

Maple: A Quick Reference

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January 1995 (February 1997, updated for Release 4)

Symbols and Abbreviations

Symbol	Description	Example
<code>:=</code>	assignment	<code>f := x^2/y^3;</code>
<code>;</code>	terminate command; display result	<code>int(x^2, x);</code>
<code>:</code>	terminate command; hide result	<code>int(x^2, x):</code>
<code>..</code>	specify a range or interval	<code>plot(t*exp(-2*t), t=0..3);</code>
<code>{ }</code>	set delimiter	<code>{ y, x, y };</code>
<code>[]</code>	list delimiter	<code>[y, x, y];</code>
<code>"</code>	refers to previous result (double quote)	<code>Int(exp(x^2), x=0..1):</code> <code>" = value(");</code>
<code>`</code> (also ?strings)	string delimiter (back quote) NOTE: single quote (<code>'</code>) is different	<code>TITLE := `A Pretty Plot`;</code>
<code>'</code> (also ?uneval)	delayed evaluation (single quote) NOTE: back quote (<code>`</code>) is different	<code>x := 'x';</code> <i>not needed in normal usage</i>
<code>-></code>	mapping (procedure) definition	<code>f := (x,y) -> x^2*sin(x-y);</code> <code>f(Pi/2,0);</code>

Mathematical Operations, Functions, and Constants

Symbol	Description	Example
<code>+</code> , <code>-</code> , <code>*</code> , <code>/</code> , <code>^</code>	add, subtract, multiply, divide, power	<code>x^(-4)*3+x/Pi;</code>
<code>sin</code> , <code>cos</code> , <code>tan</code> , <code>cot</code> , <code>sec</code> , <code>csc</code>	trigonometric functions	<code>sin(x-Pi/5)-sec(x^2);</code>
<code>arcsin</code> , <code>arccos</code> , <code>arctan</code> , <code>arccot</code> , <code>arcsec</code> , <code>arccsc</code>	inverse trigonometric functions	<code>arctan(2*theta);</code>
<code>exp</code>	exponential function	<code>exp(2*x);</code>
<code>ln</code>	natural logarithm	<code>ln(x*y/2);</code>
<code>log10</code>	common logarithm (base 10)	<code>log10(1000);</code>
<code>abs</code>	absolute value	<code>abs((-3)^5);</code>
<code>sqrt</code>	square root	<code>sqrt(24);</code>
<code>!</code>	factorial	<code>k!;</code>
<code>=</code> , <code><></code> , <code><</code> , <code><=</code> , <code>></code> , <code>>=</code>	equations and inequalities <i>Note: E no longer exists; use exp(1)</i>	<code>diff(y(x), x) + x*y(x) = F(x);</code> <code>exp(Pi) > Pi^exp(1);</code>
<code>Pi</code> , <code>I</code>	π , i (mathematical constants)	<code>exp(Pi*I);</code>
<code>infinity</code>	infinity	<code>int(x^(-2), x=1..infinity);</code>

NOTES:

- The document is also available on the World Wide Web; the Universal Resource Locator is <http://www.math.sc.edu/~meade/maple/maple-ref/>
- Please send comments, corrections, and suggestions for improvements to meade@math.sc.edu.

Commands

Command	Description	Example
restart	clear all Maple definitions	restart;
with	load a Maple package	with(DEtools); with(plots);
help (also ?)	display Maple on-line help	?DEplot
example	provide examples for a function	example(plot);
limit	calculate a limit	limit(sin(x)/x, x=0);
diff	compute the derivative of an expression	diff(a*x*exp(b*x)*cos(c*y), x)
int	definite or indefinite integration	int(sin(x), x=0..Pi);
value	evaluate an inert expression (typically used with Limit, Diff, or Int)	G := Int(exp(-x^2), x); value(G);
Limit	inert (unevaluated) form of limit	Limit(sin(x)/x, x=0);
Diff	inert (unevaluated) form of diff	Diff(exp(x^2), x);
Int	inert (unevaluated) form of int	Int(sqrt(x), x=0..1);
plot	create a 2-dimensional plot of functions	plot(u^3, u=0..1, title=`cubic`); plot({sin(x), cos(x)}, x=0..Pi);
plot3d	create a 3-dimensional plot of functions	plot3d(sin(x+y), x=0..2, y=0..1);
DEplot	create a plot associated with an ODE or system of ODEs; see ?DEplot for more information	ODE := diff(y(x), x) = 2*x*y(x); DEplot(ODE, [y(x)], x=-2..2, y=-1..1, arrows=SMALL);
display	display a list of plot structures	with(plots): F:=plot(exp(x), x=0..1, style=line); G:=plot(ln(x), x=0..1, style=point); display([F,G], title='2 curves');
solve	solve equations	solve(x^4 - 5*x^2 + 6*x = 2, x);
fsolve	solve using floating-point arithmetic	fsolve(1/10*t+t*exp(-2*t)=1, t);
subs	substitute values into an expression	subs(x=r^(1/3), 3*x*ln(x^3));
simplify	apply simplification rules to an expression	simplify(exp(a+ln(b*exp(c))));
factor	factor a polynomial	factor((x^3-y^3)/(x^4-y^4));
convert	convert an expression to a different form	convert(x^3/(x^2-1), parfrac, x);
collect	collect coefficients of like powers	collect((x+1)^3*(x+2)^2, x);
rhs	right-hand side of an equation	rhs(y = a*x^2 + b);
lhs	left-hand side of an equation	lhs(y = a*x^2 + b);
numer	extract the numerator of an expression	numer((x+1)^3/(x+2)^2);
denom	extract the denominator of an expression	denom((x+1)^3/(x+2)^2);
evalf	evaluate using floating-point arithmetic	evalf(exp(Pi^2));
evalc	evaluate a complex-valued expression (returns a value in the form a+I*b)	evalc(exp(alpha+I*omega));
evalb	evaluate a Boolean expression (returns true or false)	evalb(exp(Pi) > Pi^E);
assign	perform assignments (often used after solve or dsolve)	s:=solve({x+y=1, 2*x+y=3}, {x,y}); assign(s);
seq	create a sequence	{ seq([0,i], i=-3..3) };
dsolve	solve ordinary differential equations; see ?dsolve for a list of available options	dsolve(diff(y(x),x)-y(x)=1, y(x));
D	differential operator (often used when specifying derivative initial conditions for dsolve)	ODE := diff(y(x),x\$2) + y(x) = 1; IC := y(0)=1, D(y)(0)=1; dsolve({ ODE, IC }, y(x));
assume	inform Maple of additional properties of objects	assume(t>0);
about	check assumptions on Maple objects	about(t);