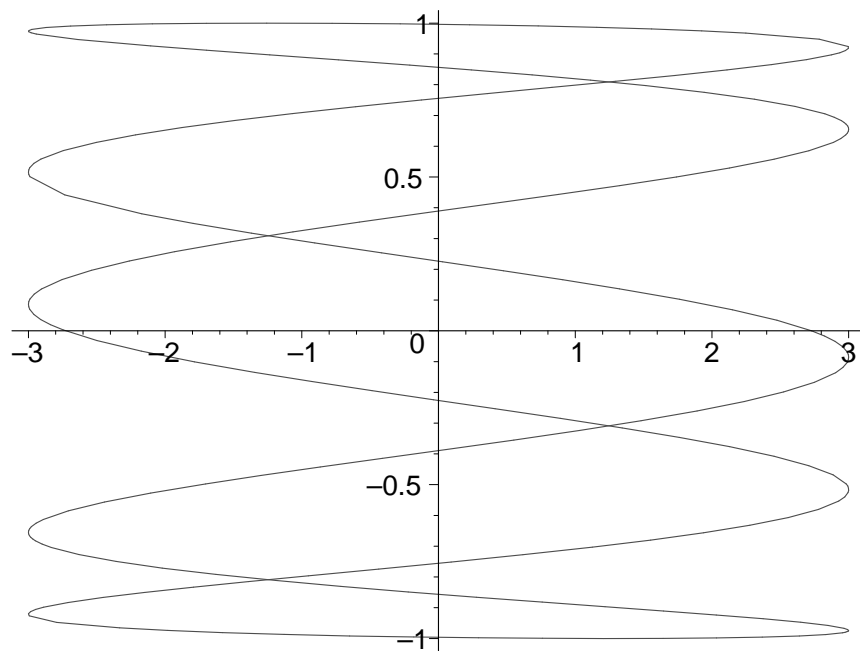


```
[ > # Lissajou-Kurven:
> a:=3;b:=2;c:=1;n:=5;

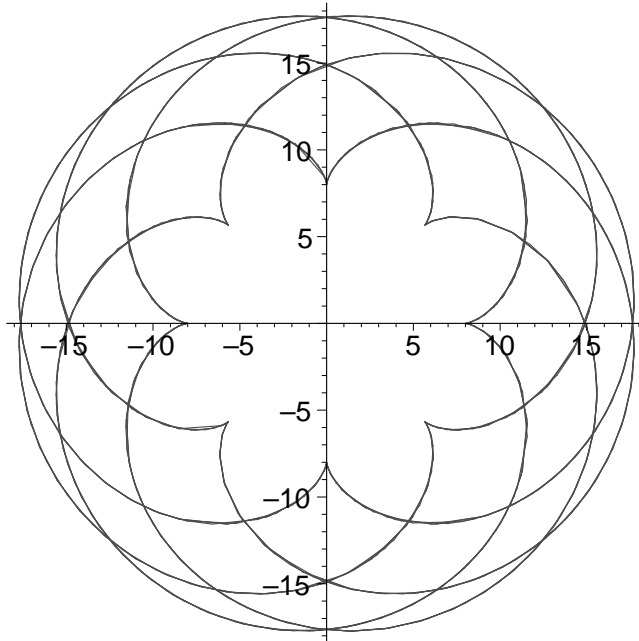
a:=3
b:=2
c:=1
n:=5
> plot([a*sin(n*t+b),c*sin(t),t=0..2*Pi]);
```



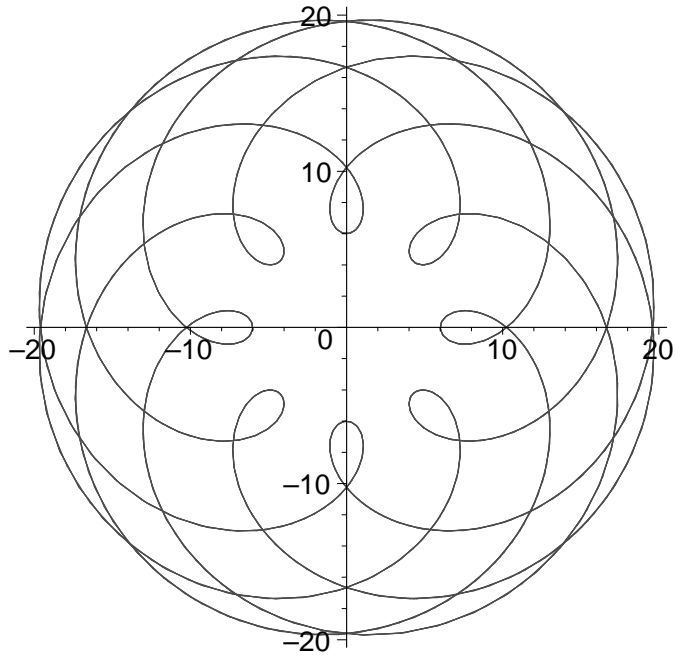
```
[ > restart;
> # Epizykloide
> epizykl:=[(a+b)*cos(t)-b*cos((a/b+1)*t),(a+b)*sin(t)-b*sin((a/b+1)
*t),t=0..a*b*Pi];

epizykl :=  $\left[ (a+b) \cos(t) - b \cos\left(\left(\frac{a}{b} + 1\right)t\right), (a+b) \sin(t) - b \sin\left(\left(\frac{a}{b} + 1\right)t\right), t=0 .. a b \pi \right]$ 
> a:=8;b:=5;

a:=8
b:=5
> plot(epizykl,scaling=constrained);
```



```
[ > # Epitrochoide
> epitroch:=[(a+b)*cos(t)-c*cos((a/b+1)*t),(a+b)*sin(t)-c*sin((a/b+1)
)*t),t=0..a*b*Pi];
      epitroch:= $\left[13 \cos(t)-c \cos\left(\frac{13}{5} t\right), 13 \sin(t)-c \sin\left(\frac{13}{5} t\right)\right] t=0 .. 40 \pi$ 
> a:=8;b:=5;c:=7;
      a:=8
      b:=5
      c:=7
> plot(epitroch,scaling=constrained);
```



```
> c:='c';
```

```
c := c
```

```
> with(plots);
```

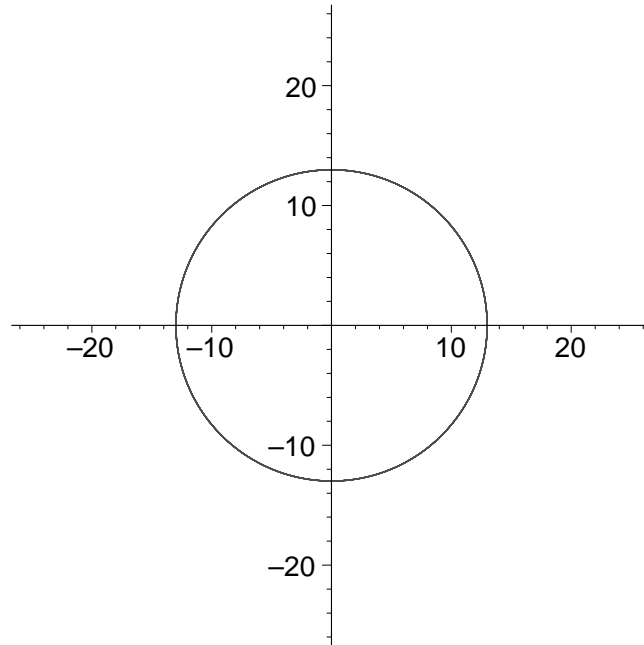
```
Warning, the name changecoords has been redefined
```

```
[animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d, conformal,
conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, cylinderplot, densityplot,
display, display3d, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot, implicitplot3d, inequal,
listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot,
odeplot, pareto, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d,
polyhedra_supported, polyhedraplot, replot, rootlocus, semilogplot, setoptions, setoptions3d,
spacecurve, sparsematrixplot, sphereplot, surfdata, textplot, textplot3d, tubeplot]
```

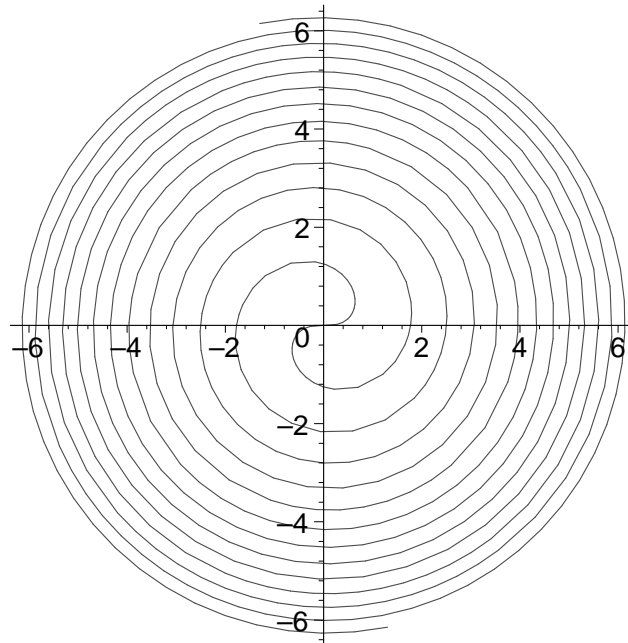
```
> epitroch;
```

$$\left[13 \cos(t) - c \cos\left(\frac{13}{5}t\right), 13 \sin(t) - c \sin\left(\frac{13}{5}t\right) \mid t=0 .. 40\pi \right]$$

```
> animate(epitroch, c=0..13, scaling=constrained, numpoints=1000);
```



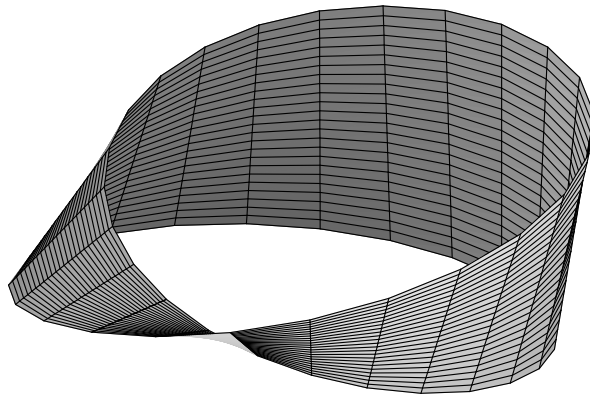
```
[ >  
[ >  
[ > # Fermat-Kurve  
[ > plot([t,t^2,t=-2*Pi..2*Pi],coords=polar,scaling=constrained);
```



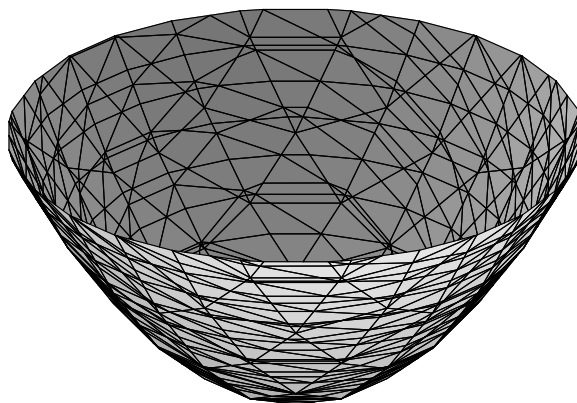
```

[ >
[ > moebius:=[cos(u)+v*cos(1/2*u)*cos(u), sin(u)+v*cos(1/2*u)*sin(u),
  v*sin(1/2*u)];
      moebius:=\left[ \cos(u)+v\cos\left(\frac{1}{2}u\right)\cos(u), \sin(u)+v\cos\left(\frac{1}{2}u\right)\sin(u), v\sin\left(\frac{1}{2}u\right) \right]
[ > plot3d(moebius,u=0..2*Pi,v=-0.2..0.2);

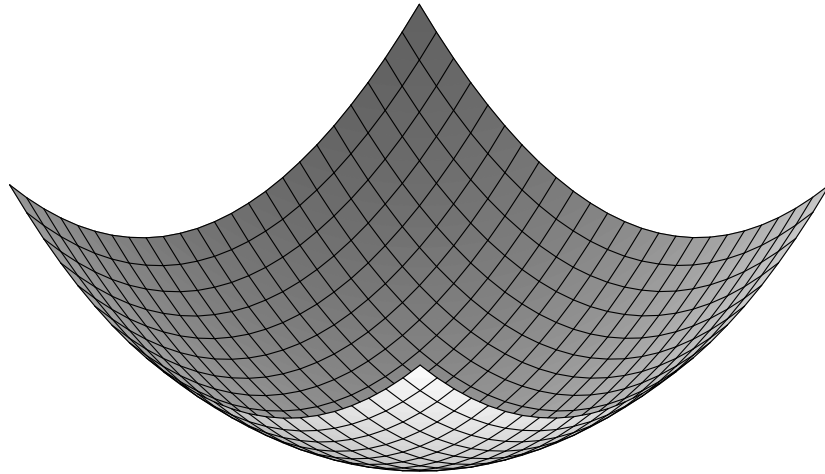
```



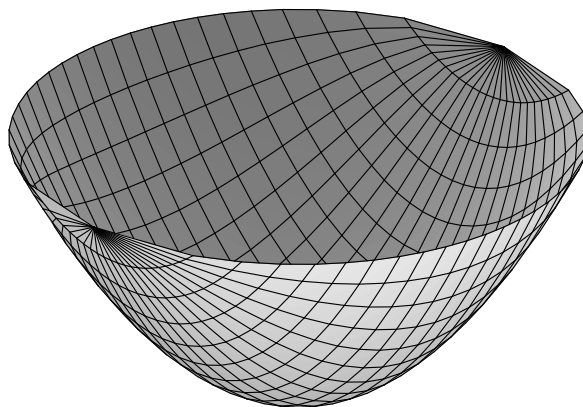
```
[ > # Paraboloid  
[ > implicitplot3d(z=x^2+y^2,x=-1..1,y=-1..1,z=0..1);
```



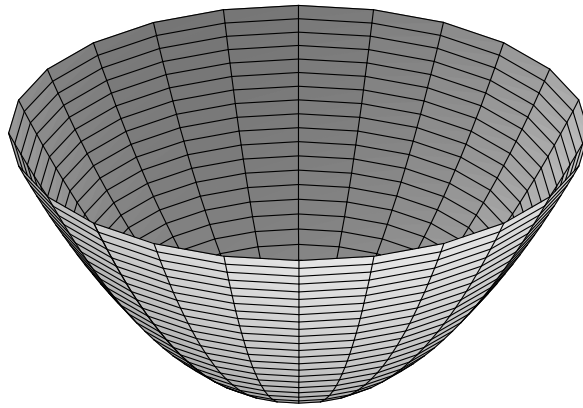
```
[ > plot3d(x^2+y^2,x=-1..1,y=-1..1);
```



```
> plot3d(x^2+y^2,x=-1..1,y=-sqrt(1-x^2)..sqrt(1-x^2));
```



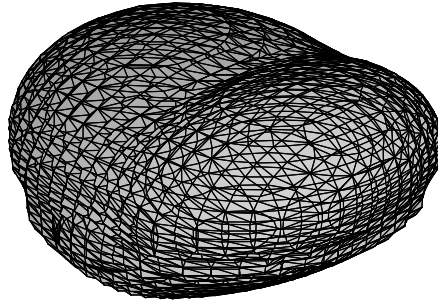
```
> plot3d(sqrt(z),phi=0..2*Pi,z=0..1,coords=cylindrical);
```



```
> p:=(2*x^2+y^2+z^2-1)^3-1/10*x^2*z^3-y^2*z^3 ;
```

$$p := (2x^2 + y^2 + z^2 - 1)^3 - \frac{1}{10}x^2 z^3 - y^2 z^3$$

```
> implicitplot3d(p,x=-1..1,y=-1.5..1.5,z=-1..1.5,grid=[30,30,30]);
```

```

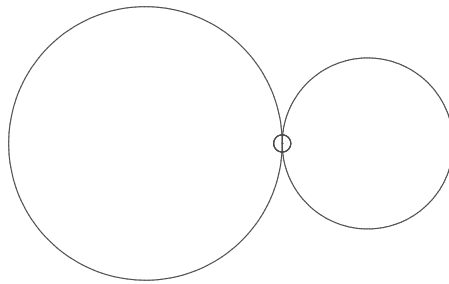
[ > restart;
[ > with(plots):
Warning, the name changecoords has been redefined
[ > epitroch:=[(a+b)*cos(d*t)-c*cos((a/b+1)*t*d), (a+b)*sin(d*t)-c*sin(
(a/b+1)*d*t), t=0..2*b*Pi];
[ epitroch :=  $\left[ (a+b) \cos(d t) - c \cos\left(\left(\frac{a}{b} + 1\right) t d\right), (a+b) \sin(d t) - c \sin\left(\left(\frac{a}{b} + 1\right) t d\right) \right]_{t=0..2 b \pi}$ 
[ > kreis1:=[a*cos(u), a*sin(u), u=0..2*Pi];
[ kreis1 :=  $[a \cos(u), a \sin(u), u = 0..2 \pi]$ 
[ > kreis2:=[(a+b)*cos(d*2*b*Pi)+b*cos(v), (a+b)*sin(d*2*b*Pi)+b*sin(v)
, v=0..2*Pi];
[ kreis2 :=  $[(a+b) \cos(2 d b \pi) + b \cos(v), (a+b) \sin(2 d b \pi) + b \sin(v), v = 0..2 \pi]$ 
[ > kreis3:=[(a+b)*cos(d*2*b*Pi)-c*cos((a/b+1)*2*b*Pi*d)+0.5*cos(w), (a
+b)*sin(d*2*b*Pi)-c*sin((a/b+1)*d*2*b*Pi)+0.5*sin(w), w=0..2*Pi];
[ kreis3 :=  $\left[ (a+b) \cos(2 d b \pi) - c \cos\left(2 \left(\frac{a}{b} + 1\right) b \pi d\right) + .5 \cos(w), \right.$ 
 $\left. (a+b) \sin(2 d b \pi) - c \sin\left(2 \left(\frac{a}{b} + 1\right) b \pi d\right) + .5 \sin(w), w = 0..2 \pi \right]$ 
[ > a:=8; b:=5; c:=5;
[ a := 8
[ b := 5

```

```

|                                     c := 5
| > animate({epitroch,kreis1,kreis2,kreis3},d=0..1,scaling=constrained
|   ,axes=None,numpoints=200,frames=50);

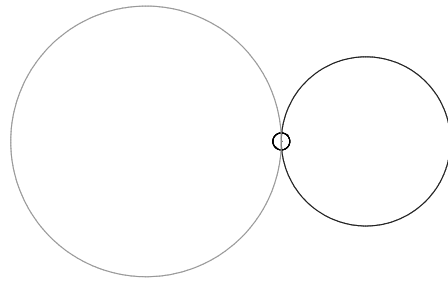
```



```

| > p0:=animate(epitroch,d=0..1,scaling=constrained,axes=None,color=red,
|   numpoints=300,frames=130):
| > p1:=animate(kreis1,d=0..1,scaling=constrained,axes=None,color=green,
|   numpoints=300,frames=130):
| > p2:=animate(kreis2,d=0..1,scaling=constrained,axes=None,color=blue,
|   numpoints=300,frames=130):
| > p3:=animate(kreis3,d=0..1,scaling=constrained,axes=None,color=black,
|   numpoints=300,frames=130):
| > display([p1,p2,p3,p0]);

```



```
[ > plotsetup(gif,plotoutput='epizykloide.gif');  
[ > restart;
```