What is Maple?

It's like a calculator...

```
1 + 2;
```

$$3 \tag{1}$$

It's like a very powerful calculator...

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1000!
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$$\begin{aligned}
&402387260077093773543702433923003985719374864210714632543799910429938512398629\backslash \\
&\quad 020592044208486969404800479988610197196058631666872994808558901323829669944\backslash \\
&\quad 590997424504087073759918823627727188732519779505950995276120874975462497043\backslash \\
&\quad 601418278094646496291056393887437886487337119181045825783647849977012476632\backslash \\
&\quad 889835955735432513185323958463075557409114262417474349347553428646576611667\backslash \\
&\quad 797396668820291207379143853719588249808126867838374559731746136085379534524\backslash \\
&\quad 221586593201928090878297308431392844403281231558611036976801357304216168747\backslash \\
&\quad 609675871348312025478589320767169132448426236131412508780208000261683151027\backslash \\
&\quad 341827977704784635868170164365024153691398281264810213092761244896359928705\backslash \\
&\quad 114964975419909342221566832572080821333186116811553615836546984046708975602\backslash \\
&\quad 900950537616475847728421889679646244945160765353408198901385442487984959953\backslash \\
&\quad 319101723355556602139450399736280750137837615307127761926849034352625200015\backslash \\
&\quad 888535147331611702103968175921510907788019393178114194545257223865541461062\backslash \\
&\quad 892187960223838971476088506276862967146674697562911234082439208160153780889\backslash \\
&\quad 893964518263243671616762179168909779911903754031274622289988005195444414282\backslash \\
&\quad 012187361745992642956581746628302955570299024324153181617210465832036786906\backslash \\
&\quad 117260158783520751516284225540265170483304226143974286933061690897968482590\backslash \\
&\quad 125458327168226458066526769958652682272807075781391858178889652208164348344\backslash \\
&\quad 825993266043367660176999612831860788386150279465955131156552036093988180612\backslash \\
&\quad 138558600301435694527224206344631797460594682573103790084024432438465657245\backslash \\
&\quad 014402821885252470935190620929023136493273497565513958720559654228749774011\backslash \\
&\quad 413346962715422845862377387538230483865688976461927383814900140767310446640\backslash \\
&\quad 259899490222221765904339901886018566526485061799702356193897017860040811889\backslash \\
&\quad 729918311021171229845901641921068884387121855646124960798722908519296819372\backslash \\
&\quad 388642614839657382291123125024186649353143970137428531926649875337218940694\backslash \\
&\quad 281434118520158014123344828015051399694290153483077644569099073152433278288\backslash \\
&\quad 269864602789864321139083506217095002597389863554277196742822248757586765752\backslash \\
&\quad 344220207573630569498825087968928162753848863396909959826280956121450994871\backslash \\
&\quad 701244516461260379029309120889086942028510640182154399457156805941872748998\backslash \\
&\quad 094254742173582401063677404595741785160829230135358081840096996372524230560\backslash \\
&\quad 855903700624271243416909004153690105933983835777939410970027753472000000000\backslash \\
&\quad 000000000000000000000000000000000000000000000000000000000000000000000000000\backslash \\
&\quad 000000000000000000000000000000000000000000000000000000000000000000000000000\backslash \\
&\quad 000000000000000000000000000000000000000000000000000000000000000000000000000\backslash \\
&\quad 000000000000000
\end{aligned} \tag{2}$$

10000!

284625968091705451890641321211986889014805140170279923079417999427441134000376\
4443772990786757784775[...35460 digits...]
000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000 **(3)**

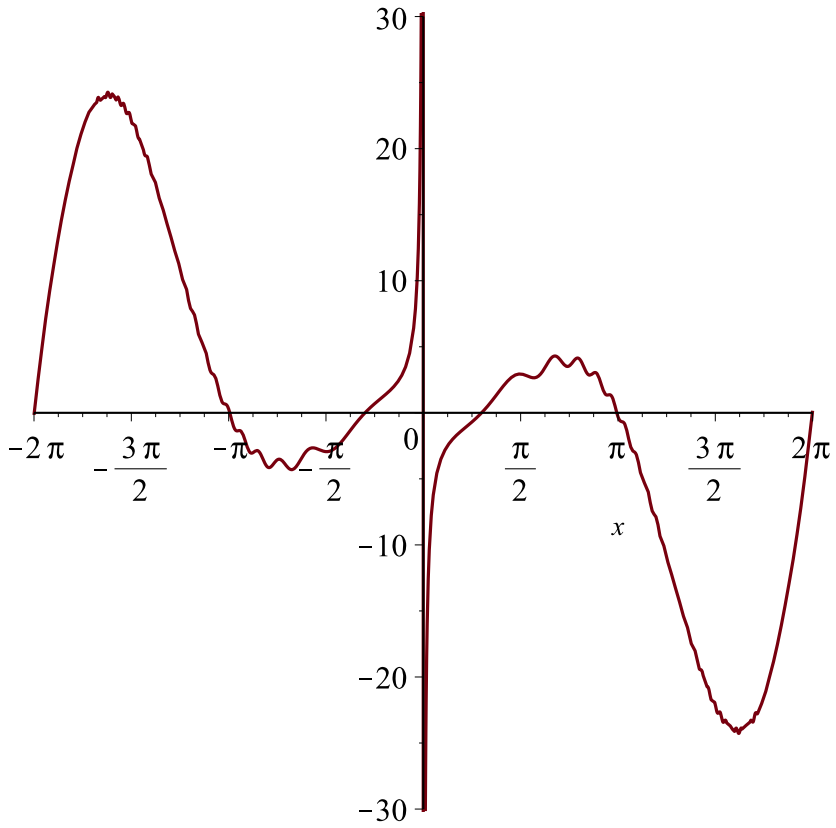
evalf(π);

3.141592654

evalf(π, 1000);

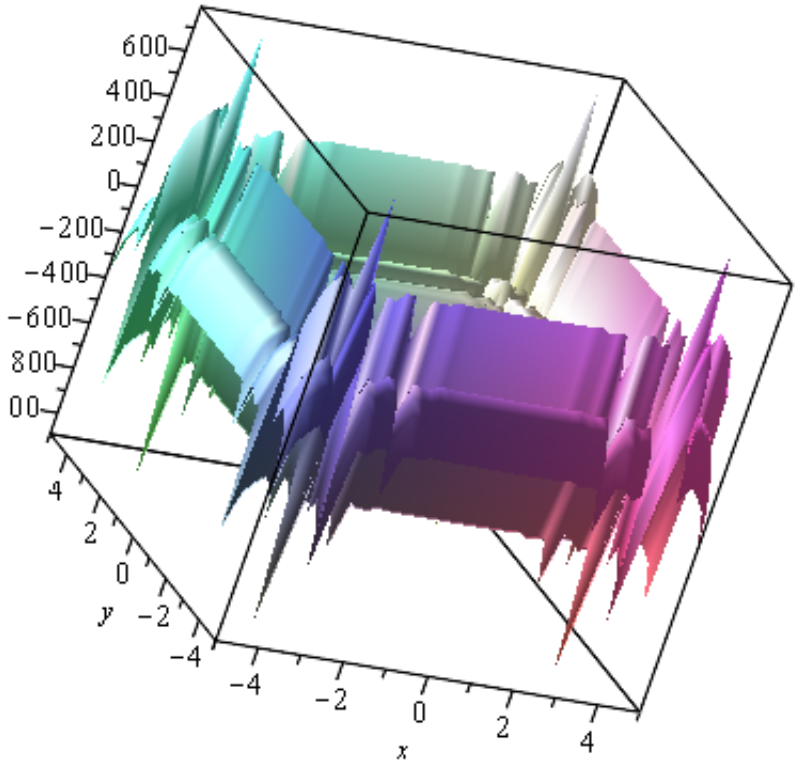
3.14159265358979323846264338327950288419716939937510582097494459230781640628620\
899862803482534211706798214808651328230664709384460955058223172535940812848\
111745028410270193852110555964462294895493038196442881097566593344612847564\
823378678316527120190914564856692346034861045432664821339360726024914127372\
458700660631558817488152092096282925409171536436789259036001133053054882046\
652138414695194151160943305727036575959195309218611738193261179310511854807\
446237996274956735188575272489122793818301194912983367336244065664308602139\
494639522473719070217986094370277053921717629317675238467481846766940513200\
056812714526356082778577134275778960917363717872146844090122495343014654958\
537105079227968925892354201995611212902196086403441815981362977477130996051\
870721134999999837297804995105973173281609631859502445945534690830264252230\
825334468503526193118817101000313783875288658753320838142061717766914730359\
825349042875546873115956286388235378759375195778185778053217122680661300192\
787661119590921642019 9 **(5)**

It's also like a graphing calculator... $plot\left(\sin(x)\cdot x^2 - \frac{\cos(x^3)}{x}\right);$



That can also work in 3-dimensions...

$$plot3d\left(\frac{x^2}{\sin(x^2)}+\frac{y^2}{\sin(y^2)}, x=-5..5, y=-5..5\right);$$



It can do algebra...

$solve(x^2 - x - 1);$

$$\frac{1}{2}\sqrt{5} + \frac{1}{2}, \frac{1}{2} - \frac{1}{2}\sqrt{5} \tag{6}$$

$solve(a \cdot x^2 + b \cdot x + c, x);$

$$\frac{1}{2}\ \frac{-b + \sqrt{-4\,a\,c + b^2}}{a}, -\frac{1}{2}\ \frac{b + \sqrt{-4\,a\,c + b^2}}{a} \tag{7}$$

It can do calculus...

$\frac{d}{dx}(x^2);$

$$2\,x \tag{8}$$

$\frac{d}{dx}\left((3 \cdot x^2 \cdot \sin(x))^2 \cdot e^x - x^3\right);$

$$36\,x^3 \sin(x)^2 e^x + 18\,x^4 \sin(x)\, e^x \cos(x) + 9\,x^4 \sin(x)^2 e^x \ln(e) - 3\,x^2 \tag{9}$$

It can work with vectors and matrices

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \end{bmatrix} . \begin{bmatrix} 9 & 10 \\ 11 & 12 \\ 13 & 14 \\ 15 & 16 \end{bmatrix};$$

$$\begin{bmatrix} 130 & 140 \\ 322 & 348 \end{bmatrix} \quad \textbf{(10)}$$

It can do sums...

$$\sum_{i=0}^{n} i;$$

$$\frac{1}{2}\,(n+1)^2 - \frac{1}{2}\,n - \frac{1}{2} \quad \textbf{(11)}$$

$$simplify\left(\frac{1}{2}\,(n+1)^2 - \frac{1}{2}\,n - \frac{1}{2}\right);$$

$$\frac{1}{2}\,n^2 + \frac{1}{2}\,n \quad \textbf{(12)}$$

Even infinite ones...

$$\sum_{i=1}^{\infty} \frac{1}{i^2};$$

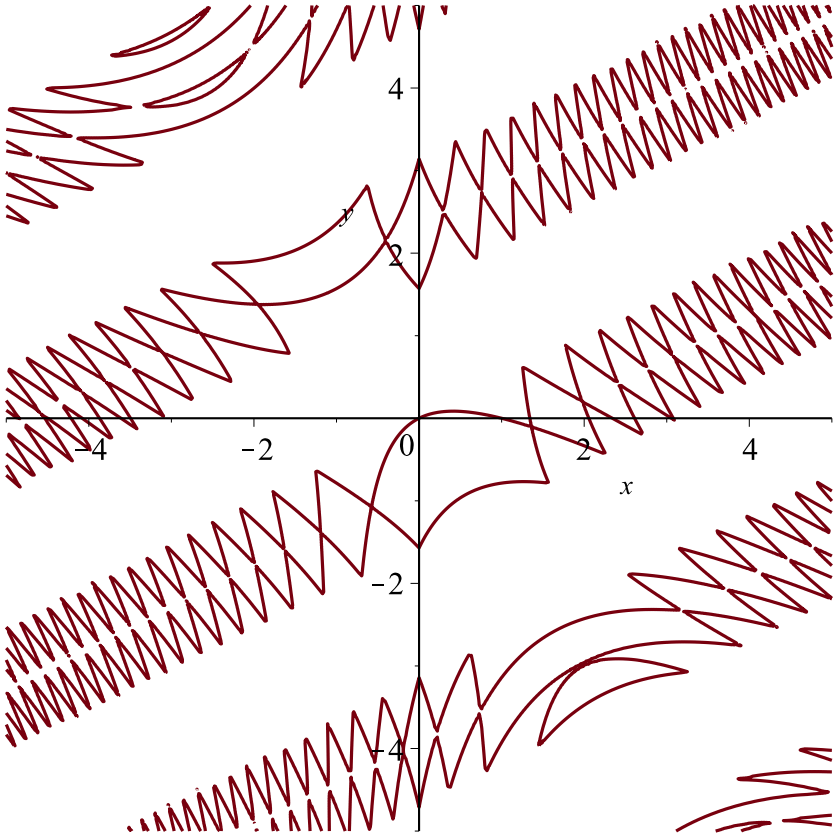
$$\frac{1}{6}\,\pi^2 \quad \textbf{(13)}$$

With Maple 'packages' you can do even more...

$$with(plots);$$

[*animate*, *animate3d*, *animatecurve*, *arrow*, *changecoords*, *complexplot*, *complexplot3d*, *conformal*, *conformal3d*, *contourplot*, *contourplot3d*, *coordplot*, *coordplot3d*, *densityplot*, *display*, *dualaxisplot*, *fieldplot*, *fieldplot3d*, *gradplot*, *gradplot3d*, *implicitplot*, *implicitplot3d*, *inequal*, *interactive*, *interactiveparams*, *intersectplot*, *listcontplot*, *listcontplot3d*, *listdensityplot*, *listplot*, *listplot3d*, *loglogplot*, *logplot*, *matrixplot*, *multiple*, *odeplot*, *pareto*, *plotcompare*, *pointplot*, *pointplot3d*, *polarplot*, *polygonplot*, *polygonplot3d*, *polyhedra_supported*, *polyhedraplot*, *rootlocus*, *semilogplot*, *setcolors*, *setoptions*, *setoptions3d*, *spacecurve*, *sparsematrixplot*, *surfdata*, *textplot*, *textplot3d*, *tubeplot*] **(14)**

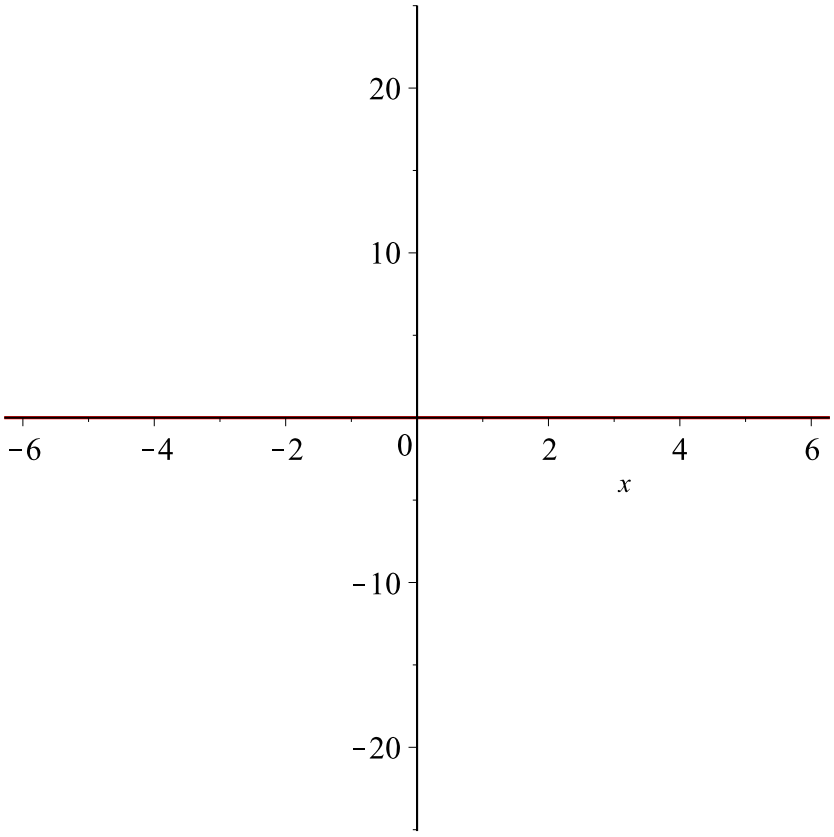
$$implicitplot\left(\left[\left|\sin\left(x^2 + 2\cdot x\cdot y\right)\right| = \sin\left(x - 2\cdot y\right)\right], x = -5..5, y = -5..5, numpoints = 100000\right);$$



When not sure about a function, use '?' to call Maple Help

?*animate*

$$animate\left(t\cdot x\cdot\sin\left(3\cdot\ t\cdot x^2-t^2\cdot x+t^3\right),\ x=-2\cdot\pi..2\cdot\pi,\ t=0..4,\ numpoints=5000\right);$$


20
10
-10
-20
-6
-4
-2
0
2
4
6
x