

AMST_EX Reference Card

(See the T_EX Reference Card for further commands)

Formatting

<code>\pagewidth{<dimen>}</code>	set page width
<code>\pageheight{<dimen>}</code>	set page height
<code>\hcorrection{<dimen>}</code>	move page right
<code>\vcorrection{<dimen>}</code>	move page down
<code>\flushpar</code>	start a paragraph with no indentation
<code>\boxed#1</code>	boxed formula
<code>\NoBlackBoxes</code>	omit overfull hbox markers
<code>\comment ... \endcomment</code>	unprinted comments
<code>\pageno#1</code>	set page number
<code>\nopagenumbers</code>	turn off page numbering if not using <code>amspt</code> style

Fonts

Text Fonts

<code>\rm</code>	roman
<code>\it</code>	italic
<code>\bf</code>	boldface
<code>\sl</code>	slant
<code>\smc</code>	small capitals

Math Mode Fonts

<code>\bold#1</code>	bold letter
<code>\loadbold</code>	load bold math symbols
<code>\boldkey#1</code>	bold keyboard symbol
<code>\boldsymbol#1</code>	bold math symbol (e.g. α)
<code>\Cal#1</code>	caligraphic (script) upper case
<code>\frak#1</code>	German Fraktur
<code>\goth#1</code>	German Fraktur (same as <code>\frak</code>)
<code>\Bbb#1</code>	blackboard bold
<code>\rom#1</code>	Roman

Loading Fonts & Symbols (if not using `amspt` style)

<code>\loadmsam</code>	load <code>msam</code> symbol font
<code>\loadmsbm</code>	load <code>msbm</code> symbol font
<code>\UseAMSsymbols</code>	define all symbols from <code>msam</code> , <code>msbm</code> fonts
<code>\newsymbol</code>	define a particular symbol

Changing Font Sizes

<code>\tenpoint</code>	use 10 point fonts
<code>\eightpoint</code>	use 8 point fonts
<code>\dsize</code>	use display size
<code>\tsize</code>	use text size
<code>\ssize</code>	use subscript size
<code>\sssize</code>	use subsubscript size

Macro Definitions

<code>\define\cs{...}</code>	define a control sequence
<code>\redefine\cs{...}</code>	redefine a control sequence
<code>\predefine\newcs{\oldcs}</code>	assign new name to a control seq
<code>\operatorname#1</code>	new operator name
<code>\operatornamewithlimits#1</code>	new operator name with limits
<code>\newsymbol</code>	new symbol from <code>msam</code> , <code>msbm</code> fonts

Footnotes and Insertions

<code>\footnote#1</code>	footnote
<code>\footnote"*#1</code>	footnote with specified marker
<code>\topinsert ... \endinsert</code>	insert at top of page
<code>\midinsert ... \endinsert</code>	insert in middle of page
<code>\topcaption#1 ... \endcaption</code>	caption at top of insert
<code>\botcaption#1 ... \endcaption</code>	caption at bottom of insert
<code>\vspace{<dimen>}</code>	leave vertical space in an insert

Hyphenation

<code>\showhyphens#1</code>	show allowable hyphens
<code>\-</code>	discretionary hyphen
<code>\hyphenation#1</code>	add words to hyphenation list

Fractions and Such

<code>\frac#1#2</code>	fraction
<code>\dfrac#1#2</code>	display size fraction
<code>\tfrac#1#2</code>	text size fraction
<code>\fracwithdelims()#1#2</code>	fraction with paren. delimiters
<code>\binom#1#2</code>	binomial coefficient
<code>\dbinom#1#2</code>	display size binomial coefficient
<code>\tbinom#1#2</code>	text size binomial coefficient
<code>\underset#1\to#2</code>	typeset #1 under #2
<code>\overset#1\to#2</code>	typeset #1 over #2
<code>\overbrace#1^#2</code>	overbrace with label above
<code>\underbrace#1_#2</code>	underbrace with label below
<code>\sideset~#1\and~#2\to\bigop</code>	superscripts on side of operator
<code>\cfrac ... \endcfrac</code>	continued fraction
<code>\lrcfrac ... \endlrcfrac</code>	continued fraction flush left
<code>\rcfrac ... \endrcfrac</code>	continued fraction flush right

Arrows & Commutative Diagrams

<code>@>#1>#2<</code>	right arrow with labels
<code>@<#1<#2<</code>	left arrow with labels
<code>\CD ... \endCD</code>	commutative diagram (don't use &'s)
<code>@V#1V#2V</code>	down arrow with labels
<code>@A#1A#2A</code>	up arrow with labels
<code>@=</code>	long horizontal = sign
<code>@ </code>	long vertical equal sign
<code>@.</code>	leave out an arrow
<code>\pretend#1\haswidth#2</code>	make arrows longer

Accents

Type	Example	In Math	In Text
hat	\hat{a}	<code>\hat</code>	<code>\^</code>
expanding hat	\widehat{abc}	<code>\widehat</code>	none
check	\check{a}	<code>\check</code>	<code>\v</code>
tilde	\tilde{a}	<code>\tilde</code>	<code>\~</code>
expanding tilde	\widetilde{abc}	<code>\widetilde</code>	none
acute	\acute{a}	<code>\acute</code>	<code>\'</code>
grave	\grave{a}	<code>\grave</code>	<code>\`</code>
dot	\dot{a}	<code>\dot</code>	<code>\D</code>
double dot	\ddot{a}	<code>\ddot</code>	<code>\"</code>
breve	\breve{a}	<code>\breve</code>	<code>\u</code>
bar	\bar{a}	<code>\bar</code>	<code>\B</code>
vector	\vec{a}	<code>\vec</code>	none
cedilla	\c{c}	none	<code>\c</code>

Dimensions

Dimensions are specified as `<number><unit of measure>`.

point	pt	pica	pc	inch	in	centimeter	cm
m width	em	x height	ex	math unit	mu	millimeter	mm
1 pc = 12 pt		1 in = 72.72 pt		2.54 cm = 1 in		18 mu = 1 em	

Spacing and Dots

<code>\linebreak</code>	force a line break
<code>\newline</code>	force a new line, old line pushed left
<code>\mathbreak</code>	force line break
<code>\allowmathbreak</code>	allow line break
<code>\-</code>	discretionary hyphen
<code>\.</code>	abbreviation period
<code>\,</code> or <code>\thinspace</code>	thin space
<code>\medspace</code>	medium space
<code>;</code> or <code>\thickspace</code>	thick space
<code>!</code> or <code>\negthinspace</code>	negative thin space
<code>\negmedspace</code>	negative medium space
<code>\negthickspace</code>	negative thick space
<code>\quad</code>	quad space
<code>\qquad</code>	double quad space
<code>%</code>	comment line
<code>\</code>	one blank space
<code>\phantom#1</code>	blank space size of #1
<code>\hphantom#1</code>	blank space width of #1, no height
<code>\vphantom#1</code>	blank space height of #1, no width
<code>\smash#1</code>	ignore height and depth
<code>\topsmash#1</code>	ignore height
<code>\botsmash#1</code>	ignore depth
<code>\mathstrut</code>	strut to help vertical spacing
<code>\smallpagebreak</code>	small space between paragraphs
<code>\medpagebreak</code>	medium space between paragraphs
<code>\bigpagebreak</code>	big space between paragraphs
<code>\pagebreak</code>	force a page break
<code>\nopagebreak</code>	forbid a page break
<code>\newpage</code>	force a page break fill page with blank space
<code>\hdots</code>	horizontal dots
<code>\vdots</code>	vertical dots
<code>\ddots</code>	diagonal dots
<code>\dots</code>	dots in text or formulas
<code>\ldots</code>	low dots in text or formulas
<code>\cdots</code>	center dots in text or formulas

Miscellaneous Operations

<code>\bmod#1</code>	mod as binary operation
<code>\pmod#1</code>	mod with parentheses
<code>\mod#1</code>	same as <code>pmod</code> , but no parens
<code>\pod#1</code>	parentheses, but no "mod"
<code>\sqrt#1</code>	square root
<code>\root#1\of#2</code>	root
<code>\uproot{<number>}</code>	move root up/down
<code>\leftroot{<number>}</code>	move root left/right
<code>\iiint</code>	two integral signs
<code>\iiiint</code>	three integral signs
<code>\idotsint</code>	integral signs with dots

AMS Preprint Style

```

\input amstex
\documentstyle{amsppt}
  (Preamble Commands)
\topmatter
  (Top Matter Commands)
\endtopmatter
\document
  (Body of Document)
\enddocument

Preamble Commands
\TagsOnLeft (default) or \TagsOnRight
\TagsAsText (default) or \TagsAsMath
\NoPageNumbers
\NoRunningHeads
\Monograph
\define

Top Matter Commands
\title ... \endtitle
\author ... \endauthor
\affil ... \endaffil
\address ... \endaddress
\curraddr ... \endcurraddr
\email ... \endemail
\date ... \enddate
\dedicatory ... \enddedicatory
\thanks ... \endthanks
\translator ... \endtranslator
\keywords ... \endkeywords
\subjclass ... \endsubjclass
\abstract ... \endabstract
\toc ... \endtoc (Table of Contents)
\leftheadtext#1 (set left headline text)
\rightheadtext#1 (set right headline text)

Body of Paper Commands
\specialhead ... \endspecialhead
\head ... \endhead
\subhead ... \endsubhead
\subsubhead ... \endsubsubhead
\proclaim#1 ... \endproclaim
\rom#1 (Roman font in proclaim)
\demo#1 ... \enddemo (proof)
\qed (end of proof marker)
\roster ... \endroster (roster of listed items)
  \item (start a new item in a roster)
  \item[(number)] (specify roster item number)
  \item*" (item with specified marker)
  \therosteritem#1 (refer to specified roster item)
  \widestnumber\item#1 (set width for roster labels)
\nofrills (turn off automatic font, spacing, punctuation)
\usualspace (usual space following punctuation)
\definition#1 ... \enddefinition
\example#1 ... \endexample
\remark#1 ... \endremark
\block ... \endblock (indented text)
\cite (cite a reference)

```

AMS Preprint Style — References

```

\Refs ... \endRefs list of references
\refstyle#1 specify style A, B, or C
  A = initials, B = name, C = number

\ref ... \endref individual reference
\no or \key number or key for reference
  \widestnumber\no#1 or \widestnumber\key#1
\by author
  \bysame same as previous author
\paper name of paper
\vol volume
\yr year of publication
\jour journal
\page or \pages page(s)
\toappear to appear
\inbook article in a book
\moreref additional reference information
\paperinfo extra information after paper title
\procinfo information about proceedings
\issue issue number
\lang language
\transl information about translated version
\book book
\ed or \eds editor(s)
\publ publisher
\publaddr publisher address
\bookinfo extra information after book title
\finalinfo extra information for end
\miscnote same as \finalinfo, in parens.

```

Overlines and Underlines

```

\underline#1 underline
\overline#1 overline
\overarrow#1 over right arrow
\underarrow#1 under right arrow
\overleftarrow#1 over left arrow
\underleftarrow#1 under left arrow
\overlefttriarrow#1 over left-right arrow

```

Delimiters

```

[ \lbrack or \l { \lbrace or \{ < \langle
] \rbrack or \r } \rbrace or \} > \rangle
| \vert or \l | \lfloor or \lceil
|| \Vert or \l | \rfloor or \rceil
↑ \uparrow ↑ \Uparrow ↓ \updownarrow
↓ \downarrow ↓ \Downarrow ⇕ \Updownarrow
[[ [\[ [ ( (\! ( ⟨ \langle!\langle
]] ]\!] ] ) )\!] ⟩ \rangle!\rangle
\left#1 \right#1 expanding delimiters
\left. \right. empty delimiters
\bigl#1 \bigr#1 big delimiters
\Bigl#1 \Bigr#1 bigger delimiters
\biggl#1 \biggr#1 even bigger delimiters

```

Non-Italic Function Names

```

\arccos \cos \csc \exp \ker \limsup \min \sinh
\arcsin \cosh \deg \gcd \lg \ln \Pr \sup
\arctan \cot \det \hom \lim \log \sec \tan
\arg \coth \dim \inf \liminf \max \sin \tanh

```

Alignments and Displayed Equations

```

\\ separate lines
& separate items in a line
\align ... \endalign align equations, full
  width of page
\alignat#1 ... \endalignat align #1 pairs
  equally spaced
\xxalignat#1 ... \endxxalignat equally spaced, flush
\aligned ... \endaligned align equations, width
  as needed
  \alignedat#1 ... \endalignedat align #1 pairs
  \topaligned ... \endtopaligned align along top
  \botaligned ... \endbotaligned align along bottom
\gather ... \endgather centered equations, full
  width of page
\gathered ... \endgathered centered equations,
  width as needed
\multline ... \endmultline first line left, middle lines
  centered, last line right
  \shoveleft#1 shove lines left
  \shoveright#1 shove lines right
  \multlinegap{(dimen)} change margins
\cases ... \endcases case construction
\split ... \endsplit align split equations with
  variable tag placement
\Sb ... \endSb multi-line subscript
\Sp ... \endSp multi-line superscript
\text#1 text within formula
\intertext#1 text between lines
\foldedtext#1 lines of text in formula
  \topfoldedtext#1 top-aligned folded text
  \botfoldedtext#1 bottom-aligned folded text
  \foldedwidth{(dimen)} set width of folded text
\allowdisplaybreak allow page break after line
\allowdisplaybreaks allow page breaks after any line
\displaybreak force page break after line
\vspace{(dimen)} extra space between two lines
\spreadlines{(dimen)} extra space between every line
  same for a matrix
\jot unit of vertical space
\tag#1 tag for a formula
  \thetag#1 refer to tag in current style
  \tag"*" tag exactly as specified

```

Matrices

```

\matrix ... \endmatrix matrix alignment
\pmatrix ... \endpmatrix matrix with parentheses
\bmatrix ... \endbmatrix matrix with brackets
\vmatrix ... \endvmatrix matrix with vertical lines
\Vmatrix ... \endVmatrix matrix with double vertical lines
\smallmatrix ... \endsmallmatrix small matrix
\format specify a format for a matrix
  \c \l \r format entry center, left, right

```

Copyright © 1998 J.H. Silverman, November 1998 v1.3
 Math. Dept., Brown Univ., Providence, RI 02912 USA
 TeX and AMSTeX are trademarks of the American Mathematical Society
 Permission is granted to make and distribute copies of this card pro-
 vided the copyright notice and this permission notice are preserved on
 all copies.

Useful Parameters and Conversions

<code>\day, \month, \year</code>	the current day, month, year
<code>\jobname</code>	name of current job
<code>\rom numeral{number}</code>	convert to lower case roman nums.
<code>\uppercase{(token list)}</code>	convert to upper case
<code>\lowercase{(token list)}</code>	convert to lower case

Fills, Leaders and Ellipses

Text or Math:	...	<code>\dots</code>
Math:	...	<code>\ldots</code> <code>\cdots</code> <code>\vdots</code> <code>\ddots</code>

The following fill space with the indicated item.

`\hrulefill` `\rightarrowfill` `\leftarrowfill` `\dotfill`

The general format for constructing leaders is

`\leaders(box or rule)\hspace{glue}` repeat box or rule
`\leaders(box or rule)\hfill` fill space with box or rule

TeX Fonts and Magnification

`\rm` Roman `\bf` Bold `\tt` Typewriter
`\sl` Slant `\it` Italic `\/` "italic correction"

`\magnification=(number)` scale document by $n/1000$
`\magstep(number)` scaling factor of $1.2^n \times 1000$
`\magstephalf` scalling factor of $\sqrt{1.2}$
`\font\FN=(fontname)` load a font, naming it `\FN`
`\font\FN=(fontname) at <dimen>` load font scaled to dimension
`\font\FN=(fontname) scaled <number>` load font scaled by $n/1000$
`true <dimen>` dimension with no scaling

Alignment Displays

`\settabs(number)\columns` set equally spaced tabs
`\settabs+(sample line)\cr` set tabs as per sample line
`\+(text1)&(text2)&...&\cr` tabbed text to be typeset
`\halign` horizontal alignment
`\halign to(dimen)` horizontal alignment
`\openup(dimen)` add space between lines
`\noalign{(vmode material)}` insert material after any `\cr`
`\tabskip=(glue)` set glue at tab stops
`\omit` omit the template for a column
`\span` span two columns
`\multispan(number)` span several columns
`\hidewidth` ignore the width of an entry
`\cr cr` insert `\cr` if one is not present

Boxes

`\hbox to(dimen)` hbox of given dimension
`\vbox to(dimen)` vbox, bottom justified
`\vtop to(dimen)` vbox, top justified
`\vcenter to(dimen)` vbox, center justified (math only)
`\rlap` right overlap material
`\llap` left overlap material

Overfull Boxes

`\hfuzz` allowable excess in hboxes
`\vfuzz` allowable excess in vboxes
`\overfullrule` width of overfull box marker. To eliminate entirely, set `\overfullrule=0pt`.

Indentation and Itemized Lists

`\indent` indent
`\noindent` do not indent
`\parindent=(dimen)` set indentation of paragraphs
`\displayindent=(dimen)` set indentation of math displays
`\leftskip=(dimen)` skip space on left
`\rightskip=(dimen)` skip space on right
`\narrower` make paragraph narrower
`\item{(label)}` singly indented itemized list
`\itemitem{(label)}` doubly indented itemized list
`\hangindent=(dimen)` hanging indentation for paragraph
`\hangafter=(number)` start hanging indent after line n .
If $n < 0$, indent first $|n|$ lines.
`\parshape=(number)` general paragraph shaping macro

Headers, Footers, and Page Numbers

`\nopagenumbers` turn off page numbering
`\pageno` current page number. To get roman nums, set `\pageno=(negative number)`
`\folio` current page number, roman num if < 0
`\footline` material to put at foot of page
`\headline` material to put at top of page. To leave space, set `\voffset=2\baselineskip`, make room with `\advance\vsiz` by `-\voffset`.

Macro Definitions

`\def\cs{(replacement text)}` define the macro `\cs`
`\def\cs#1...#n{(repl. text)}` macro with parameters
`\let\cs=(token)` give `\cs` token's current meaning
Advanced Macro Definition Commands
`\long\def` macro whose args may include `\par`
`\outer\def` macro not allowed inside definitions
`\global\def` or `\gdef` definition that transcends grouping
`\edef` expand while defining macro
`\xdef` or `\global\edef` global version of `\edef`
`\noexpand(token)` do not expand token
`\expandafter(token)` expand item after token first
`\futurelet\cs(tok1)(tok2)` equals `\let\cs=(tok1)(tok2)`
`\csname... \endcsname` create a control sequence name
`\string\cs` list characters in name, `\ c s`
`\number(number)` list of characters in number
`\the(internal quantity)` list of tokens giving value of quantity

Conditionals

The general format of a conditional is

`\if(condition){true text}\else(false text)\fi`
`\ifnum(num1)(relation)(num2)` compare two integers
`\ifdim(dimen1)(relation)(dimen2)` compare two dimensions
`\ifodd(num)` test for an odd integer
`\ifmmode` test for math mode
`\if(token1)(token2)` test if character codes agree
`\ifdim` compare two dimensions
`\ifx(token1)(token2)` test if tokens agree
`\ifeof(number)` test for end of file
`\iftrue, \iffalse` always true, always false
`\ifcase(number)(text0)\or(text1)\or... \or(textn)\else(text)\fi` choose text by (number)
`\loop α \if...β \repeat` loop $\alpha\beta\alpha\cdots\alpha$ until `\if` is false
`\newif\ifblob` create a new conditional called `\ifblob`
`\blobtrue, \blobfalse` set conditional `\ifblob` true, false

Dimensions, Spacing, and Glue

Dimensions are specified as (number)(unit of measure).
Glue is specified as (dimen) plus(dimen) minus(dimen).

point	pt	pica	pc	inch	in	centimeter	cm
m width	em	x height	ex	math unit	mu	millimeter	mm
1 pc =	12 pt	1 in =	72.72 pt	2.54 cm =	1 in	18 mu =	1 em

Horizontal Spacing: `\quad` (skip 1em) `\qquad`
Horizontal Spacing (Text): `\thinspace` `\enspace` `\enskip`
`\hskip(glue)` `\hfil` `\hfill` `\hfilneg`
Horizontal Spacing (Math): thin space `\,` medium space `\>`
thick space `\;` neg. thin space `\!` `\mskip(mu glue)`

Vertical Spacing: `\vskip(glue)` `\vfill` `\vfill`
`\strut` box w/ ht and depth of "(", zero width
`` invisible box with dim of (text)
`\vphantom{(text)}` box w/ ht & depth of (text), zero width
`\hphantom{(text)}` box w/ width of (text), zero ht & depth
`\smash{(text)}` typeset (text), set ht & depth to zero
`\raise(dimen)\hbox{(text)}` raise box up
`\lower(dimen)\hbox{(text)}` lower box down
`\moveleft(dimen)\vbox{(text)}` move box left
`\moveright(dimen)\vbox{(text)}` move box right

Skip Space Between Lines: `\smallskip` `\medskip` `\bigskip`
encourage a break `\smallbreak` `\medbreak` `\bigbreak`
break if no room `\filbreak`

Set Line Spacing: `\baselineskip = (glue)`
single space `\baselineskip = 12pt`
1 1/2 space `\baselineskip = 18pt`
double space `\baselineskip = 24pt`

Increase Line Spacing `\openup(dimen)`
use `\jot's` `1\jot = 3pt`
Allow Unjustified Lines `\raggedright`
Allow Unjustified Pages `\raggedbottom`

Braces and Matrices

`\matrix` rectangular array of entries
`\pmatrix` matrix with parentheses
`\bordermatrix` matrix with labels on top and left
`\overbrace` overbrace, may be superscripted
`\underbrace` underbrace, may be subscripted

For small matrices in text, use the following constructions:

$$\{a,b \ \text{\choose} \ c,d\} \qquad \begin{pmatrix} a \\ c \\ d \end{pmatrix}$$
$$\left\{ \text{\a atop} \ c \right\} \left\{ \text{\b atop} \ d \right\} \qquad \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

Displayed Equations

`\eqno` equation number at right
`\leqno` equation number at left
`\eqalign` display several aligned equations
`\eqalignno` display aligned equations numbered at right
`\leqalignno` display aligned equations numbered at left
`\displaylines` display several equations, centered
`\cases` case by case definitions
`\noalign` to insert space between lines in displays, use `\noalign{\vskip(glue)}` after any `\cr`
`\openup(dimen)` add space between all lines in a display

Copyright © 1998 J.H. Silverman, November 1998 v1.3
Math. Dept., Brown Univ., Providence, RI 02912 USA

TeX is a trademark of the American Mathematical Society
Permission is granted to make and distribute copies of this card provided the copyright notice and this permission notice are preserved on all copies.

Published by Ford & Mason Ltd, GL19 3JB, UK. Further copies of this card can be ordered through our web site: <http://www.refcards.com>.