principia.sty
A LaTeX 2ε Package for Typesetting Whitehead and Russell's *Principia Mathematica* (Version 1.3)

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The principia package is designed for typesetting the Peanese notation of *Principia Mathematica*. "Peanese" is something of a misnomer: Whitehead and Russell invented much of the notations used in *Principia Mathematica* even while borrowing from many others.

principia's style has antecedents in Kevin C. Klement's excellent *Tractatus* typesetting, to which we owe the device of adding 'd's and 't's to typeset further square dots. The device of beginning all principia commands with '\pm' is owed to the begriff package, a style that was mimicked in both the frege package and the Grundgesetze package.

In *Principia Mathematica* some symbols occur with an argument and sometimes that same symbol occurs without an argument. For example, '$(\exists x)$' occurs in some formulas, but sometimes '$\exists$' occurs in the text when they talk about the symbol itself. principia is designed to accommodate these different occurrences of symbols. When a symbol is to occur without an argument, capitalize the first letter following the '\pm' part of the command. E.g. \pmsome{x} produces $(\exists x)$ and \pmSome produces '$\exists$'. Note the former command requires an argument and the latter command does not. Not all commands in the principia package admit of such dual use because some symbols in *Principia Mathematica* never occur without an argument or do not take an argument in the usual sense. For example, the propositional connectives do not take an 'argument' in the way singular or plural descriptions do.

Version 1.3 of principia is adequate to typeset all notations throughout Sections A and B of *Principia*'s Volume I and includes some minor fixes. See the package documentation for details.

principia's dependencies are amsmath, amssymb, pifont, and graphicx. Make sure to load these package by typing \usepackage{graphicx}, etc., into the document preamble.

To load principia, type \usepackage{principia} in the document's preamble.

Symbol	LaTeXcommand	Notes
$\vdash$	`\pmthm`	Theorem.
$*$	`\pmast`	As in $*1$.
$\cdot$	`\pmcdot`	As in, $*1\cdot 1$.
Pp	`\pmpp`	Primitive proposition. Note the indentation.
$=$	`\pmiddf`	Identity for definitions ('=' differs in spacing).
Df	`\pmdf`	Definition. Note the indentation.
Dem.	`\pmdem`	This symbol begins a proof.
$\left[\frac{p}{q}\right]$, $\left[\frac{p,\ r}{q,\ s}\right]$, $\left[\frac{p,\ r,\ t}{q,\ s,\ u}\right]$, ...	`\pmsub{p}{q}`, `\pmsubb{p}{q}{r}{s}`, `\pmsubbb{p}{q}{r}{s}{t}{u}`, ...	Substitution into theorems. Add 'b's to the end of `\pmsub` to increase the number of substitutions (up to four 'b's). Each extra 'b' adds two arguments. To substitute and specify the theorem as well, capitalize the 's' in `\pmsub`.
$\left[\text{Add}\ \frac{p}{q}\right]$, ...	`\pmSub{\text{Add}}{p}{q}`	
., :, :., ::, ::., ::	`\pmdot`, `\pmdott`, `\pmdottt`, ...	Add 't's to the end of `\pmdot` to increase the number of dots (up to six 't's).
., :, :., ::, ::., ::	`\pmand`, `\pmandd`, `\pmanddd`, ...	Add 'd's to the end of `\pmand` command to increase the number of dots (up to six 'd's).
$\vee$	`\pmor`	Disjunction.
$\sim$	`\pmnot`	Negation. Note its spacing differs from `\sim`.
$\supset$	`\pmimp`	Material implication.
$\equiv$	`\pmiff`	Material biconditional.
$\supset_x$, $\supset_{x,y}$	`\pmimp_x`, `\pmimp_{x,y}`	And so on for more subscripts.
$\equiv_x$, $\equiv_{x,y}$	`\pmiff_x`, `\pmiff_{x,y}`	And so on for more subscripts.
$\hat{x}$	`\pmhat{x}`	This command requires one argument. It can be embedded in other commands. E.g., `\pmpf{\phi}{\pmhat{x}}` renders '$\phi\hat{x}$'.
ϕx	`\pmpf{\phi}{x}`	This command requires two arguments.
$\phi(x, y)$	`\pmpff{\phi}{x}{y}`	This command requires three arguments.
$\phi(x, y, z)$	`\pmpfff{\phi}{x}{y}{z}`	This command requires four arguments.
(x)	`\pmall{x}`	Universal quantifier.
$(\exists x)$, $\exists$	`\pmsome{x}`, `\pmSome`	Existential quantifier.
!	`\pmshr`	The predicative propositional functions.
$\phi!x$	`\pmpred{\phi}{x}`	This command requires two arguments.
$\phi!(x, y)$	`\pmpredd{\phi}{x}{y}`	This command requires three arguments.
$\phi!(x, y, z)$	`\pmpreddd{\phi}{x}{y}{z}`	This command requires four arguments.

$=, \neq$	`=, \pmnid`	Identity and its negation.
$(\boldsymbol{\imath} x)$	`\pmdsc{x}`	Definite description.
$\mathbf{E!}$	`\pmexists`	Existence.