# Maple Reference

### Mathematical Operators and Constants

The symbols in the table below are used to create Maple expressions.				
Symbol	Description	Example		
+,-,*,/,^	arithmetic operators	2+54/3*5^3;		
(,)	expression delimiters	(2+12/25)*3^(7/3);		
Pi	$\pi$	5*Pi;		
I	imaginary unit, $\sqrt{-1}$	2+5*I;		
infinity	positive infinity, $\infty$			
alpha, beta, gamma	other constants			

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

#### 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
;	terminate command, get output	2*31^12*Pi;
:	terminate command, suppress output	2*31^12*Pi:
=	equality, for setting up equation	2*x+3=5
:=	assignment of a label to an expression	f := 23*x+5*y;
		2*f;
->	function definition	g := x -> x^2+2*x;
		g(x);
••	numerical range, mostly used in plot	-22
		plot(x^2,x=05);
[,]	delimit a list in Maple	[1,2,3,4]
{,}	delimit a set in Maple	{2,5,x,r}
, ,	delay evaluation, often	x := 2;
	used to clear out a variable	x := 'x';
	given a previous value	x;
,, ((	used to delimit a character string,	<pre>plot(x^2,x=-22,title =</pre>
	for example a plot title	My First Plot);

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

## **Standard Mathematical Functions**

#### **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	<pre>subs(x=2,x*exp(x));</pre>
	substitute into a function	f(2);
evalf	evaluate to a decimal	<pre>evalf(Pi);</pre>
	(floating-point) approximation	
expand	expand an expression	expand((x+1)^8);
factor	factor an expression	<pre>factor(x^2+x);</pre>
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	<pre>fsolve(x=tan(x),x=Pi/23*Pi/2);</pre>
D	differentiation operator	D(g)(x);
	(works only on a function)	D(g)(2);
diff	differentiation of an	diff(x <sup>2</sup> ,x);
	expression or a function	diff(g(x),x,x);
int	indefinite or definite	int(x^2,x);
	integral	int(x^2,x=01);
limit	limit of an expression	<pre>limit(sin(x)/x,x=0);</pre>
	or a function	<pre>limit(f(x),x=0);</pre>
plot	two-dimensional plot	plot(x^2,x=-22);
	more than one function	plot([x^3,2*x],x=-22);
plot3d	three dimensional plot	plot3d(x <sup>2</sup> +y <sup>2</sup> ,x=-11,y=-11);
map	apply a function to a list	<pre>map(t -&gt; 1/t,[1,2,3,4]);</pre>
seq	define a sequence	<pre>seq(i^3,i=15);</pre>