

# Maple Reference

## Mathematical Operators and Constants

The symbols in the table below are used to create Maple expressions.

Symbol	Description	Example
<code>+, -, *, /, ^</code>	arithmetic operators	<code>2+54/3*5^3;</code>
<code>(, )</code>	expression delimiters	<code>(2+12/25)*3^(7/3);</code>
<code>Pi</code>	$\pi$	<code>5*Pi;</code>
<code>I</code>	imaginary unit, $\sqrt{-1}$	<code>2+5*I;</code>
<code>infinity</code>	positive infinity, $\infty$	
<code>alpha, beta, gamma</code>	other constants	

## Special Maple Delimiters and Command Terminators

The symbols in the table below are used in Maple to terminate commands, assign results to named labels, and to delimit sets and lists.

Symbol	Description	Example
<code>;</code>	terminate command, get output	<code>2*31^12*Pi;</code>
<code>:</code>	terminate command, suppress output	<code>2*31^12*Pi:</code>
<code>=</code>	equality, for setting up equation	<code>2*x+3=5</code>
<code>:=</code>	assignment of a label to an expression	<code>f := 23*x+5*y;</code> <code>2*f;</code>
<code>-&gt;</code>	function definition	<code>g := x -&gt; x^2+2*x;</code> <code>g(x);</code>
<code>..</code>	numerical range, mostly used in plot	<code>-2..2</code> <code>plot(x^2,x=0..5);</code>
<code>[,]</code>	delimit a list in Maple	<code>[1,2,3,4]</code>
<code>{,}</code>	delimit a set in Maple	<code>{2,5,x,r}</code>
<code>' '</code>	delay evaluation, often used to clear out a variable given a previous value	<code>x := 2;</code> <code>x := 'x';</code> <code>x;</code>
<code>'' ''</code>	used to delimit a character string, for example a plot title	<code>plot(x^2,x=-2..2,title = My First Plot);</code>

## Standard Mathematical Functions

Command	function	Example
abs	absolute value	abs(-12/31);
sqrt	square root function	sqrt(35); sqrt(x+1);
exp	e to the : $e^{2x}$	exp(2*x);
ln	natural logarithm	ln(200.4);
sin, cos, tan cot, sec, csc	trig functions	cos(Pi); tan(x);
arccos, arcsin arctan, arccot arcsec, arccsc	inverse trig functions	arcsin(1/2); arctan(x); arccsc(1);

## Essential Maple Commands

The following commands are those used most often in Calculus. Note that each example ends with a semi-colon, which is the signal to Maple to process the command and print its result.

Command	Description	Example
with	load a Maple package	with(CalcP7);
subs	substitute a value substitute into a function	subs(x=2,x*exp(x)); f(2);
evalf	evaluate to a decimal (floating-point) approximation	evalf(Pi);
expand	expand an expression	expand((x+1)^8);
factor	factor an expression	factor(x^2+x);
simplify	simplify and expression	simplify((x^2+x)/(x+1));
solve	solve an equation analytically	solve(2*x+3 = 5,x);
fsolve	solve an equation numerically	fsolve(x=tan(x),x=Pi/2..3*Pi/2);
D	differentiation operator (works only on a function)	D(g)(x); D(g)(2);
diff	differentiation of an expression or a function	diff(x^2,x); diff(g(x),x,x);
int	indefinite or definite integral	int(x^2,x); int(x^2,x=0..1);
limit	limit of an expression or a function	limit(sin(x)/x,x=0); limit(f(x),x=0);
plot	two-dimensional plot more than one function	plot(x^2,x=-2..2); plot([x^3,2*x],x=-2..2);
plot3d	three dimensional plot	plot3d(x^2+y^2,x=-1..1,y=-1..1);
map	apply a function to a list	map(t -> 1/t, [1,2,3,4]);
seq	define a sequence	seq(i^3,i=1..5);