ \upharpoonright
⇋ \leftrightharpoons	↮ \nleftrightarrow	⇈ \upuparrows
↭ \leftrightsquigarrow	↛ \nrightarrow	

...we've got symbols out the wazoo!

϶ \backepsilon	⊈ \nsubseteqq	⌣ \smallsmile	∴ \therefore
∵ \because	⊉ \nsupseteq	⌣ \smile	⊴ \trianglelefteq
≬ \between	⊉ \nsupseteqq	⊏ \sqsubset	⊵ \triangleq
◀ \blacktriangleleft	⋪ \ntriangleleft	⊑ \sqsubseteq	∝ \varpropto
▶ \blacktriangleright	⋬ \ntrianglelefteq	⊐ \sqsupset	⫋ \varsubsetneq
⋈ \bowtie	⋫ \ntriangleright	⊒ \sqsupseteq	⫋ \varsubsetneqq
⊣ \dashv	⋭ \ntrianglerighteq	⊂ \subset	⫌ \varsupsetneq
⌢ \frown	⊬ \nvdash	⋐ \Subset	⫌ \varsupsetneqq
∈ \in	⊮ \nVdash	⊆ \subseteq	△ \vartriangle
∣ \mid	⊭ \nvDash	⫅ \subseteqq	◁ \vartriangleleft
⊨ \models	⊯ \nVDash	⊊ \subsetneq	▷ \vartriangleright
∋ \ni	∥ \parallel	⫋ \subsetneqq	⊢ \vdash
∤ \nmid	⊥ \perp	⊃ \supset	⊩ \Vdash
∉ \notin	⋔ \pitchfork	⋑ \Supset	⊨ \vDash
∦ \nparallel	∝ \propto	⊇ \supseteq	⊪ \Vvdash
∤ \nshortmid	∣ \shortmid	⫆ \supseteqq	
∦ \nshortparallel	∥ \shortparallel	⊋ \supsetneq	
⊈ \nsubseteq	⌢ \smallfrown	⫌ \supsetneqq	

Fonts, too - don't get me started on fonts!

Cyrillic, medium weight – `wncyr10`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
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5	П	Ч	Р	С	Т	У	В	Ш	Ш	Ы	З	[	“	]	Ь	Ъ	5
6	‘	а	б	ц	д	е	ф	г	х	и	ј	к	л	м	н	о	6
7	п	ч	р	с	т	у	в	щ	ш	ы	з	–	—	№	ь	ъ	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	