

Maple 2015 Quick Reference Card



Macintosh® version

Document Mode vs. Worksheet Mode


Maple offers two primary modes of problem entry and content creation: Document mode and Worksheet mode. Both modes have respective advantages and you can easily switch from one mode to the other for maximum flexibility. See [worksheet](#) for more information on the worksheet interface.




Document Mode	Worksheet Mode
<ul style="list-style-type: none"> Quick problem-solving and free-form, rich content composition No prompt (>) displayed Math is entered and displayed in 2-D Solve math problems with [Control]-click menu on input and output 	<ul style="list-style-type: none"> Traditional Maple problem-solving environment Enter problems at a prompt (>) Math entered and displayed in 2-D or 1-D Solve math problems with [Control]-click menu on output

Document mode lets you create rich content. For example, the following solves for x without any commands: $\frac{(x-2)}{\alpha} = 1$ solutions for $x \rightarrow \alpha + 2$	The command to perform the same operation in Worksheet mode is in 2-D (Math) Input: $> \text{solve}\left(\frac{x-2}{\alpha} = 1, x\right)$ $\alpha + 2$ or in 1-D (Maple) Input: $> \text{solve}((x-2)/\alpha=1, x);$ $\alpha + 2$
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
Toggle Math/Text entry mode	[F5]  on toolbar	Toggle 2-D/1-D Math entry mode	[F5] 2-D black font, 1-D red font
Evaluate math expression and display result inline	[Command] [=]	Evaluate math expression and display result on new line	[Return]
Evaluate math expression and display result on new line	[Return]	Continue on next line without executing	[Shift] [Return]
Switch to Worksheet mode (insert prompt)	 on toolbar	Switch to Document mode	Format → Create Document Block
Show hidden commands	View → Expand Document Block	Hide commands. Show only results.	Highlight commands to be hidden. Format → Create Document Block

Common Operations Available in Both Document and Worksheet Modes


Display quick help (Details)	[Command] [Shift] [?] for Quick Help. [Command] [F2] for Quick Reference Card (this guide)
Refer to previous result using equation numbers	[Command] [L] then enter equation number in dialog
Recompute calculations within a line	 on toolbar

Recompute all calculations in a document	 on toolbar
Symbol selection, e.g. ϵ (epsilon)	Enter leading characters [Esc] (or [Command] [Shift] [Space]), e.g. eps [Esc]
Command completion, e.g. Lambert W function	Enter leading characters [Esc] (or [Command] [Shift] [Space]), e.g. Lamb [Esc]
Perform context operation on math expression	[Control] -click any math expression
Insert prompt	 on toolbar
Insert text paragraph	 on toolbar
Drag a copy of an expression to a new location	Highlight the expression, hold [Command] , and drag to new location

2-D Math Editing Operations, Keyboard Shortcuts, and Operations ([Details](#))

Navigate through expression	[←] [→] [↑] [↓]								
Move cursor to different level in expression, e.g. out of exponent	[→]								
Navigate through placeholders	[Tab]								
Add, remove, rearrange palettes	View → Palettes → Arrange Palettes or [Control] -click palette								
Fraction $\frac{x}{y}$, superscript x^n , subscript x_n	x/y , x^n , x_n								
Prime notation for derivatives, e.g. $y'' + y' = 0$ for $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ (Details)	$y'' + y' = 0$								
Square root \sqrt{x} , n th root $\sqrt[n]{x}$	Enter leading characters sqrt [Esc] , nthroot [Esc]								
Symbol above, e.g. \vec{x}	x [Command] [Shift] ["] then insert symbol, e.g.  from Arrows palette								
To enter literal characters (^, /, etc.), precede character with \ (backslash)	e.g. foo\^bar produces foo^bar								
Greek letter entry mode (single letter)	[Command] [Shift] [G] letter								
Special characters and symbols: Enter leading characters and [Esc]	<table border="1"> <tbody> <tr> <td>π, e, i</td> <td>π, e, i</td> <td>α, λ</td> <td>alpha, lambda</td> </tr> <tr> <td>∞</td> <td>infn</td> <td>\geq, \leq, \neq, \pm</td> <td>geq, leq, ne, pm</td> </tr> </tbody> </table>	π, e, i	π, e, i	α, λ	alpha, lambda	∞	infn	\geq, \leq, \neq, \pm	geq, leq, ne, pm
π, e, i	π, e, i	α, λ	alpha, lambda						
∞	infn	\geq, \leq, \neq, \pm	geq, leq, ne, pm						

Plotting and Animation ([Plotting Guide](#))

Plot an existing expression (see plot menu items for more options)	[Control] -click expression → Plots → Plot Builder
Plot new expression (see plot interface for more information)	Tools → Assistants → Plot Builder
Add new expression to existing plot	Highlight and drag expression into plot
Add annotations to plots	[Control] -click plot and select  on toolbar
Animation and parameter plots for functions of several variables	[Control] -click expression → Plots → Plot Builder and select a plot type

Mathematical Operations

Common manipulations (simplify, factor, expand,...)	[Control] -click expression and select from menu
Solve equations	[Control] -click equation → Solve
Solve numerically (floating-point)	[Control] -click equation → Solve → Numerically Solve
Solve ODE	[Control] -click DE expression → Solve DE Interactively
Integrate, differentiate	[Control] -click expression → select Integrate or Differentiate
Evaluate expression at a point	[Control] -click expression → Evaluate at a Point
Create a matrix or vector	Matrix palette → Choose → Insert
Invert, transpose, solve matrix	[Control] -click matrix → Standard Operations → select Inverse , Transpose , ...
Evaluate as floating-point	[Control] -click expression → Approximate
Various operations and tasks	Use Task Templates: Tools → Tasks → Browse


Important Maple Syntax ([More](#))

<code>:=</code> Assignment	<code>a := 2; b := 3 + x; c := a + b;</code> produces $5 + x$ for <code>c</code>
<code>=</code> Mathematical equation	<code>solve(2*x + a = 1, x);</code> produces $x = \frac{1-a}{2}$
<code>=</code> Boolean equality	<code>if a = 0 then ...</code>
Suppress display of output	Terminate command with a colon, e.g. <code>1000! :</code>
<code>[]</code> List (ordered)	<code>z := [c, b, a]; z[1];</code> produces <code>c</code>
<code>{ }</code> Set (unordered, no duplicates)	<code>{a, b, a, c};</code> produces <code>{a, b, c}</code>
Display help on topic	<code>?topic</code>

Expressions vs. Functions ([Details](#))

Operations	Expression $x^2 + y^2$	Function (operator) $g(x,y) = x^2 + y^2$
Definition	<code>f := x^2 + y^2;</code>	<code>g := (x,y) -> x^2+y^2;</code>
Evaluate at $x=1, y=2$	<code>eval(f, [x=1,y=2]);</code> produces 5	<code>g(1,2);</code> produces 5
3-D plot for x from 0 to 1, y from 0 to 1	<code>plot3d(f, x=0..1, y=0..1);</code>	<code>plot3d(g(x,y), x=0..1, y=0..1);</code>
Conversion to other form	<code>f2 := unapply(f, x, y);</code> <code>f2(1,2);</code> produces 5	<code>g2 := g(x,1);</code> <code>g2 + z;</code> produces $x^2 + 1 + z$

Units and Tolerances ([Units Details](#))

Add units to value or expression	Place cursor to right of quantity. Use Units (SI) or Units (FPS) palette or [Control] -click → Units → Affix Unit .
Add arbitrary unit	 from Units (SI) or Units (FPS) palette and enter desired unit.
Simplify units in an expression	[Control] -click expression → Units → Simplify
Convert units to a different system of units	[Control] -click expression → Units → Convert
Enable automatic units simplification	<code>with(Units)(Standard);</code>
Enable tolerance calculations	<code>with(Tolerances);</code>
Tolerance quantity in 2-D Math	9 pm [Esc] 1.1 for 9 ± 1.1
Tolerance quantity in 1-D Math	9 &+- 1.1; for 9 ± 1.1

Input and Output

Interactive data import assistant	Tools → Assistants → Import Data
Import audio or image file (for details see ImportData)	Tools → Assistants → Import Data
Code generation (C, C#®, Fortran, Java™, JavaScript®, MATLAB®, Perl, Python®, R, Visual Basic®)	[Control] -click expression → Language Conversions . See CodeGeneration for help and details.
Publish document in HTML, LaTeX, or Microsoft® Word-RTF	File → Export As → select HTML , LaTeX , or Rich Text Format
Publish document in PDF	File → Print → select Save as PDF from the drop-down menu

Select Interactive Tools and Utilities