Txfonts Version

of LaTeX and AMS-LaTeX Symbols

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Introduction I
About This Document

- This document lists symbols in standard LaTeX, AMS-LaTeX and a few additional packages.
- The document is optimized for viewing on a computer. I recommend using it full screen (Ctrl+L for Acrobat) and then navigating by clicking the sidebar.
- This document uses the `Txfonts` package, which redefines many symbols. There's another, standard version.
- You may reach the latest version of both files at `academic.cankaya.edu.tr/~sermutlu`.

Introduction II
Note About Packages

- I did not separate the the $\mathcal{AMS}$-LaTeX symbols from the standard ones. Do not forget the include `\usepackage{txfonts}` before `\begin{document}` to be able to use these symbols.
- In the section Extra, I have included the packages `Textcomp`, `Marvosym`, `Pifont` and `Chemarrow` to give a taste of the rich world of LaTeX. You need to install packages and then write `\usepackage{packagename}` to access these symbols. (If you are using MiKTeX, it will install packages automatically at first usage.)
- There are many more packages and thousands of symbols not included here. I recommend Scott Pakin's `The Comprehensive LaTeX Symbol List` for a complete listing. (It can be reached at `www.ctan.org`).

Introduction III
About the Author

- Prepared by Dr. Emre Sermutlu, Department of Mathematics and Computer Science, Çankaya University, Ankara-Turkey.
- I started this project for my personal needs, as it was unfeasible to browse books or search the internet every time I needed an unfamiliar symbol. I am using a computer whenever I am using LaTeX, so I needed a file optimized for viewing on screen, not printing on paper.
- I am a fan of Beamer, which is a wonderful class for preparing Power-Point like presentations in LaTeX. You are currently seeing the power of Beamer. You can learn more about it at: `http://latex-beamer.sourceforge.net`
- Please report errors, omissions, suggestions and any other kind of feedback to sermutlu@cankaya.edu.tr.

TEXT Symbols I

$	\$	Ü	\"{U}	©	\copyright
&	\&	İ	\.{I}	®	\circledR
#	\#	G̃	\~{G}	ⓐ	\textcircled{a}
%	\%	Ő	\H{A}	™	\texttrademark
{	\{	Ò	\‘{O}	✓	\checkmark
}	\}	Ĉ	\^{C}	£	\pounds
	\-	Č	\v{C}	✠	\maltese
¶	\P	Ť	\r{T}	•	\textbullet
§	\S	Ṕ	\’{P}	\	\textbackslash
†	\dag	M̆	\u{M}	|	\textbar
‡	\ddag	N̄	\={N}	_	_
ı	\i	E̱	\b{E}	–	\textendash
ȷ	\j	Ş	\c{S}	—	\textemdash
B̂B	\t{BB}	Ḟ	\d{F}	<	\textless
				>	\textgreater

TEXT Symbols II

…	\dots	~	\textasciitilde
ł	\l	^	\textasciicircum
Ł	\L	¡	\textexclamdown
ø	\o	¿	\textquestiondown
Ø	\O	‘	\textquoteleft
å	\aa	’	\textquoteright
Å	\AA	“	\textquotedblleft
ß	\ss	”	\textquotedblright
SS	\SS	␣	\textvisiblespace
æ	\ae	º	\textordmasculine
Æ	\AE	ª	\textordfeminine
œ	\oe	*	\textasteriskcentered
Œ	\OE	·	\textperiodcentered

Common Math Symbols

Some of these symbols may appear at other tables for user convenience

$\neq$	\neq	$\pm$	\pm	$\to$	\to
$\leqslant$	\leqslant	$\mp$	\mp	$\iff$	\iff
$\geqslant$	\geqslant	$\times$	\times	\$	\$
$\approx$	\approx	$\div$	\div	£	\pounds
$\equiv$	\equiv	$\cup$	\cup	%	\%
$\cong$	\cong	$\cap$	\cap	&	\&
$\simeq$	\simeq	$\in$	\in	{	\{
∂	\partial	$\notin$	\notin	}	\}
∞	\infty	$\setminus$	\setminus	_	_
∇	\nabla	$\varnothing$	\varnothing	¶	\P
$\aleph$	\aleph	$\subset$	\subset	§	\S
ℓ	\ell	$\supset$	\supset	*	\ast
$\vee$	\vee	$\cdot$	\cdot	†	\dag
$\wedge$	\wedge	$\centerdot$	\centerdot	‡	\ddag
$\forall$	\forall	©	\copyright	•	\bullet
$\exists$	\exists	✠	\maltese	≀	\wr

Greek Letters

α	\alpha	υ	\upsilon
β	\beta	ξ	\xi
γ	\gamma	τ	\tau
δ	\delta	ι	\iota
λ	\lambda	η	\eta
ω	\omega	ζ	\zeta
ψ	\psi	μ	\mu
χ	\chi	ν	\nu
ρ	\rho	ϱ	\varrho
ϵ	\epsilon	ε	\varepsilon
κ	\kappa	$\varkappa$	\varkappa
π	\pi	ϖ	\varpi
ϕ	\phi	φ	\varphi
σ	\sigma	ς	\varsigma
θ	\theta	ϑ	\vartheta

Greek and Hebrew Letters

Γ	\Gamma	$\varGamma$	\varGamma
Δ	\Delta	$\varDelta$	\varDelta
Λ	\Lambda	$\varLambda$	\varLambda
Ω	\Omega	$\varOmega$	\varOmega
Π	\Pi	$\varPi$	\varPi
Φ	\Phi	$\varPhi$	\varPhi
Ψ	\Psi	$\varPsi$	\varPsi
Σ	\Sigma	$\varSigma$	\varSigma
Θ	\Theta	$\varTheta$	\varTheta
Υ	\Upsilon	$\varUpsilon$	\varUpsilon
Ξ	\Xi	$\varXi$	\varXi
$\digamma$	\digamma		

$\aleph$	\aleph	$\gimel$	\gimel
$\beth$	\beth	$\daleth$	\daleth

Binary Operations I

$\oplus$	\oplus	$\boxplus$	\boxplus
$\ominus$	\ominus	$\boxminus$	\boxminus
$\otimes$	\otimes	$\boxtimes$	\boxtimes
$\odot$	\odot	$\boxdot$	\boxdot
$\oslash$	\oslash	$\divideontimes$	\divideontimes
$\circ$	\circ	$\intercal$	\intercal
$\bigcirc$	\bigcirc	$\dotplus$	\dotplus
$\circledcirc$	\circledcirc	$\setminus$	\setminus
$\circleddash$	\circleddash	$\smallsetminus$	\smallsetminus
$\circledast$	\circledast	$\centerdot$	\centerdot
$\amalg$	\amalg	$\diamond$	\diamond
$\cup$	\cup	$\cap$	\cap
$\Cup$	\Cup	$\Cap$	\Cap
$\sqcup$	\sqcup	$\sqcap$	\sqcap
$\leftthreetimes$	\leftthreetimes	$\rightthreetimes$	\rightthreetimes
$\uplus$	\uplus	$\backepsilon$	\backepsilon

Binary Operations II

$\vee$	\vee	$\wedge$	\wedge
$\curlyvee$	\curlyvee	$\curlywedge$	\curlywedge
$\veebar$	\veebar	$\barwedge$	\barwedge
$\ltimes$	\ltimes	$\doublebarwedge$	\doublebarwedge
$\rtimes$	\rtimes	$\dagger$	\dagger
$\dashv$	\dashv	$\ddagger$	\ddagger
$\vdash$	\vdash	$\nvdash$	\nvdash
$\vDash$	\vDash	$\nvDash$	\nvDash
$\Vdash$	\Vdash	$\nVdash$	\nVdash
$\models$	\models	$\nVDash$	\nVDash
$\Vvdash$	\Vvdash	$\pitchfork$	\pitchfork
$\bowtie$	\bowtie	$\smile$	\smile
$\Join$	\Join	$\smallsmile$	\smallsmile
$\because$	\because	$\frown$	\frown
$\therefore$	\therefore	$\smallfrown$	\smallfrown
&	\And	$\bullet$	\bullet

Binary Relations I

$\cong$	\cong	$\ncong$	\ncong
$\preccurlyeq$	\preccurlyeq	$\succcurlyeq$	\succcurlyeq
$\curlyeqprec$	\curlyeqprec	$\curlyeqsucc$	\curlyeqsucc
$\prec$	\prec	$\nprec$	\nprec
$\preceq$	\preceq	$\npreceq$	\npreceq
$\precapprox$	\precapprox	$\precnapprox$	\precnapprox
$\precsim$	\precsim	$\precnsim$	\precnsim
$\succ$	\succ	$\nsucc$	\nsucc
$\succeq$	\succeq	$\nsucceq$	\nsucceq
$\succapprox$	\succapprox	$\succnapprox$	\succnapprox
$\succsim$	\succsim	$\succnsim$	\succnsim

Binary Relations II

$\mid$	\mid	$\nmid$	\nmid
$\shortmid$	\shortmid	$\nshortmid$	\nshortmid
$\parallel$	\parallel	$\nparallel$	\nparallel
$\shortparallel$	\shortparallel	$\nshortparallel$	\nshortparallel
$\sim$	\sim	$\nsim$	\nsim
$\thicksim$	\thicksim	$\doteq$	\doteq
$\simeq$	\simeq	$\doteqdot$	\doteqdot
$\backsim$	\backsim	$\between$	\between
$\backsimeq$	\backsimeq	$\asymp$	\asymp
$\approx$	\approx	$\fallingdotseq$	\fallingdotseq
$\thickapprox$	\thickapprox	$\risingdotseq$	\risingdotseq
$\approxeq$	\approxeq	$\bumpeq$	\bumpeq
$\equiv$	\equiv	$\Bumpeq$	\Bumpeq
$\propto$	\propto	$\circeq$	\circeq
$\varpropto$	\varpropto	$\eqcirc$	\eqcirc
$\multimap$	\multimap	$\perp$	\perp

Subset Relations

$\subset$	`\subset`	$\supset$	`\supset`
$\subseteq$	`\subseteq`	$\supseteq$	`\supseteq`
$\subseteqq$	`\subseteqq`	$\supseteqq$	`\supseteqq`
$\sqsubset$	`\sqsubset`	$\sqsupset$	`\sqsupset`
$\sqsubseteq$	`\sqsubseteq`	$\sqsupseteq$	`\sqsupseteq`
$\Subset$	`\Subset`	$\Supset$	`\Supset`
$\nsubseteq$	`\nsubseteq`	$\not\supseteq$	`\nsupseteq`
$\subsetneq$	`\subsetneq`	$\supsetneq$	`\supsetneq`
$\varsubsetneq$	`\varsubsetneq`	$\varsupsetneq$	`\varsupsetneq`
$\not\subseteqq$	`\nsubseteqq`	$\not\supseteqq$	`\nsupseteqq`
$\subsetneqq$	`\subsetneqq`	$\supsetneqq$	`\supsetneqq`
$\varsubsetneqq$	`\varsubsetneqq`	$\varsupsetneqq$	`\varsupsetneqq`

Inequalities I

$<$	`<`	$\not<$	`\nless`
$>$	`>`	$\not>$	`\ngtr`
$\leqslant$	`\leqslant`	$\not\leqslant$	`\nleqslant`
$\geqslant$	`\geqslant`	$\not\geqslant$	`\ngeqslant`
$\leq$	`\leq`	$\not\leq$	`\nleq`
$\geq$	`\geq`	$\not\geq$	`\ngeq`
$\leqq$	`\leqq`	$\not\leqq$	`\nleqq`
$\geqq$	`\geqq`	$\not\geqq$	`\ngeqq`
$\eqslantless$	`\eqslantless`	$\lneqq$	`\lneqq`
$\eqslantgtr$	`\eqslantgtr`	$\gneqq$	`\gneqq`
$\lneq$	`\lneq`	$\lvertneqq$	`\lvertneqq`
$\gneq$	`\gneq`	$\gvertneqq$	`\gvertneqq`

Inequalities II

$\ll$	\ll	$\lll$	\lll
$\gg$	\gg	$\ggg$	\ggg
$\lesssim$	\lesssim	$\lnsim$	\lnsim
$\gtrsim$	\gtrsim	$\gnsim$	\gnsim
$\lessapprox$	\lessapprox	$\lnapprox$	\lnapprox
$\gtrapprox$	\gtrapprox	$\gnapprox$	\gnapprox
$\lessgtr$	\lessgtr	$\lessdot$	\lessdot
$\gtrless$	\gtrless	$\gtrdot$	\gtrdot
$\lesseqgtr$	\lesseqgtr	$\lesseqqgtr$	\lesseqqgtr
$\gtreqless$	\gtreqless	$\gtreqqless$	\gtreqqless

Triangular Relations
Harpoons

$\bigtriangleup$	\bigtriangleup	$\bigtriangledown$	\bigtriangledown
$\triangleright$	\triangleright	$\triangleleft$	\triangleleft
$\ntriangleright$	\ntriangleright	$\ntriangleleft$	\ntriangleleft
$\vartriangleright$	\vartriangleright	$\vartriangleleft$	\vartriangleleft
$\rhd$	\rhd	$\lhd$	\lhd
$\trianglerighteq$	\unrhd	$\trianglelefteq$	\unlhd
$\trianglerighteq$	\trianglerighteq	$\trianglelefteq$	\trianglelefteq
$\ntrianglerighteq$	\ntrianglerighteq	$\ntrianglelefteq$	\ntrianglelefteq
$\blacktriangleright$	\blacktriangleright	$\blacktriangleleft$	\blacktriangleleft
$\triangleq$	\triangleq		

$\rightharpoonup$	\rightharpoonup	$\leftharpoonup$	\leftharpoonup
$\rightharpoondown$	\rightharpoondown	$\leftharpoondown$	\leftharpoondown
$\rightleftharpoons$	\rightleftharpoons	$\leftrightharpoons$	\leftrightharpoons
$\upharpoonright$	\upharpoonright	$\upharpoonleft$	\upharpoonleft
$\downharpoonright$	\downharpoonright	$\downharpoonleft$	\downharpoonleft

Arrows I

$\rightarrow$	\rightarrow	$\leftarrow$	\leftarrow
$\Rightarrow$	\Rightarrow	$\Leftarrow$	\Leftarrow
$\longrightarrow$	\longrightarrow	$\longleftarrow$	\longleftarrow
$\Longrightarrow$	\Longrightarrow	$\Longleftarrow$	\Longleftarrow
$\uparrow$	\uparrow	$\downarrow$	\downarrow
$\Uparrow$	\Uparrow	$\Downarrow$	\Downarrow
$\nrightarrow$	\nrightarrow	$\nleftarrow$	\nleftarrow
$\nRightarrow$	\nRightarrow	$\nLeftarrow$	\nLeftarrow
$\updownarrow$	\updownarrow	$\nleftrightarrow$	\nleftrightarrow
$\Updownarrow$	\Updownarrow	$\nLeftrightarrow$	\nLeftrightarrow
$\nearrow$	\nearrow	$\leftrightarrow$	\leftrightarrow
$\nwarrow$	\nwarrow	$\Leftrightarrow$	\Leftrightarrow
$\swarrow$	\swarrow	$\longleftrightarrow$	\longleftrightarrow
$\searrow$	\searrow	$\Longleftrightarrow$	\Longleftrightarrow
$\iff$	\iff	$\rightsquigarrow$	\leftrightsquigarrow

Arrows II

⇉	\rightrightarrows	⇇	\leftleftarrows
⇄	\rightleftarrows	⇆	\leftrightarrows
⇛	\Rrightarrow	⇚	\Lleftarrow
↪	\hookrightarrow	↩	\hookleftarrow
↣	\rightarrowtail	↢	\leftarrowtail
↬	\looparrowright	↫	\looparrowleft
↠	\twoheadrightarrow	↞	\twoheadleftarrow
↷	\curvearrowright	↶	\curvearrowleft
↻	\circlearrowright	↺	\circlearrowleft
⇢	\dashrightarrow	⇠	\dashleftarrow
↱	\Rsh	↰	\Lsh
⇈	\upuparrows	⇊	\downdownarrows
↦	\mapsto	⇝	\rightsquigarrow
⟼	\longmapsto	⇝	\leadsto

Mathematical Operators

The following operators have two different sizes

$\prod$	$\prod$	\prod	$\coprod$	$\coprod$	\coprod
$\sum$	$\sum$	\sum	$\bigcup$	$\bigcup$	\bigcup
$\int$	$\int$	\int	$\bigcap$	$\bigcap$	\bigcap
$\oint$	$\oint$	\oint	$\biguplus$	$\biguplus$	\biguplus
$\iint$	$\iint$	\iint	$\bigsqcup$	$\bigsqcup$	\bigsqcup
$\iiint$	$\iiint$	\iiint	$\bigvee$	$\bigvee$	\bigvee
$\iiiint$	$\iiiint$	\iiiint	$\bigwedge$	$\bigwedge$	\bigwedge
$\idotsint$	$\idotsint$	\idotsint	$\bigoplus$	$\bigoplus$	\bigoplus
			$\bigotimes$	$\bigotimes$	\bigotimes
			$\bigodot$	$\bigodot$	\bigodot

Mathematical Functions I

Pure Functions

Please note that *sinx* (`sin x`) and $\sin x$ (`\sin x`) look totally different.

sin	`\sin`	arcsin	`\arcsin`	sinh	`\sinh`
cos	`\cos`	arccos	`\arccos`	cosh	`\cosh`
tan	`\tan`	arctan	`\arctan`	tanh	`\tanh`
cot	`\cot`	arg	`\arg`	coth	`\coth`
sec	`\sec`	$m \mod n$	`m\mod n`	lg	`\lg`
csc	`\csc`	$m \bmod n$	`m\bmod n`	log	`\log`
ln	`\ln`	$m \pmod n$	`m\pmod n`	exp	`\exp`
dim	`\dim`	$m \pod n$	`m\pod n`	hom	`\hom`
deg	`\deg`			ker	`\ker`

Mathematical Functions II

Functions with Limits

The following functions may take limits below: $\lim_{x \to 0}$

This is written as: `\lim_{x \to 0}`

min	`\min`	lim inf	`\liminf`
max	`\max`	$\underline{\lim}$	`\varliminf`
inf	`\inf`	lim sup	`\limsup`
sup	`\sup`	$\overline{\lim}$	`\varlimsup`
det	`\det`	inj lim	`\injlim`
gcd	`\gcd`	$\varinjlim$	`\varinjlim`
Pr	`\Pr`	proj lim	`\projlim`
lim	`\lim`	$\varprojlim$	`\varprojlim`

Miscellaneous Symbols I

$\Im$	\Im	ℓ	\ell
$\Re$	\Re	∂	\partial
$\wp$	\wp	$\eth$	\eth
$\top$	\top	$\imath$	\imath
$\bot$	\bot	$\jmath$	\jmath
$\forall$	\forall	$\Bbbk$	\Bbbk
$\exists$	\exists	$\Finv$	\Finv
$\nexists$	\nexists	$\Game$	\Game
$\neg$	\neg	∞	\infty
$\in$	\in	$\emptyset$	\emptyset
$\notin$	\notin	$\varnothing$	\varnothing
$\ni$	\ni	$\angle$	\angle
$\complement$	\complement	$\measuredangle$	\measuredangle
$\hbar$	\hbar	$\sphericalangle$	\sphericalangle
$\hbar$	\hslash	$\smallint$	\smallint

Miscellaneous Symbols II

∇	\nabla	\	\backslash
$\mho$	\mho	$\diagdown$	\diagdown
$\square$	\square	$\diagup$	\diagup
$\square$	\Box	$\blacksquare$	\blacksquare
$\triangle$	\triangle	$\Diamond$	\Diamond
$\vartriangle$	\vartriangle	$\blacktriangle$	\blacktriangle
$\triangledown$	\triangledown	$\blacktriangledown$	\blacktriangledown
$\lozenge$	\lozenge	$\blacklozenge$	\blacklozenge
$\surd$	\surd	$\heartsuit$	\heartsuit
$\checkmark$	\checkmark	$\diamondsuit$	\diamondsuit
$\sharp$	\sharp	$\spadesuit$	\spadesuit
$\natural$	\natural	$\clubsuit$	\clubsuit
$\flat$	\flat	$\star$	\star
$\prime$	\prime	$\bigstar$	\bigstar
$\backprime$	\backprime	$\circledR$	\circledR
$\mapstochar$	\mapstochar	$\circledS$	\circledS

Mathematical Alphabets I

ABCDEFGHIJKLMN *OPQRSTUVWXYZ* *abcdefghijklmnopqrstuvwxyz* 1234567890	`\mathnormal{...}`
ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890	`\mathrm{...}`
ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890	`\mathsf{...}`

Mathematical Alphabets II

ABCDEFGHIJKLMN **OPQRSTUVWXYZ** **abcdefghijklmnopqrstuvwxyz** **1234567890**	`\mathbf{...}`
$\mathscr{A}\,\mathscr{B}\,\mathscr{C}\,\mathscr{D}\,\mathscr{E}\,\mathscr{F}\,\mathscr{G}\,\mathscr{H}\,\mathscr{I}\,\mathscr{J}\,\mathscr{K}\,\mathscr{L}\,\mathscr{M}\,\mathscr{N}$ $\mathscr{O}\,\mathscr{P}\,\mathscr{Q}\,\mathscr{R}\,\mathscr{S}\,\mathscr{T}\,\mathscr{U}\,\mathscr{V}\,\mathscr{W}\,\mathscr{X}\,\mathscr{Y}\,\mathscr{Z}$ (Include `\usepackage{mathrsfs}` before `\begin{document}`)	`\mathscr{...}`
$\mathcal{ABCDEFGHIJKLMN}$ $\mathcal{OPQRSTUVWXYZ}$	`\mathcal{...}`

Mathematical Alphabets III

$\mathfrak{ABCDEFGHIJKLMN}$ $\mathfrak{OPQRSTUVWXYZ}$ $\mathfrak{abcdefghijklmnopqrstuvwxyz}$ $\mathfrak{gyvw}$	`\mathfrak{...}`
$\boldsymbol{ABCDEFGHIJKLMN}$ $\boldsymbol{OPQRSTUVWXYZ}$ $\boldsymbol{abcdefghijklmnopqrstuvwxyz}$ $\boldsymbol{1234567890}$ $\boldsymbol{\alpha\beta\pi\theta\Phi\Psi\Omega\ldots}$ $\boldsymbol{\in \hbar\partial\nabla \leftarrow \infty\varnothing\square\ldots}$	`\boldsymbol{...}`

Mathematical Alphabets IV

$\mathbb{ABCDEFGHIJKLMN}$ $\mathbb{OPQRSTUVWXYZ}$	`\mathbb{...}`
$\varmathbb{ABCDEFGHIJKLMN}$ $\varmathbb{OPQRSTUVWXYZ}$	`\varmathbb{...}`

Brackets

These are variable sized

(	(	)	)
[	[	]	]
|	\vert	‖	\Vert
{	\{	}	\}
⟨	\langle	⟩	\rangle
⌈	\lceil	⌉	\rceil
⌊	\lfloor	⌋	\rfloor
⟮	\lgroup	⟯	\rgroup
|	\lvert	|	\rvert
‖	\lVert	‖	\rVert
⎰	\lmoustache	⎱	\rmoustache
|	\arrowvert	‖	\Arrowvert
\	\backslash	⎪	\bracevert

Brackets - Math Accents

$\ulcorner$	\ulcorner	$\urcorner$	\urcorner
$\llcorner$	\llcorner	$\lrcorner$	\lrcorner
$\uparrow$	\uparrow	$\Uparrow$	\Uparrow
$\downarrow$	\downarrow	$\Downarrow$	\Downarrow
$\updownarrow$	\updownarrow	$\Updownarrow$	\Updownarrow

$\tilde{a}$	\tilde{a}	$\breve{a}$	\breve{a}
$\hat{a}$	\hat{a}	$\dot{a}$	\dot{a}
$\check{a}$	\check{a}	$\ddot{a}$	\ddot{a}
$\vec{a}$	\vec{a}	$\dddot{a}$	\dddot{a}
$\bar{a}$	\bar{a}	$\ddddot{a}$	\ddddot{a}
$\acute{a}$	\acute{a}	$\mathring{a}$	\mathring{a}
$\grave{a}$	\grave{a}		

Dots

…	\ldots	lower dots
⋯	\cdots	center dots
⋱	\ddots	diagonal dots
⋮	\vdots	vertical dots
.....	\dotfill	fill with dots
…	\dots	lower or center
⋯	\dotsm	multiplication
…	\dotsi	dots for integrals
⋯	\dotsb	dots for binary op.
…	\dotsc	dots after commas
…	\dotso	other dots
.	\ldotp	
·	\cdotp	
:	\colon	

Variable Size Constructions

$\overbrace{abc}$	\overbrace{abc}	$\sqrt{abc}$	\sqrt{abc}
$\underbrace{abc}$	\underbrace{abc}	$\widetilde{abc}$	\widetilde{abc}
$\xleftarrow{abc}$	\xleftarrow{abc}	$\widehat{abc}$	\widehat{abc}
$\xrightarrow{abc}$	\xrightarrow{abc}	$\overline{abc}$	\overline{abc}
		$\underline{abc}$	\underline{abc}

$\overrightarrow{abc}$	\overrightarrow{abc}
$\overleftarrow{abc}$	\overleftarrow{abc}
$\overleftrightarrow{abc}$	\overleftrightarrow{abc}
$\underrightarrow{abc}$	\underrightarrow{abc}
$\underleftarrow{abc}$	\underleftarrow{abc}
$\underleftrightarrow{abc}$	\underleftrightarrow{abc}

Txfonts I

Include \usepackage{txfonts} before \begin{document}

⨆	\bigsqcapplus	∮	\ointclockwise
⨅	\bigsqcupplus	∮	\ointctrclockwise
∬	\iint	∯	\oiintclockwise
∭	\iiint	∯	\oiintctrclockwise
⨌	\iiiint	∰	\oiiintclockwise
⨍	\sqint	∰	\oiiintctrclockwise
⨏	\sqiint	∮	\varointclockwise
⨐	\sqiiint	∮	\varointctrclockwise
∫⋯∫	\idotsint	∯	\varoiintclockwise
⨍	\fint	∯	\varoiintctrclockwise
∯	\oiint	∰	\varoiiintclockwise
∰	\oiiint	∰	\varoiiintctrclockwise

Txfonts II

$\varprod$	\varprod	$\multimap$	\multimap
$\circledless$	\circledless	$\multimapdot$	\multimapdot
$\circledgtr$	\circledgtr	$\multimapinv$	\multimapinv
$\lJoin$	\lJoin	$\multimapdotinv$	\multimapdotinv
$\rJoin$	\rJoin	$\multimapboth$	\multimapboth
$\opentimes$	\opentimes	$\multimapdotboth$	\multimapdotboth
$\openJoin$	\openJoin	$\multimapdotbothA$	\multimapdotbothA
$\lrtimes$	\lrtimes	$\multimapdotbothB$	\multimapdotbothB
$\Perp$	\Perp	$\multimapbothvert$	\multimapbothvert
$\preceqq$	\preceqq	$\multimapdotbothvert$	\multimapdotbothvert
$\precneqq$	\precneqq	$\multimapdotbothAvert$	\multimapdotbothAvert
$\succeqq$	\succeqq	$\multimapdotbothBvert$	\multimapdotbothBvert
$\succneqq$	\succneqq	$\VvDash$	\VvDash

Txfonts III

$:-$	\coloneq	g	\varg
$::-$	\Coloneq	v	\varv
$:=$	\coloneqq	w	\varw
$::=$	\Coloneqq	y	\vary
$-:$	\eqcolon	$¢$	\mathcent
$-::$	\Eqcolon	$£$	\mathsterling
$=:$	\eqqcolon	$\notin$	\notin
$=::$	\Eqqcolon	$\notni$	\notni
$:\sim$	\colonsim	$\strictif$	\strictif
$::\sim$	\Colonsim	$\strictfi$	\strictfi
$:\approx$	\colonapprox	$\strictiff$	\strictiff
$::\approx$	\Colonapprox	$/\!/$	\varparallel
$\eqsim$	\eqsim	$\backslash\!\backslash$	\varparallelinv

Txfonts IV

$\nequiv$	\nequiv	$\nvarparallel$	\nvarparallel
$\napproxeq$	\napproxeq	$\nvarparallelinv$	\nvarparallelinv
$\nthickapprox$	\nthickapprox	$\nbumpeq$	\nbumpeq
$\nsimeq$	\nsimeq	$\nBumpeq$	\nBumpeq
$\nbacksimeq$	\nbacksimeq	$\nVdash$	\nVdash
$\nasymp$	\nasymp	$\ntwoheadleftarrow$	\ntwoheadleftarrow
$\nbacksim$	\nbacksim	$\ntwoheadrightarrow$	\ntwoheadrightarrow
$\npreccurlyeq$	\npreccurlyeq	$\nsucccurlyeq$	\nsucccurlyeq
$\npreceqq$	\npreceqq	$\nsucceqq$	\nsucceqq
$\nprecsim$	\nprecsim	$\nsuccsim$	\nsuccsim
$\nprecapprox$	\nprecapprox	$\nsuccapprox$	\nsuccapprox
$\nll$	\nll	$\ngg$	\ngg
$\nlesssim$	\nlesssim	$\ngtrsim$	\ngtrsim
$\nlessapprox$	\nlessapprox	$\ngtrapprox$	\ngtrapprox
$\nlessgtr$	\nlessgtr	$\ngtrless$	\ngtrless

Txfonts V

⦶	\circledbar	⋤	\nsqsubset
⦵	\circledwedge	⋥	\nsqsupset
⦷	\circledvee	⋢	\nsqsubseteq
⦸	\circledbslash	⋣	\nsqsupseteq
○	\medcirc	⋹	\nSubset
●	\medbullet	⋻	\nSupset
⅋	\invamp	⫋	\nsubseteqq
⨦	\sqcapplus	⟐	\Diamonddot
⨧	\sqcupplus	◆	\Diamondblack
⨟	\mappedfromchar	ƛ	\lambdabar
⫲	\mmappedfromchar	ƛ	\lambdaslash
⨞	\Mappedfromchar	♥	\varheartsuit
⫱	\Mmappedfromchar	♣	\varclubsuit
⫳	\mmapstochar	♤	\varspadesuit
⫴	\Mmapstochar	♦	\vardiamondsuit

Txfonts VI

○→	\circleright	←○	\circleleft
⊙→	\circleddotright	←⊙	\circleddotleft
□→	\boxright	←□	\boxleft
□⇒	\boxRight	⇐□	\boxLeft
⊡→	\boxdotright	←⊡	\boxdotleft
⊡⇒	\boxdotRight	⇐⊡	\boxdotLeft
◇→	\Diamondright	←◇	\Diamondleft
◇⇒	\DiamondRight	⇐◇	\DiamondLeft
◈→	\Diamonddotright	←◈	\Diamonddotleft
◈⇒	\DiamonddotRight	⇐◈	\DiamonddotLeft
↗	\Nearrow	↖	\Nwarrow
↘	\Searrow	↙	\Swarrow
⇛	\Rrightarrow	⇜	\leftsquigarrow
⇢	\dashleftrightarrow		

Txfonts VII

α	\alphaup	υ	\upsilonup
β	\betaup	ξ	\xiup
γ	\gammaup	τ	\tauup
δ	\deltaup	ι	\iotaup
λ	\lambdaup	η	\etaup
ω	\omegaup	ζ	\zetaup
ψ	\psiup	μ	\muup
χ	\chiup	ν	\nuup
ρ	\rhoup	ϱ	\varrhoup
ϵ	\epsilonup	ε	\varepsilonup
π	\piup	ϖ	\varpiup
ϕ	\phiup	φ	\varphiup
σ	\sigmaup	ς	\varsigmaup
θ	\thetaup	ϑ	\varthetaup
κ	\kappaup		

Textcomp I

Include \usepackage{textcomp} before \begin{document}

$	\textdollar	$	\textdollaroldstyle
¢	\textcent	¢	\textcentoldstyle
€	\texteuro	₵	\textcolonmonetary
¥	\textyen	↓	\textdownarrow
£	\textsterling	→	\textrightarrow
₤	\textlira	←	\textleftarrow
฿	\textbaht	↑	\textuparrow
₲	\textguarani	˝	\textacutedbl
₫	\textdong	ˇ	\textasciicaron
₦	\textnaira	¯	\textasciimacron
₱	\textpeso	´	\textasciiacute
₩	\textwon	¨	\textasciidieresis
¤	\textcurrency	̏	\textgravedbl
ƒ	\textflorin	˘	\textasciibreve
Â	\newtie{A}	`	\textasciigrave
â	\newtie{a}	℞	\textrecipe

Textcomp II

Ⓟ	\textcircledP	0	\textzerooldstyle
©	\textcopyright	1	\textoneoldstyle
SM	\textservicemark	2	\texttwooldstyle
ↄ	\textcopyleft	3	\textthreeoldstyle
®	\textregistered	4	\textfouroldstyle
TM	\texttrademark	5	\textfiveoldstyle
°	\textdegree	6	\textsixoldstyle
½	\textonehalf	7	\textsevenoldstyle
¼	\textonequarter	8	\texteightoldstyle
¾	\textthreequarters	9	\textnineoldstyle
−	\textminus	¹	\textonesuperior
±	\textpm	²	\texttwosuperior
÷	\textdiv	³	\textthreesuperior
×	\texttimes	¬	\textlnot
√	\textsurd		

Textcomp III

¦	\textbrokenbar	♪	\textmusicalnote
‖	\textbardbl	⟨	\textlangle
¶	\textparagraph	⟩	\textrangle
¶	\textpilcrow	⟦	\textlbrackdbl
◯	\textbigcircle	⟧	\textrbrackdbl
ƀ	\textblank	{	\textlquill
†	\textdagger	}	\textrquill
‡	\textdaggerdbl	°C	\textcelsius
⁒	\textdiscount	µ	\textmu
~	\texttildelow	Ω	\textohm
№	\textnumero	℧	\textmho
e	\textestimated	★	\textborn
§	\textsection	o|o	\textdivorced
'	\textquotesingle	⚭	\textmarried
•	\textbullet	†	\textdied
○	\textopenbullet		\textleaf

Textcomp IV

※	\textreferencemark
‱	\textpertenthousand
‰	\textperthousand
⁎	\textasteriskcentered
·	\textperiodcentered
ª	\textordfeminine
º	\textordmasculine
⁄	\textfractionsolidus
‧	\textdblhyphen
=	\textdblhyphenchar
‚	\textquotestraightbase
„	\textquotestraightdblbase
⸘	\textinterrobang
¡	\textinterrobangdown
⁓	\textthreequartersemdash
–	\texttwelveudash

Marvosym I

Include \usepackage{marvosym} before \begin{document}

€	\EUR	ℌ	\Denarius
€	\EURdig	ℬ	\Shilling
€	\EURtm	∢	\Anglesign
€	\EURcr	·	\Squaredot
€	\EURhv	≙	\Corresponds
₸	\Pfund	⃗	\Vectorarrow
@	\Ecommerce	⃗	\Vectorarrowhigh
$	\EyesDollar	➔	\MVRightarrow

☥	\Ankh		\Womanface
✝	\Cross		\MartinVogel
⌖	\Celtcross		\Bouquet
♡	\Heart		\Mundus
🦇	\Bat	☯	\Yinyang
FH BO	\FHBOlogo	☺	\Smiley
FH BO	\FHBOLOGO	☹	\Frowny
FH BO FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	\FullFHBO	Ⓐ	\CircledA

Marvosym II

0	\MVZero	5	\MVFive
1	\MVOne	6	\MVSix
2	\MVTwo	7	\MVSeven
3	\MVThree	8	\MVEight
4	\MVFour	9	\MVNine

♀	\Female	♂	\Male
⚲	\FEMALE	□	\MALE
⚢	\FemaleFemale	⚣	\MaleMale
⚤	\FemaleMale	○	\Neutral
⚥	\Hermaphrodite	⚦	\HERMAPHRODITE

▶	\Forward	⏫	\ToTop
◀	\Rewind	⏬	\ToBottom
⏭	\ForwardToEnd	⏮	\RewindToStart
▼	\MoveDown	⏩	\ForwardToIndex
▲	\MoveUp	⏪	\RewindToIndex

Marvosym III

☿	\Mercury	♈	\Aries
♀	\Venus	♉	\Taurus
♁	\Earth	♊	\Gemini
♂	\Mars	♋	\Cancer
♃	\Jupiter	♌	\Leo
♄	\Saturn	♍	\Virgo
♅	\Uranus	♎	\Libra
♆	\Neptune	♏	\Scorpio
♇	\Pluto	♐	\Sagittarius
☽	\Moon	♑	\Capricorn
☉	\Sun	♒	\Aquarius
		♓	\Pisces

✁	\Cutleft	✂	\Rightscissors
✁	\Cutright	---	\Cutline
✂	\Leftscissors	---	\Kutline

Marvosym IV

	\Biohazard		\BSEfree
	\CEsign		\Estatically
	\Explosionsafe		\Stopsign
	\Radioactivity		\Laserbeam
	\Lsteel		\Circsteel
	\Tsteel		\Squaresteel
	\TTsteel		\Rectsteel
	\RoundedTsteel		\Hexasteel
	\RoundedLsteel		\Octosteel
	\RoundedTTsteel		\Flatsteel
	\Force		\Circpipe
	\Beam		\Squarepipe
	\Bearing		\Rectpipe
	\Fixedbearing		\Lefttorque
	\Loosebearing		\Righttorque
	\Lineload		

Marvosym V

	\Email		\Bicycle
	\fax		\Football
	\Faxmachine		\Pointinghand
	\Lightning		\Checkedbox
	\Pickup		\Gentsroom
	\Emailct		\Ladiesroom
	\FAX		\Wheelchair
	\Letter		\Clocklogo
	\Mobilefone		\Industry
	\Telefon		\Writinghand
	\Info		\Coffeecup
	\MVAt		\Crossedbox

	\ComputerMouse		\SerialInterface
	\ParallelPort		\Keyboard
	\SerialPort		\Printer

Marvosym VI

	\CleaningA		\AtForty
	\CleaningF		\AtSixty
	\CleaningFF		\AtNinetyFive
	\CleaningP		\ShortThirty
	\CleaningPP		\ShortForty
	\Tumbler		\ShortFifty
	\NoTumbler		\ShortSixty
	\NoChemicalCleaning		\ShortNinetyFive
	\Bleech		\SpecialForty
	\NoBleech		\WashCotton
	\IroningI		\WashSynthetics
	\IroningII		\WashWool
	\IroningIII		\Handwash
	\NoIroning		\Dontwash

Pifont I

Include \usepackage{pifont} before \begin{document}

☎ \ding{37}	✕ \ding{53}	✣ \ding{69}
✆ \ding{38}	✖ \ding{54}	✦ \ding{70}
✇ \ding{39}	✗ \ding{55}	✧ \ding{71}
✈ \ding{40}	✘ \ding{56}	★ \ding{72}
✉ \ding{41}	✙ \ding{57}	☆ \ding{73}
☛ \ding{42}	✚ \ding{58}	✪ \ding{74}
☞ \ding{43}	✛ \ding{59}	✫ \ding{75}
✌ \ding{44}	✜ \ding{60}	✬ \ding{76}
✍ \ding{45}	✝ \ding{61}	✭ \ding{77}
✎ \ding{46}	✞ \ding{62}	✮ \ding{78}
✏ \ding{47}	✟ \ding{63}	✯ \ding{79}
✐ \ding{48}	✠ \ding{64}	✰ \ding{80}
✑ \ding{49}	✡ \ding{65}	✱ \ding{81}
✒ \ding{50}	✢ \ding{66}	✲ \ding{82}
✓ \ding{51}	✣ \ding{67}	✳ \ding{83}
✔ \ding{52}	✤ \ding{68}	✴ \ding{84}

Pifont II

✳	\ding{85}	❄	\ding{101}	◆	\ding{117}
✶	\ding{86}	❅	\ding{102}	❖	\ding{118}
✷	\ding{87}	❆	\ding{103}	◗	\ding{119}
✸	\ding{88}	❇	\ding{104}	❘	\ding{120}
✹	\ding{89}	❈	\ding{105}	❙	\ding{121}
✺	\ding{90}	❉	\ding{106}	❚	\ding{122}
✻	\ding{91}	❊	\ding{107}	❛	\ding{123}
✼	\ding{92}	●	\ding{108}	❜	\ding{124}
✽	\ding{93}	❍	\ding{109}	❝	\ding{125}
✾	\ding{94}	■	\ding{110}	❞	\ding{126}
✿	\ding{95}	❑	\ding{111}	❡	\ding{161}
❀	\ding{96}	❒	\ding{112}	❢	\ding{162}
❁	\ding{97}	❑	\ding{113}	❣	\ding{163}
❂	\ding{98}	❒	\ding{114}	❤	\ding{164}
❃	\ding{99}	▲	\ding{115}	❥	\ding{165}
❄	\ding{100}	▼	\ding{116}	❦	\ding{166}

Pifont III

❧	\ding{167}	❶	\ding{182}	⑦	\ding{198}
♣	\ding{168}	❷	\ding{183}	⑧	\ding{199}
♦	\ding{169}	❸	\ding{184}	⑨	\ding{200}
♥	\ding{170}	❹	\ding{185}	⑩	\ding{201}
♠	\ding{171}	❺	\ding{186}	❶	\ding{202}
		❻	\ding{187}	❷	\ding{203}
①	\ding{172}	❼	\ding{188}	❸	\ding{204}
②	\ding{173}	❽	\ding{189}	❹	\ding{205}
③	\ding{174}	❾	\ding{190}	❺	\ding{206}
④	\ding{175}	❿	\ding{191}	❻	\ding{207}
⑤	\ding{176}	①	\ding{192}	❼	\ding{208}
⑥	\ding{177}	②	\ding{193}	❽	\ding{209}
⑦	\ding{178}	③	\ding{194}	❾	\ding{210}
⑧	\ding{179}	④	\ding{195}	❿	\ding{211}
⑨	\ding{180}	⑤	\ding{196}		
⑩	\ding{181}	⑥	\ding{197}		

Pifont IV

\ding{212}	\ding{228}	\ding{245}
\ding{213}	\ding{229}	\ding{246}
\ding{214}	\ding{230}	\ding{247}
\ding{215}	\ding{231}	\ding{248}
\ding{216}	\ding{232}	\ding{249}
\ding{217}	\ding{233}	\ding{250}
\ding{218}	\ding{234}	\ding{251}
\ding{219}	\ding{235}	\ding{252}
\ding{220}	\ding{236}	\ding{253}
\ding{221}	\ding{237}	\ding{254}
\ding{222}	\ding{238}	
\ding{223}	\ding{239}	\ding{33}
\ding{224}	\ding{241}	\ding{34}
\ding{225}	\ding{242}	\ding{35}
\ding{226}	\ding{243}	\ding{36}
\ding{227}	\ding{244}	

Chemarrow

Include \usepackage{chemarrow} before \begin{document}