

A General Introduction to Maple

Maple is a computer application for advanced mathematics. The way you run Maple depends on the systems you are on. In Unix systems you would type "xmaple," unless there is an Xmaple icon. Using Microsoft Windows you click on the Maple icon that has an integral symbol superimposed on a Maple leaf.

First do some simple arithmetic:

```
> 7*(4^3)-9;
```

439

```
> 5^77;
```

661744490042422139897126953655970282852649688720703125

OK, now some algebra:

```
> factor(x^7-1);
```

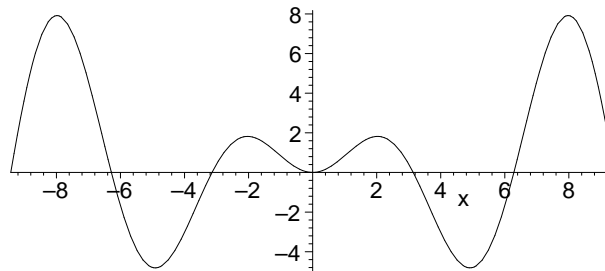
$$(x-1)(x^6+x^5+x^4+x^3+x^2+x+1)$$

```
> expand((x^3+3*x+1)*(x^2-1));
```

$$x^5+2x^3-3x+x^2-1$$

Now for a graph:

```
> plot(x*sin(x), x=-3*Pi..3*Pi, color=black, thickness=2);
```



Next, some calculus.

```
> diff((x*y+3)/(x^3+7*y^2), x);
```

$$\frac{y}{x^3+7y^2} - 3 \frac{(xy+3)x^2}{(x^3+7y^2)^2}$$

```
> int(x^3*sin(x), x);
```

$$-x^3 \cos(x) + 3x^2 \sin(x) - 6 \sin(x) + 6x \cos(x)$$

```
> int(exp(-x^2), x=0..5);
```

$$\frac{1}{2} \operatorname{erf}(5) \sqrt{\pi}$$

What? Use the HELP button to see what erf means. To get a numerical answer use evalf.

```
> evalf(int(exp(-x^2), x=0..5));
```

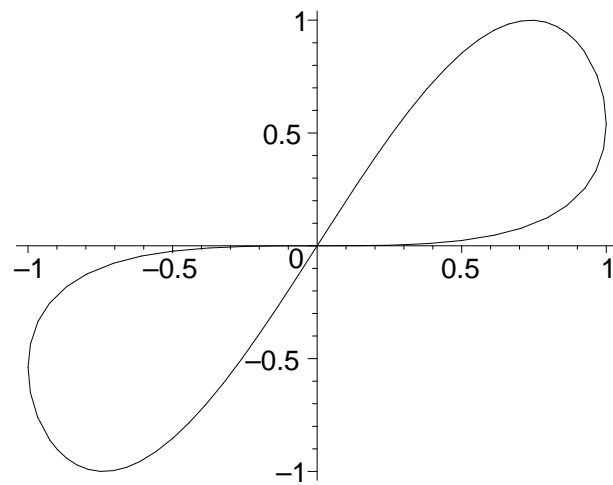
.8862269255

Notice that this worksheet uses both plane text and Maple commands. You can switch between these input modes by using ctrl t and ctrl m. You can create new command lines with ctrl k and ctrl j.

Next we do a parametric plot. Is it from 10.2 #12: (You can see that the tangents at (0,0) have two

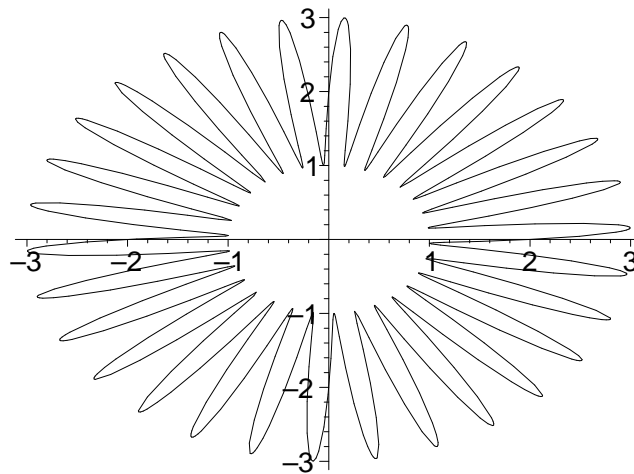
[different slopes.)

```
[ > plot([sin(t),sin(t+sin(t))],t=0..2*Pi,color=black,thickness=2);
```



[We can also do polar plots. (You need the "extra" t.)

```
[ > plot([2+sin(30*t),t],t=0..2*Pi,coords=polar,color=black,thickness=2);
```



```
[ >
```