



class: article report book slides letter

jarticle jreport jbook tarticle treport tbook jsarticle jsbook  
 [10pt 11pt 12pt a4paper a5paper b4paper b5paper a4j a5j b4j b5j  
 landscape onecolumn twocolumn oneside twoside notitlepage  
 titlepage fleqn leqno final draft tate openbib openright openany]

packages: AMS amscd amsthm graphicx color hyperref dvipdfm

PapersizeSpecial pagesize offset

pagestyle: plain empty headings myheadings \thispagestyle{*pstyle*}

title newtheorem

Environment

document

*abstract itemize enumerate description quotation quote center*

*verbatim tabular equation equation\* **array** slide bibliography*

\newenvironment{*name*}[*narg*][*default*]{*bigdef*}{*enddef*}

\renewenvironment{*name*}[*narg*]{*bigdef*}{*enddef*}

AMS L<sup>A</sup>T<sub>E</sub>X

*align align\* falign falign\* alignat alignat\* xalignat xalignat\* xxalignat  
gather gather\* multiline multiline\**

⇒

*subequation **split aligned alignedat gathered** text intertext*

\numberwithin{equation}{section} (in Preamble)

⇒

\notag \tag{ } \tag\*{ } \eqref{ } \ll[*len*] \theparentequation

\theequation  $\Leftarrow$  {\arabic{section},\arabic{equation}}

Count

$x + y$   $f(x)$   $\xleftarrow[1st]{2nd}$   $\xrightarrow[1st]{2nd}$   $\overset{a}{X}$   $X_a$   $\sum_{1}^{234}$   $\sum_{1}^{234}$   $\prod_5^2$   $\prod_3^4$

⇒

\mathop\* \DeclareMathOperator\*

Matrix:  $(\dots)$   $[\dots]$   $\{\dots\}$   $|\dots|$   $\|\dots\|$   $\dots$   $(\dots)$   $:(\dots)$

*MaxMatrixCols hdotsfor cases*

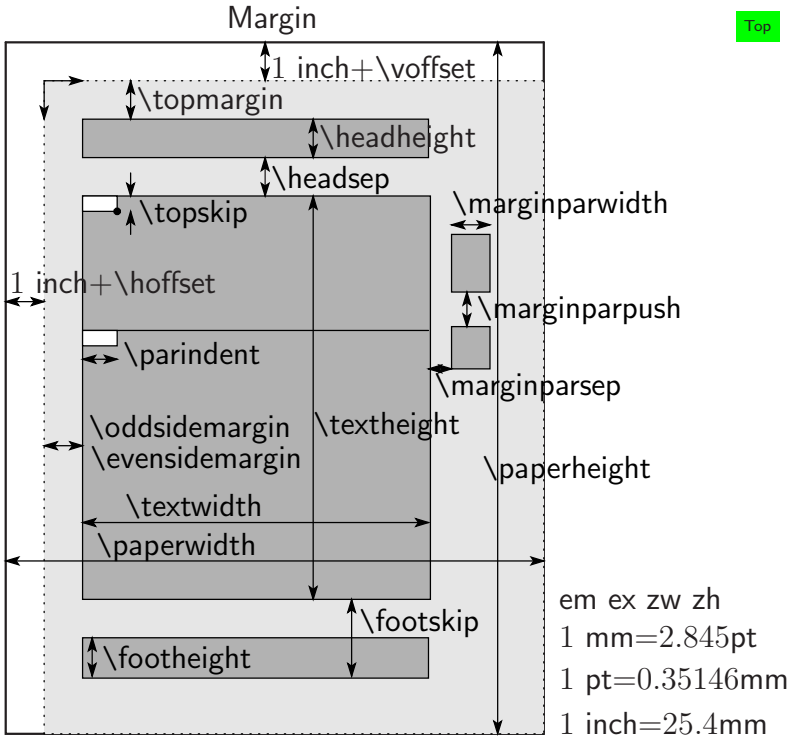
⇒

$\frac{a}{b}$   $\binom{n}{k}$   $\sqrt[3]{4}$  amscd:  $A \xrightarrow[down]{up} B$   
 $C \longleftarrow D$

Frac: \frac \tfrac \dfrac \cfrac[*pos*] (*pos*: l or r)

\genfrac{*ldelim*}{*rdelim*}{*thick*}{*style*}{*num*}{*denom*}

*style*: 0 ~ 3 (\displaystyle, \textstyle, \scriptstyle, \scriptscriptstyle)



• starting reference point:

$$x\text{-position} = 1 \text{ inch} + \text{\hoffset} + \text{\odd(enen)sidemargin}$$

$$y\text{-position} = 1 \text{ inch} + \text{\voffset} + \text{\topmargin} + \text{\headheight} + \text{\headsep} + \text{\topskip}$$

$$\text{\textheight} \equiv \text{\baselineskip} \times (\#(\text{lines/page}) - 1) + \text{\topskip}$$

$$\text{line space} = \text{\baselineskip} \times \text{\baselinestretch} \quad (=1 \text{ default value})$$

$$\text{\parskip} = 0\text{pt plus } 1\text{pt}$$

Indent

\leftline	\centerline	\rightline
<i>flushleft</i>	<i>center</i>	<i>flushright</i>

\hangafter = #lines

\hangindent = len

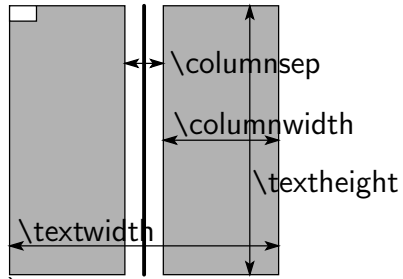
after #lines or top - #lines

Size

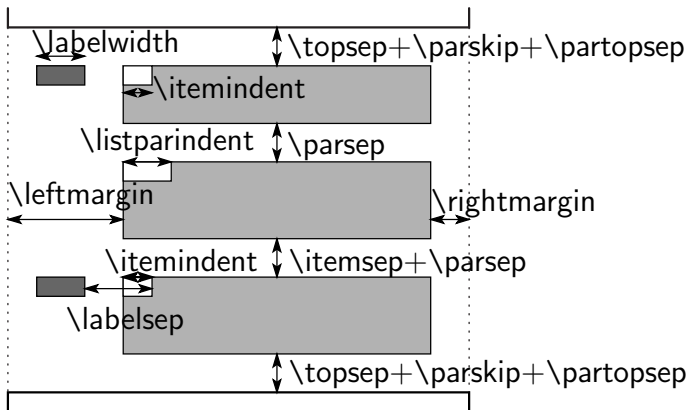
\scriptstyle \scriptscriptstyle (disp.)      \columnseprule

\tiny \scriptsize \footnotesize \small \normalsize

\large \Large \LARGE \huge \Huge



```
\begin{list}{default_label}{decls} item_list \end{list}
```



indent of label:  $\leftmargin - \labelwidth - \labelsep + \itemindent$   
 default:  $\rightmargin = \listparindent = \itemindent = 0$  pt  
 $\labelsep = 0.5$  em

```
\begin{trivlist} item_list \end{trivlist}
```

$\leftmargin = \labelwidth = 0$  pt,  $\parsep = \parskip$

```
\begin{enumerate} item_list \end{enumerate}
```

1 → (a) → i → A  $\labelenumi$   $\labelenumii$   $\labelenumiii$

$\labelenumiv$  ← Ex.  $\{\{\backslashbfseries\arabic{enumiv}\}\}$

```
\begin{itemize} item_list \end{itemize}
```

• → – → \* → ·  $\labelitemi$   $\labelitemii$   $\labelitemiii$

```
\begin{description} item_list \end{description}
```

$\descriptionlabel$  ← Ex.  $\{\hspace{\labelsep}\text{texts}\{#\!1\}\}$

## Space

$\vspace{\textit{len}}$   $\vspace*\{\textit{len}\}$   $\vfill = \vspace\{\fill\}$

$\hspace{\textit{len}}$   $\hspace*\{\textit{len}\}$   $\hfill = \hspace\{\fill\}$

$\fill = \stretch\{1\}$   $\stretch\{\textit{value}\}$

$\dotfill$   $\hrulefill$

$\smallskip 3\text{pt} \pm 1\text{pt}$   $\medskip 6\text{pt} \pm 2\text{pt}$   $\bigskip 12\text{pt} \pm 4\text{pt}$

$\! - \frac{3}{18}$   $\, \frac{3}{18}$   $\! > \frac{4}{18}$   $\, ; \frac{5}{18}$   $\, \_ \frac{9}{18}$   $\quad 1$   $\quad 2$  em

## Break

$\par$   $\fussy$   $\sloppy$   $\parskip$   $\parindent$

$\backslash[\textit{len}]$   $\newline$   $\linebreak[\textit{lev}]$   $\nolinebreak[\textit{lev}]$   $\textit{lev}:0-4$  (default)

$\newpage$   $\clearpage$   $\cleardoublepage$   $\samepage$

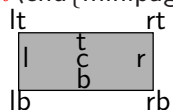
$\pagebreak[\textit{lev}]$   $\nopagebreak[\textit{lev}]$   $\enlargethispage\{\textit{len}\}$

$\raggedbottom$   $\flushbottom$

## Box

Top

`\makebox[width][pos]{text}`  
`\mbox{text}`  
`\raisebox{lift}[height][depth]{text}`  
`\width \height \depth \totalheight \fboxrule=0.4pt \fboxsep=3pt`  
`\thinlines \thicklines \linethickness{len}`  
`\unitlength \makebox(w,h)[ipos]{text} \framebox(w,h)[ipos]{text}`  
`\begin{minipage}[pos][height][inner_pos]{width}text\end{minipage}`  
`\parbox[pos][height][inner_pos]{width}{text}`  
**pos:** c l r s                    **inner\_pos:** c t b s  
`\shortstack[pos]{text\ \cdots text}`  
`\rule[lift]{width}{total_height}`  
`\newsavebox{cmd}`                    declare box  
`\savebox{cmd}[width][pos]{text}`    fill box  
`\sbox{cmd}{text}`                    fill box  
`\begin{lrbox}{cmd} text \end{lrbox}`    fill box  
`\usebox{cmd}`                        use contents



## Tab

longtable

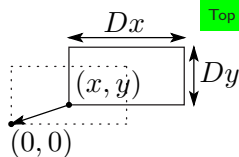
`tabbing`                    `\kill`    `\pushtabs`    `\poptabs`  
 indent: `\+` `\-`            this indent: `\<`    left col: `\'`    right most: `\'`  
`\begin{tabbing}`  
`... \= ... \= ... \kill`  
`... \> ... \> ... \> ... \\\`  
`... \> ... \> ... \> ... \+ \\\`  
`... \> \'+ ... \\\`  
`\end{tabbing}`

`tabular[pos]{cols}`            **pos:** t b  
`cols = column:` l c r p {width}    **separator:** | || @ {decl.}  
`\tabcolsep=len`    `\doublerulesep=len`    `\hline`  
`tabular*{width}[pos]{cols}`    `\extracolsep{\fill}`  
`\begin{tabular}{| c | | | r |}\hline`  
`... & ... & ... & ... \\\ \hline`  
`... & \multicolumn{2}{c |}{...} \\\ \hline`  
`\end{tabular}`                    `\end{array}`

`\[ array[pos]{cols} \]`  
`\arrayrulewidth=len`    `\extrarowheight=len`    `\arraystretch=val`  
`\cline{m-n}`    `\hline` from the *m*-th column to the *n*-th    `\vline`  
`\multicolumn{ncol}{col}{text}`    **col=column separator**  
 more **column:** p {width} = `\parbox[t]{width}`  
                   m {width} = `\parbox{width}`  
                   b {width} = `\parbox[b]{width}`  
**separator:** > {decl.} (pre-col.) < {decl.} (post-col.) ! {decl.} (any)  
**cols:** |c|r@{.}|>{\parindent=5mm}m{2cm}|>{\\$}c<{\\$}|  
 $\Rightarrow |col1 || col2.col3 | \parbox{2cm} \{ \parindent=5mm col4 \} | \$col5 |$

## Picture

`picture(Dx,Dy)(x,y) \unitlength=`  
`\put(x,y){object}`  
`\multiput(x,y)(Dx,Dy){num}{object}`



*object:*

`\line(Dx,Dy){L}`  $-6 \leq Dx, Dy \leq 6$ , *Dx, Dy*: integer  
`\vector(Dx,Dy){L}`  $-4 \leq Dx, Dy \leq 4$ , *Dx, Dy*: integer  
`\circle{diam}` `\circle*{diam}` (fill circle)  
`\oval(Dx,Dy)[pos]` *pos*: l c r t u b

## Figure

Xy-pic

Young

bar

`figure[pos]` `table[pos]` `figure*[pos]` `table*[pos]`  
`\figurename` `\tablename`  
*pos*: h (here) t (top) b (bottom) p (last page) (h>t>b>p)

*ratio* ( $0 \leq ratio \leq 1$ ): `\topfraction` `\bottomfraction` `\textfraction`  
`\dbltopfraction` `\dblfloatpagefraction`

*len*: `\floatsep` `\textfloatsep` `\intextsep` `\dblfloatsep` `\dbltextfloatsep`

`\usepackage{floatfig}` `floatingfigure[width]`  
`\usepackage{wrapfig}` `wrapfigure[nlines]{rl}{width}`

## Verb

`\verb|text|` `verbatim` `\verb*|text|` `verbatim*` (␣ for a space)

## Footnote

Count

`\footnote[count]{text}`  
`\footnotemark[count]` `\footnotetext[count]{text}`  
`\footnotesep=` `\renewcommand{\footnoterule}{rule}`  
*rule*: `\noindent\rule{130mm}{0.5mm}\vspace{1mm}`

## Reference

`\label{label}` `\ref{label}` `\eqref{label}` `\pageref{label}`  
`thebibliography{widest_entry}` `\bibitem[label]{cite_key} contents`  
`\cite{text}{cite_key_list}`

## Index

`\makeindex`  $\Rightarrow$  `\usepackage{makeidx}`  $\Rightarrow$  `\printindex`  
`\index{key@visual!key2@visual2!...|see{text}}`  
 |( (top of pages) |) (end of pages)  
`\seename` (see) `\indexname` (Index)

## Counter

part section subsection subsection paragraph subparagraph  
 equation figure table page footnote mpfootnote  
 enumi enumii enumiii enumiv (List)

`\newcounter{counter}` `\value{counter}`

`\setcounter{counter}{value}` `\addtocounter{counter}{value}`

`\advance\value{counter} by value`

`\multiply\value{counter} by value`

`\divide\value{counter} by value`

`\renewcommand{\thecounter}{format}`



`\arabic \alph \Alph \roman \Roman \fnsymbol`

Ex: `\renewcommand{\thepage}{--\arabic{page}--}`

`\setcounter{page}{12}`

## Chapter

`\part \chapter \section \subsection \subsubsection \paragraph`  
`\subparagraph \appendix`

`\partname \chaptername`



`\prepartname \postpartname \prechaptername \postchaptername`

`\abstractname \appendixname \contentsname \figurename`

`\tablename \listfigurename \listtablename \refname \bibname`

1 inch = 72.27 pt = 25.4 mm, 1 pt = 0.35146 mm

A4:  $\begin{cases} \backslash\text{paperwidth} = 210 \text{ mm} = 597 \text{ pt} \\ \backslash\text{paperheight} = 297 \text{ mm} = 845 \text{ pt} \end{cases}$

`\documentclass[a4paper]{article}`

`\textwidth=345pt=121.25mm` `\textheight=598pt=210.2mm`

`\oddsidemargin=53pt=18.6mm` `\topmargin=17pt=6.0mm`

`\headheight=12pt=4.2mm` `\headsep=25pt=8.8mm`

`\marginparwidth=57pt=20.0mm` `\marginparsep=11pt=3.9mm`

`\documentclass[a4j]{jarticle}`

`\textwidth=418pt=146.9mm` `\textheight=641pt=225.3mm`

`\oddsidemargin=17pt=6.0mm` `\topmargin=-3pt=-1.1mm`

`\headheight=12pt=4.2mm` `\headsep=25pt=8.8mm`

`\marginparwidth=60pt=21.1mm` `\marginparsep=10pt=3.5mm`

`\documentclass[a4j]{jsarticle}`

`\textwidth=453pt=159.2mm` `\textheight=634pt=222.8mm`

`\oddsidemargin=0pt=0mm` `\topmargin=4pt=1.4mm`

`\headheight=20pt=7.0mm` `\headsep=18pt=6.3mm`

`\marginparwidth=18pt=6.3mm` `\marginparsep=18pt=6.3mm`

# Graphics

Top

`\usepackage[opt]{graphicx}`      `\usepackage[opt]{graphicx,color}`

*opt*: dvips dviout dviptfm xdvi pdftex draft final hiresbb

`\includegraphics[para]{file_name}`

*para*: width=*len*, height=*len*, scale=*value*, keepaspectratio, clip

bb=*x*<sub>1</sub> *y*<sub>1</sub> *x*<sub>2</sub> *y*<sub>2</sub> (ex. bb=0 0 640 480), hiresbb, draft

trim=*l b r t* (by 1/72 inch, ex. trim=0 0 5 0)

angle=*value* (by degree)

`\rotatebox[opt]{angle}{text}`      *angle*: counterclockwise by *degree*

*opt*: origin=*lrctbB* (B:Baseline), x=*len*, y=*len*

units=6.2832 (by radian)

`\saclebox{scale}[vscale]{text}`      scalebox

`\reflectbox{text}`      xodtjclftelr

`\resizebox{width}{height}{text}`      `\width` `\height` `\hsize` !=*keep ratio*

ex: `\resizebox{0.9\hsize}{!}{...}`

`\resizebox*{width}{height+depth}{text}`

`{\color[opt]{col}text}`      `\textcolor[opt]{col}{text}`

*col*: black white red green blue cyan magenta yellow

`[opt]{col}`: [gray]{*val*} [rgb]{*r,g,b*} [cmymk]{*c,m,y,k*} [named]{*color*}

`\colorbox[opt]{col}{text}`      colorbox

`\fcolorbox[opt]{frame_col}{fill_col}{text}`      fcolorbox

`\fboxrule=len` `\fboxsep=len` `\definecolor{name}{opt}{value}`

GreenYellow      Yellow      Goldenrod      Dandelion      Apricot

Peach      Melon      YellowOrange      Orange      BurntOrange      Bittersweet

RedOrange      Mahogany      Maroon      BrickRed      Red      OrangeRed

RubineRed      WildStrawberry      Salmon      CarnationPink      Magenta

VioletRed      Rhodamine      Mulberry      RedViolet      Fuchsia      Lavender

Thistle      Orchid      DarkOrchid      Purple      Plum      Violet      RoyalPurple

BlueViolet      Periwinkle      CadetBlue      CornflowerBlue      MidnightBlue

NavyBlue      RoyalBlue      Blue      Cerulean      Cyan      ProcessBlue

SkyBlue      Turquoise      TealBlue      Aquamarine      BlueGreen      Emerald

JungleGreen      SeaGreen      Green      ForestGreen      PineGreen      LimeGreen

YellowGreen      SpringGreen      OliveGreen      RawSienna      Sepia      Brown

Tan      Gray      Black      White



## Sample

Top

`\text{..{ } }` : Roman **Boldface** *Italic* *Slanted* Sans\_Serif  
 Typewriter SMALL\_CAPS  
`\normalfont \rmfamily \sffamily \ttfamily \mcfamily \gtfamily`  
`\bfseries \mdseries \upshape \itshape \slshape \scshape`  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
 a b c d e f g h i j k l m n o p q r s t u v w x y z  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
`\sideset \mathop \overset \stackrel \atop \atopwithdelims`

$$a \sum_c^d \Phi_{n=1}^\infty \quad abc \quad ab^c \quad a^{bb} \quad a^c \quad ab^c \quad \langle b \rangle_a \quad b \} a \quad abc$$

$$\underbrace{(0, \dots, 0, 1, \dots, 1, 2, \dots, 2)}_{q+r} \quad \begin{matrix} p+q \\ q+r \end{matrix}$$

## Macros

Top

`\ensuremath{math-text}`  
`\newif\ifname \nametrue \namefalse`  
`\ifname true-case \else false-case \fi`  
`\IfFileExists{filename}{true-case}{false-case}`

## Sample Macros

Top

`\ruby{text}{ruby}{font}`: p $\LaTeX$  \ruby  
`\kenten{text}`: p $\LaTeX$  \kenten  
`\kintou{len}{text}`: p $\LaTeX$  \kintou{1cm}  
`\slantbox{angle}{text}`:  $-30 \leq \textit{angle} \leq 30$  (by degree, use graphicx)  
`\slantbox{-12}{slant} \slantbox{30}` slant  
`\coord{#1}{#2}{#3}`: ( $\#1\#2, \dots, \#1\#3$ )  
`\coord x1n`: ( $x_1, \dots, x_n$ )  
`\set{#1}{#2}{#3}`:  $\{\#1\#2, \dots, \#1\#3\}$   
`\set a1n`:  $\{a_1, \dots, a_n\}$   
`\setdef{#1}{#2}`:  $\{\#1;\#2\}$   
`\setdef{(x,y)}{x^2+y^2=1}`:  $\{(x,y); x^2 + y^2 = 1\}$   
`\setdef[|]{(x,y)}{x^2+y^2=1}`:  $\{(x,y) | x^2 + y^2 = 1\}$   
`\ang{#1}{#2}`:  $\langle \#1, \#2 \rangle$   
`\ang\alpha\beta`:  $\langle \alpha, \beta \rangle$   
`\ang[|]\alpha\beta`:  $\langle \alpha | \beta \rangle$

```
\begin{equation}
\begin{split}
a& =b+c-d\\[-3pt]
& \quad +e-f\\
& =g+h
\end{split}
\end{equation}
```

$$a = b + c - d + e - f = g + h \quad (1)$$

```
\begin{multline}
a+b+c+d+e+f\\
+i+j+k+l+m+n
\end{multline}
```

$$a + b + c + d + e + f + i + j + k + l + m + n \quad (2)$$

```
\begin{gather}
a_1=b_1+c_1\label{eq1}\\
a_2=b_2+c_2-d_2+e_2
\end{gather}
```

$$a_1 = b_1 + c_1 \quad (3)$$

$$a_2 = b_2 + c_2 - d_2 + e_2 \quad (4)$$

```
\begin{align}
a_{11}& =b_{11}& \\
a_{12}& =b_{12}& \\
a_{21}& =b_{21}& \\
a_{22}& =b_{22}+c_{22}
\end{align}
```

$$a_{11} = b_{11} \quad a_{12} = b_{12} \quad (5)$$

$$a_{21} = b_{21} \quad a_{22} = b_{22} + c_{22} \quad (6)$$

```
\begin{align*}
x& = y_1-y_2-\cdots \\
& \quad \text{by Lemma} \\
& = y' \circ y^* \\
& \quad \text{by \eqref{eq1}}
\end{align*}
```

$$x = y_1 - y_2 - \cdots \quad \text{by Lemma}$$

$$= y' \circ y^* \quad \text{by (3)}$$

```
\begin{alignat*}{2}
x& = y_1-y_2-\cdots \\
& \quad \text{by Lemma} \\
& = y' \circ y^* \\
& \quad \text{by \eqref{eq1}}
\end{alignat*}
```

$$x = y_1 - y_2 - \cdots \quad \text{by Lemma}$$

$$= y' \circ y^* \quad \text{by (3)}$$

```
\begin{flalign}
a_{11}& =b_{11} & a_{12} = b_{12} & (7) \\
a_{12}& =b_{12} & \\
a_{21}& =b_{21} & a_{22} = b_{22} + c_{22} & (8) \\
a_{22}& =b_{22}+c_{22}
\end{flalign}
```

$$a_{11} = b_{11} \quad a_{12} = b_{12} \quad (7)$$

$$a_{21} = b_{21} \quad a_{22} = b_{22} + c_{22} \quad (8)$$

```

\begin{align}
x^2+y^2 &= z^2 \quad \backslash\text{label}\{eqx\}\backslash\quad (9) \\
x^3+y^3 &= z^3 \quad \backslash\text{notag}\backslash\quad x^3 + y^3 = z^3 \\
x^4+y^4 &= z^4 \quad \backslash\text{tag}\{[4th]\}\backslash\quad x^4 + y^4 = z^4 \quad [4th] \\
x^5+y^5 &= z^5 \quad \backslash\text{tag}\{\backslash\text{ref}\{eqx\}'\}\quad x^5 + y^5 = z^5 \quad (9')
\end{align}

```

```

\begin{subequations}
\begin{align}
x^6+y^6 &= z^6 \quad (10a) \\
x^7+y^7 &= z^7 \quad (10b)
\end{align}
\end{subequations}

```

```

\[\backslash\begin{gathered}[b]
xy = c \quad x + y = b \quad x + y = b \\
\end{gathered} \quad \backslash\text{qqquad} \\
\backslash\begin{aligned}[t]
c &= x(b-x) \quad \&= -x^2+bx \quad = bx - x^2 \\
\end{aligned} \quad \backslash]

```

```

\begin{equation}
\overset{*}U = \underset{*}X + \overset{a}\{\underset{b}Z\} \\
\quad \backslash\text{quad} \quad \backslash\text{xleftarrow}[xi]{b\to\infty} \quad \backslash\text{quad} \\
\sum\backslash\text{no limits}' a_n = \backslash\text{sideset}\{-1^2\}\{-3^4\}\backslash\text{prod}_k b_k \\
+ \backslash\text{sideset}\{\}\{\}'\backslash\text{sum} \\
\quad \backslash\text{substack}\{0 \le m \le n \backslash\backslash 0 \le n \le \infty\} c_n^m \\
\end{equation}
U = X + Z \xrightarrow[\xi]{b \to \infty} \sum' a_n = \prod_1^4 b_k + \sum'_{\substack{0 \le m \le n \\ 0 \le n \le \infty}} c_n^m \quad (11)

```

```

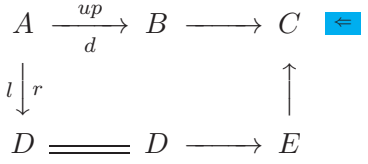
\DeclareMathOperator*\esssup\{ess\,sup\} % Preamble
\DeclareMathOperator*\Hom\{Hom\} % Preamble
\newcommand{\abs}[1]{\lvert#1\rvert}
\newcommand{\norm}[1]{\lVert#1\rVert}
\begin{equation}
\norm{f}_{\infty} = \esssup_{x \in \mathbb{R}^n} \abs{f(x)} \\
\text{\text{ and }} \Hom_R(A, B)^* = \Hom_R(B^*, A^*) \\
\end{equation}
\|f\|_{\infty} = \esssup_{x \in \mathbb{R}^n} |f(x)| \text{ and } \Hom_R(A, B)^* = \Hom_R(B^*, A^*) \quad (12)

```

```

\[\begin{CD}
A @>\up>> B @>>> C \\
@V{1}VV @. @AAA \\
D @= D @>>> E
\end{CD}\]

```



```

\begin{align}
u & \equiv v+1 \pmod{n^2} \\
u & \equiv v+1 \pmod{n^2} \\
u & \equiv v+1 \pmod{n^2}
\end{align}

```

$$\begin{aligned}
 u &\equiv v+1 \pmod{n^2} & (13) \\
 u &\equiv v+1 \pmod{n^2} & (14) \\
 u &\equiv v+1 \pmod{n^2} & (15)
 \end{aligned}$$

```

\begin{equation}
\cfrac{1}{2+}
\cfrac{3}{4+}
\cfrac{r}{5}{6+\cdots}
\end{equation}

```

$$\frac{1}{2 + \frac{3}{4 + \frac{5}{6 + \dots}}} \quad (16)$$

```

\begin{equation}
\genfrac{[{}]{1pt}{}{n-3}{m}
\end{equation}

```

$$\left[ \frac{n-3}{m} \right] \quad (17)$$

```

\[\begin{vmatrix}
a & \cdots & b & \cdots & d \\
\vdots & & \ddots & & \vdots \\
e & \cdots & f & \cdots & g \\
m & \hdotsfor{3} & & & n
\end{vmatrix}\]

```

$$\begin{vmatrix}
 a & \cdots & b & \cdots & d \\
 \vdots & & \ddots & & \vdots \\
 e & \cdots & f & \cdots & g \\
 m & \cdots & \cdots & \cdots & n
 \end{vmatrix}$$

```

[E_{ij}=\bordermatrix{
& & i \\
& & i & \cr
& & \vdots & \cr
j & \cdots & 1 & \phantom{\cdots} & \cr
& & \phantom{\vdots} & & \cr
}

```

$$E_{ij} = j \begin{pmatrix} i \\ \vdots \\ \cdots & 1 \end{pmatrix}$$

```

\[\begin{cases}
1 & \text{if } x > 0 \\
-1 & \text{if } x < 0
\end{cases}
\end{cases}

```

$$Y(x) = \begin{cases} 1 & \text{if } x > 0 \\ -1 & \text{if } x < 0 \end{cases}$$

```

\sqrt{\mathstrut{a}}+\sqrt{\mathstrut{f}}$
\sqrt{a}+\sqrt{f}$

```

$$\begin{aligned}
 &\sqrt{a} + \sqrt{f} \\
 &\sqrt{a} + \sqrt{f}
 \end{aligned}$$



```

\begin{tabular}{|c||l|r|} \hline
\multicolumn{3}{|c|}{Rooms} \\ \hline
\multicolumn{1}{|c|}{Floor} & Name & \\ \hline
\multicolumn{1}{|c|}{Area} \\ \hline
1 & kitchen & $42 m^2$ \\ \hline
& study & $57 m^2$ \\ \cline{2-3}
2 & living & $120 m^2$ \\ \hline
\end{tabular}

```

Rooms		
Floor	Name	Area
1	kitchen	42m <sup>2</sup>
	study	57m <sup>2</sup>
2	living	120m <sup>2</sup>

```

\newcommand{\topsp}[1]{\vbox{\vbox to#1{\vbox to1em{}}}}
\newcommand{\tbsp}[2]{\rule{0pt}{#1}\rule[-#2]{0pt}{0pt}}
\begin{tabular}{|l@{\vrule width 2pt}c|r|}

```

```

\hline\topsp{2mm}%
1 & 2 & 3 \\ [2mm] \hline
A & B & C \tbsp{8mm}{4mm} \\ \hline
a-1 & b-2 & c-3 \\ \hline
\end{tabular}

```

1	2	3
A	B	C
a-1	b-2	c-3

```

\tabcolsep=10mm
\begin{tabular}{|l|p{40mm}|} \hline
tabular & This is used for text. \\ \hline
array & This is mainly used for equations. \\ \hline
\end{tabular}

```

tabular	This is used for text.
array	This is mainly used for equations.

```

\begin{tabular}{r@{.}l}
3 & 14259 \\
$-$ & $ 2 & 71828 \\ \hline
0 & 42431 \\ \hline
\end{tabular}

```

3.14259
- 2.71828
0.42431

```

\begin{tabular*}{0.5\textwidth}{@{\extracolsep{\fill}}|l|c|r|} \hline
1234 & A & B \\ \hline
\end{tabular*}

```

1234	A	B
------	---	---

```

\begin{tabbing}
aaa \= \hspace{10mm} \= cccc\kill
aa \> bb \> cc\\
aaa \> bbb \> c
\end{tabbing}

\begin{tabbing}
AA\=BB\=CC\=DD\=EE \kill
a\> b\> c\> d\> e\+|\+|\+ \\\
a\> b \\\
\<\< a\> b \\\
a\> b \\'g\|- \\\
a\> b \\'ggg \\\
a\> b\> y\' c \\\

```

```

\pushtabs
A\=A\=A\=\kill \\\
1\>2\>3\\
4\>5\>6\\

```

```

\poptabs
\ a={0}\> \ a'\{a}\> \ a'\{e}\\\
\end{tabbing}

```

```

\usepackage{array}
\begin{tabular}{!{\vrule width 2pt}>{\bfseries}c!|}%
>{\$}c<{\$}|>{\setlength{\parindent}{5mm}}m{2cm}%
!{\vrule width 2pt}}
\noalign{\hrule height 2pt}
Differential & (x^3)' = 3x^2
& Study in this week.\par Review!\! \hline
Integral & \int x^2 dx = \frac{2}{3}x^3 + C
& Study in this month. \\\
\end{tabular}

```

Differential	$(x^3)' = 3x^2$	Study in this week. Review!
Integral	$\int x^2 dx = \frac{2}{3}x^3 + C$	Study in this month.

```
\usepackage{longtable}
```

```
%\setlongtable
```

```
\begin{longtable}[pos]{cols} % pos: c l r
```

```
%%\setlength{LTleft}{ } % \fill
```

```
%%\setlength{LTright}{ } % \fill
```

```
%%\setlength{LTpre}{ } % \bigskipamount
```

```
%%\setlength{LTpost}{ } % \bigskipamount
```

```
%%\setlength{LTcapwidth}{ } % 4in
```

```
%\caption{ } % \caption*{title}
```

```
%%\ \hline % \caption[short title]{long title}
```

```
%%%
```

```
%%\multicolumn{}{}{} \ \hline
```

```
%% & & \ \hline
```

```
%%\endfirsthead % first page
```

```
%%%
```

```
%\hline
```

```
%\multicolumn{}{}{} \ \hline
```

```
% & & \ \hline
```

```
%\endhead % each page
```

```
%%%
```

```
%%\hline
```

```
%%\multicolumn{}{}{} \ \hline
```

```
%%\endfoot % each page
```

```
%%%
```

```
%%\hline
```

```
%%\multicolumn{}{}{} \ \hline
```

```
%%\endlastfoot % last page
```

```
% & & \kill
```

```
& & \ \
```

```
& & \ \
```

```
%\newpage
```

```
& & \ \
```

```
\end{longtable}
```

```
\usepackage{dcolumn} decimal places=-1: no limit
```

```
D{inputsep}{outputsep}{decimal places}
```

```
\usepackage{multirow}
```

```
\multirow{nrow}[njob]{width}[vmove↑]{text}
```

Counter	Value	Type
part	\thepart	\Roman
chapter	\thechapter	\arabic
section	\thesection	\arabic
subsection	\thesubsection	\arabic
subsubsection	\thesubsubsubsection	\arabic
paragraph	\theparagraph	\arabic
subparagraph	\thesubparagraph	\arabic
equation	\theequation	\arabic
figure	\thefigure	\arabic
table	\thetable	\arabic
page	\thepage	\arabic
footnote	\thefootnote	\arabic
mpfootnote	\thempfootnote	\arabic
enumi	\theenumi	\arabic
enumii	\theenumii	\alph
enumiii	\theenumiii	\roman
enumiv	\theenumiv	\Alph

Name	Definition
\partname	Part
\prepartname	
\postpartname	
\chaptername	Chapter
\prechaptername	
\postchaptername	
\abstractname	Abstract
\appendixname	Appendix
\contentsname	Contents
\figurename	Figure
\tablename	Table
\listfigurename	List of Figures
\listtablename	List of Tables
\refname	References
\bibname	Bibliography
\indexname	Index
\seename	see

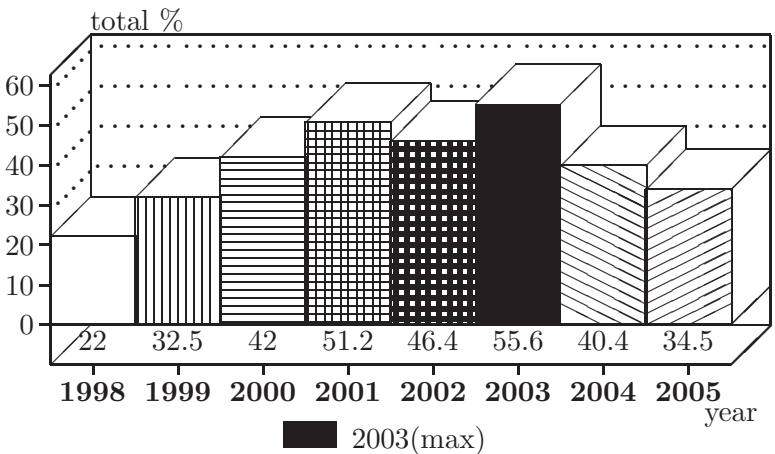


```

\usepackage{bar}
\begin{barenv}
  \setwidth{32}           % width of a bar by point
  \setstyle{\small\bfseries} % font
  \setxaxis{1998}{2005}{1}
  \setxname{year}
  \setstyle{\small\rmfamily}
  \setyaxis[10]{0}{63}{10} % [offset]{origin}{end}{step}
  \setyname{total \%}
%\setprecision{digits}
  \setstretch{1.5}       % vertical stretch
  \setlinestyle{dotted}  % solid or dotted
  \hlineon               % horizontal line
  \setdepth{10}         % 3 dimensional  $\geq 10$ 
%\sethspace{val}        % val:0~1
  \setnumberpos{down}
    % empty, axis, down, inside, outside, up
  \bar{22}{1}   \bar{32.5}{2} % \bar{height}{idx}[text]
  \bar{42}{3}   \bar{51.2}{4} %   idx:0~8
  \bar{46.4}{5} \bar{55.6}{8}
  \bar{40.4}{7} \bar{34.5}{6}
\end{barenv}

\centerline{\legend8{2003(max)} % \legendidx{text}

```



## L-Click:

Click the left button on the mouse at the hot spot.

L-Click at green box or cyan box :

HyperJump to the corresponding spot.

L-Click at blue letters:

Copy command string to Clipboard.

L-Click with [ALT] at blue letters:

Append command string to Clipboard.

L-Click with [CTRL] at blue letters:

Copy command string to Clipboard and an Editor.

L-Click with [CTRL]+[ALT] at blue letters:

Copy command string to Clipboard and a new Editor.

## R-Click:

Click the right button on the mouse to enlarge the area.

In the above L-Click at blue letters, the functions with/without [CTRL] are inverted if Option → Clipboard+Editor is checked.

[PgDn] or [N]: Go to the Next page.

[PgUp] or [P]: Go to the Previous page.

[CTRL]+[T]: Go to the Top page.

[CTRL]+[B]: Go to the Bottom page.

[ALT]+[X]: Terminate Help TeX.

## Character Codes

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f	
20	_	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	09 TAB
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	0d CR
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	0a LF
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	
60	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
70	p	q	r	s	t	u	v	w	x	y	z	{		}	~		