Art of Problem Solving

LaTeX:Symbols

From AoPSWiki

This article will provide a short list of commonly used LaTeX symbols.

Contents

Operators

Symbol	Command	Symbol	Command	Symbol	Command
$\pm$	\pm	$\mp$	\mp	$\times$	\times
$\div$	\div	$\cdot$	\cdot	$\ast$	\ast
$\star$	\star	$\dagger$	\dagger	$\ddagger$	\ddagger
$\amalg$	\amalg	$\cap$	\cap	$\cup$	\cup
$\uplus$	\uplus	$\sqcap$	\sqcap	$\sqcup$	\sqcup
$\vee$	\vee	$\wedge$	\wedge	$\oplus$	\oplus
$\ominus$	\ominus	$\otimes$	\otimes	$\circ$	\circ
$\bullet$	\bullet	$\diamond$	\diamond	$\lhd$	\lhd
$\rhd$	\rhd	$\unlhd$	\unlhd	$\unrhd$	\unrhd
$\oslash$	\oslash	$\odot$	\odot	$\bigcirc$	\bigcirc
$\triangleleft$	\triangleleft	$\Diamond$	\Diamond	$\bigtriangleup$	\bigtriangleup
$\bigtriangledown$	\bigtriangledown	$\Box$	\Box	$\triangleright$	\triangleright
$\setminus$	\setminus	$\wr$	\wr	$\sqrt{x}$	\sqrt{x}
x°	x^{\circ}				

Relations

Symbol	Command	Symbol	Command	Symbol	Command
$\leq$	\le	$\geq$	\ge	$\neq$	\neq
$\sim$	\sim	$\ll$	\ll	$\gg$	\gg
$\doteq$	\doteq	$\simeq$	\simeq	$\subset$	\subset
$\supset$	\supset	$\approx$	\approx	$\asymp$	\asymp
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong
$\smile$	\smile	$\sqsubset$	\sqsubset	$\sqsupset$	\sqsupset
$\equiv$	\equiv	$\frown$	\frown	$\sqsubseteq$	\sqsubseteq
$\sqsupseteq$	\sqsupseteq	$\propto$	\propto	$\bowtie$	\bowtie
$\in$	\in	$\ni$	\ni	$\prec$	\prec
$\succ$	\succ	$\vdash$	\vdash	$\dashv$	\dashv
$\preceq$	\preceq	$\succeq$	\succeq	$\models$	\models
$\perp$	\perp	$\parallel$	\parallel	$\|$	|
$\mid$	\mid				

Negations of many of these relations can be formed by just putting \not before the symbol, or by slipping an n between the \ and the word. Here are a few examples, plus a few other negations; it works for many of the others as well.

Symbol	Command	Symbol	Command	Symbol	Command
$\nmid$	\nmid	$\nleq$	\nleq	$\ngeq$	\ngeq
$\nsim$	\nsim	$\ncong$	\ncong	$\nparallel$	\nparallel
$\not<$	\not<	$\not>$	\not>	$\not=$	\not=
$\not\le$	\not\le	$\not\ge$	\not\ge	$\not\sim$	\not\sim
$\not\approx$	\not\approx	$\not\cong$	\not\cong	$\not\equiv$	\not\equiv
$\not\parallel$	\not\parallel	$\nless$	\nless	$\ngtr$	\ngtr
$\lneq$	\lneq	$\gneq$	\gneq	$\lnsim$	\lnsim
$\lneqq$	\lneqq	$\gneqq$	\gneqq		

To use other relations not listed here, such as =, >, and <, in LaTeX, you may just use the symbols on your keyboard.

Greek Letters

Lowercase Letters

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

Capital Letters

Symbol	Command	Symbol	Command	Symbol	Command	Symbol	Command
Γ	\Gamma	Δ	\Delta	Θ	\Theta	Λ	\Lambda
Ξ	\Xi	Π	\Pi	Σ	\Sigma	Υ	\Upsilon
Φ	\Phi	Ψ	\Psi	Ω	\Omega		

Headline text

Arrows

Symbol	Command	Symbol	Command
$\gets$	\gets	$\to$	\to
$\leftarrow$	\leftarrow	$\Leftarrow$	\Leftarrow
$\rightarrow$	\rightarrow	$\Rightarrow$	\Rightarrow
$\leftrightarrow$	\leftrightarrow	$\Leftrightarrow$	\Leftrightarrow
$\mapsto$	\mapsto	$\hookleftarrow$	\hookleftarrow
$\leftharpoonup$	\leftharpoonup	$\leftharpoondown$	\leftharpoondown
$\rightleftharpoons$	\rightleftharpoons	$\longleftarrow$	\longleftarrow
$\Longleftarrow$	\Longleftarrow	$\longrightarrow$	\longrightarrow
$\Longrightarrow$	\Longrightarrow	$\longleftrightarrow$	\longleftrightarrow
$\Longleftrightarrow$	\Longleftrightarrow	$\longmapsto$	\longmapsto
$\hookrightarrow$	\hookrightarrow	$\rightharpoonup$	\rightharpoonup
$\rightharpoondown$	\rightharpoondown	$\leadsto$	\leadsto
$\uparrow$	\uparrow	$\Uparrow$	\Uparrow
$\downarrow$	\downarrow	$\Downarrow$	\Downarrow
$\updownarrow$	\updownarrow	$\Updownarrow$	\Updownarrow
$\nearrow$	\nearrow	$\searrow$	\searrow
$\swarrow$	\swarrow	$\nwarrow$	\nwarrow

(For those of you who hate typing long strings of letters, \iff and \implies can be used in place of \Longleftrightarrow and \Longrightarrow respectively.)

Dots

Symbol	Command	Symbol	Command	Symbol	Command	Symbol	Command
$\ldots 2$	\ldots 2	$\vdots$	\vdots	$\cdots 2$	\cdots 2	$\ddots$	\ddots

(The '2's after \ldots and \cdots are only present to make the distinction between the two clear.)

Accents

Symbol	Command	Symbol	Command	Symbol	Command
$\hat{x}$	\hat{x}	$\check{x}$	\check{x}	$\dot{x}$	\dot{x}
$\breve{x}$	\breve{x}	$\acute{x}$	\acute{x}	$\ddot{x}$	\ddot{x}
$\grave{x}$	\grave{x}	$\tilde{x}$	\tilde{x}	$\mathring{x}$	\mathring{x}
$\bar{x}$	\bar{x}	$\vec{x}$	\vec{x}		

When applying accents to i and j, you can use \imath and \jmath to keep the dots from interfering with the accents:

Symbol	Command	Symbol	Command
$\vec{\jmath}$	\vec{\jmath}	$\tilde{\imath}$	\tilde{\imath}

\tilde and \hat have wide versions that allow you to accent an expression:

Symbol	Command	Symbol	Command
$\widehat{3+x}$	\widehat{3+x}	$\widetilde{abc}$	\widetilde{abc}

Others

Symbol	Command	Symbol	Command	Symbol	Command
∞	\infty	$\triangle$	\triangle	$\angle$	\angle
$\aleph$	\aleph	$\hbar$	\hbar	$\imath$	\imath
$\jmath$	\jmath	ℓ	\ell	$\wp$	\wp
$\Re$		$\Im$		$\mho$	

	\Re		\Im		\mho
$'$	\prime	$\emptyset$	\emptyset	∇	\nabla
$\surd$	\surd	∂	\partial	$\top$	\top
$\bot$	\bot	$\vdash$	\vdash	$\dashv$	\dashv
$\forall$	\forall	$\exists$	\exists	$\neg$	\neg
$\flat$	\flat	$\natural$	\natural	$\sharp$	\sharp
$\backslash$	\backslash	$\Box$	\Box	$\Diamond$	\Diamond
$\clubsuit$	\clubsuit	$\diamondsuit$	\diamondsuit	$\heartsuit$	\heartsuit
$\spadesuit$	\spadesuit	$\bowtie$	\Join	$\blacksquare$	\blacksquare
$\S$	\S	$\P$	\P	$\copyright$	\copyright
$\pounds$	\pounds	$\overarc{ABC}$	\overarc{ABC}(it works)	$\underarc{XYZ}$	\underarc{XYZ}(it works)

Command Symbols

Some symbols are used in commands so they need to be treated in a special way.

Symbol	Command	Symbol	Command	Symbol	Command	Symbol	Command
$	\textdollar	&	\&	%	\%	#	\#
_	_	{	\{	}	\}	\	\backslash

(Warning: Using \$ for $ will result in 036;. This is a bug as far as we know. Depending on the version of LaTex this is not always a problem.)

European Language Symbols

Symbol	Command	Symbol	Command	Symbol	Command	Symbol	Command
œ	{\oe}	æ	{\ae}	å	{\aa}	ø	{\o}
Œ	{\OE}	Æ	{\AE}	Å	{\AA}	Ø	{\O}
ł	{\l}	ß	{\ss}	¡	!`		
Ł	{\L}	SS	{\SS}	¿	?`		

Bracketing Symbols

In mathematics, sometimes we need to enclose expressions in brackets or braces or parentheses. Some of these work just as you'd imagine in LaTeX; type (and) for parentheses, [and] for brackets, and | and | for absolute value. However, other symbols have special commands:

Symbol	Command	Symbol	Command	Symbol	Command
{	\{	}	\}	$\|$	|
\	\backslash	$\lfloor$	\lfloor	$\rfloor$	\rfloor
$\lceil$	\lceil	$\rceil$	\rceil	$\langle$	\langle
$\rangle$	\rangle				

You might notice that if you use any of these to typeset an expression that is vertically large, like

```
(\frac{a}{x} )^2
```

the parentheses don't come out the right size:

$(\frac{a}{x})^2$

If we put \left and \right before the relevant parentheses, we get a prettier expression:

```
\left(\frac{a}{x} \right)^2
```

gives

$\left(\frac{a}{x}\right)^2$

\left and \right can also be used to resize the following symbols:

Symbol	Command	Symbol	Command	Symbol	Command
$\uparrow$	\uparrow	$\downarrow$	\downarrow	$\updownarrow$	\updownarrow
$\Uparrow$	\Uparrow	$\Downarrow$	\Downarrow	$\Updownarrow$	\Updownarrow

Multi-Size Symbols

Some symbols render differently in inline math mode and in display mode. Display mode occurs when you use \[...\] or $$...$$, or environments like \begin{equation}...\end{equation}, \begin{align}...\end{align}. Read more in the commands section of the guide about how symbols which take arguments above and below the symbols, such as a summation symbol, behave in the two modes.

In each of the following, the two images show the symbol in display mode, then in inline mode.

Symbol	Command	Symbol	Command	Symbol	Command
$\sum$ $\sum$	\sum	$\int$ $\int$	\int	$\oint$ $\oint$	\oint
$\prod$ $\prod$	\prod	$\coprod$ $\coprod$	\coprod	$\bigcap$ $\bigcap$	\bigcap
$\bigcup$ $\bigcup$	\bigcup	$\bigsqcup$ $\bigsqcup$	\bigsqcup	$\bigvee$ $\bigvee$	\bigvee
$\bigwedge$ $\bigwedge$	\bigwedge	$\bigodot$ $\bigodot$	\bigodot	$\bigotimes$ $\bigotimes$	\bigotimes
$\bigoplus$ $\bigoplus$	\bigoplus	$\biguplus$ $\biguplus$	\biguplus		

Examples

- x^y is the same as x^{y}, producing x^y .
- x_y is the same as x_{y}, producing x_y .
- However, x^10 is *not* the same as x^{10}. The former produces x^10 instead of x^{10}.

See Also

- Next: Commands
- Previous: Layout