

```

> 12 + 4 - 5
11
(1)

> 2^10
1024
(2)

> sin(0.1)
0.09983341665
(3)

> expand((a+b)*(a-b))
a2 - b2
(4)

> y:=x->3*(x^3)+2*(x^2)-5
y := x  $\mapsto$  3·x3 + 2·x2 - 5
(5)

> diff(y(x),x)
9 x2 + 4 x
(6)

> y:=x->sqrt(1+x^4)
y := x  $\mapsto$   $\sqrt{1 + x^4}$ 
(7)

> diff(y(x),x)

$$\frac{2 x^3}{\sqrt{x^4 + 1}}$$

(8)

> y:=x->exp(x)*sin(x)*cos(x)
y := x  $\mapsto$  ex·sin(x)·cos(x)
(9)

> diff(y(x),x)
ex sin(x) cos(x) + ex cos(x)2 - ex sin(x)2
(10)

> int(3*(x^3)+2*(x^2)-5,x=0..1)
-  $\frac{43}{12}$ 
(11)

> int(1/(x^2),x=0..infinity)

$$\infty$$

(12)

> int(exp(-x^2),x=-infinity..infinity)

$$\sqrt{\pi}$$

(13)

> limit(sin(x)/x,x=0)
1
(14)

> limit((x^3+3*(x^2)-5)/(2*(x^3)-7*x),x=infinity)

$$\frac{1}{2}$$

(15)

> limit((cos(x)+1)/(x-Pi),x=Pi)
0
(16)

> with(plot)
Error, invalid input: with expects its 1st argument, pname, to be of
type {`module`, package}, but received plot
(17)

```

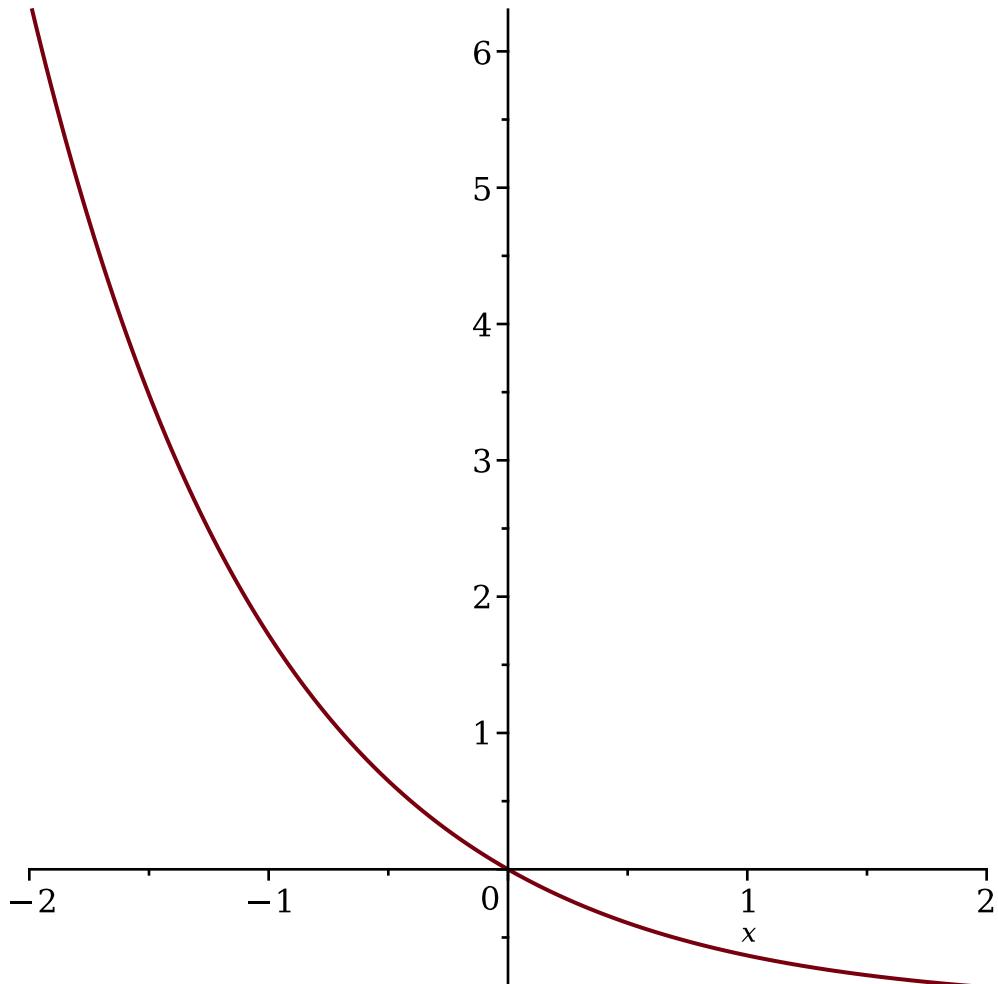
$$x := t \mapsto (1 - \cos(t)) \cdot \cos(t) \quad (17)$$

$$> y := t \mapsto (1 - \cos(t)) \cdot \sin(t) \quad (18)$$

$$> f := x \mapsto \exp(-x) - 1 \quad (19)$$

```
> with(plots):
```

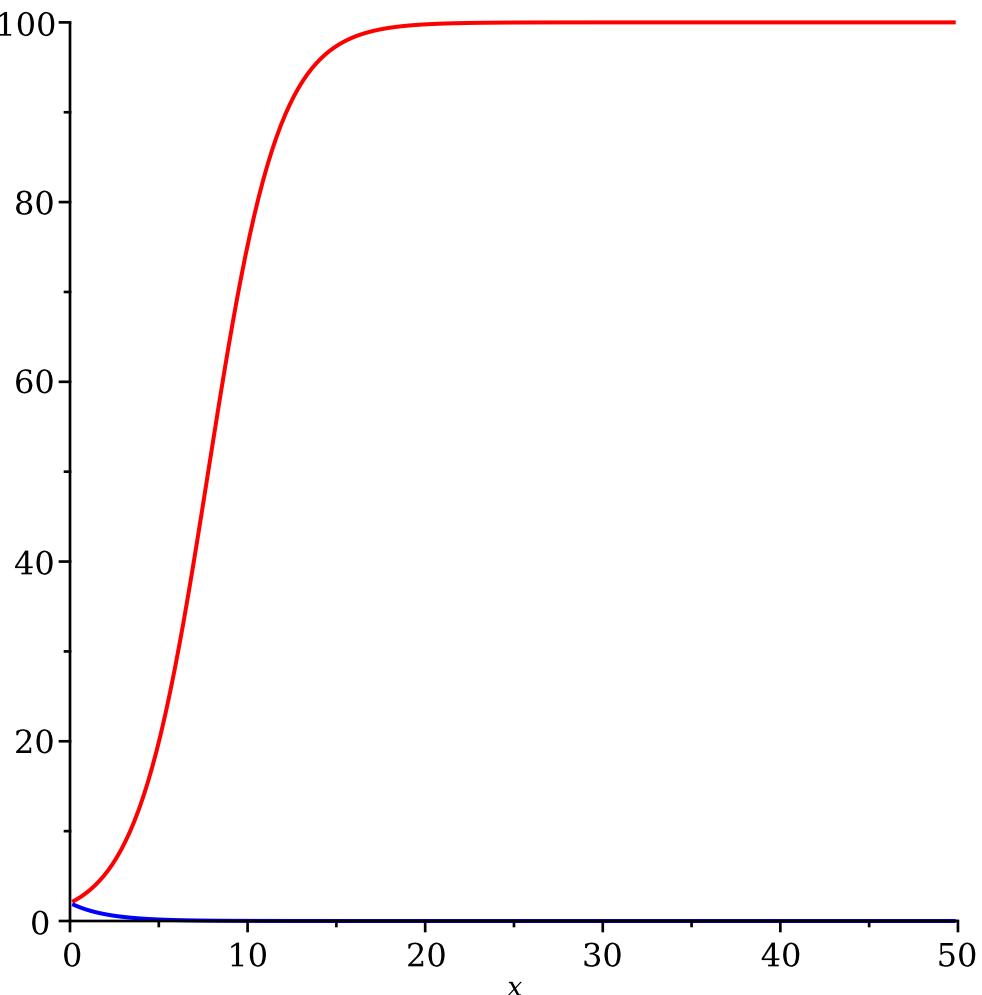
```
> plot(f(x), x = -2 .. 2)
```



$$> f := (x, r) \mapsto \frac{200 \cdot e^{rx}}{2 \cdot e^{rx} + 98} \quad (20)$$

```
> with(plots):
```

```
> plot([f(x, 0.5), f(x, -0.5)], x = 0 .. 50, color = [red, blue])
```



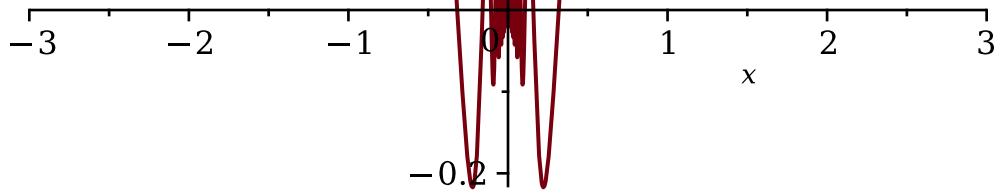
```
> f:=x->x*sin(1/x)
```

$$f := x \mapsto x \cdot \sin\left(\frac{1}{x}\right)$$

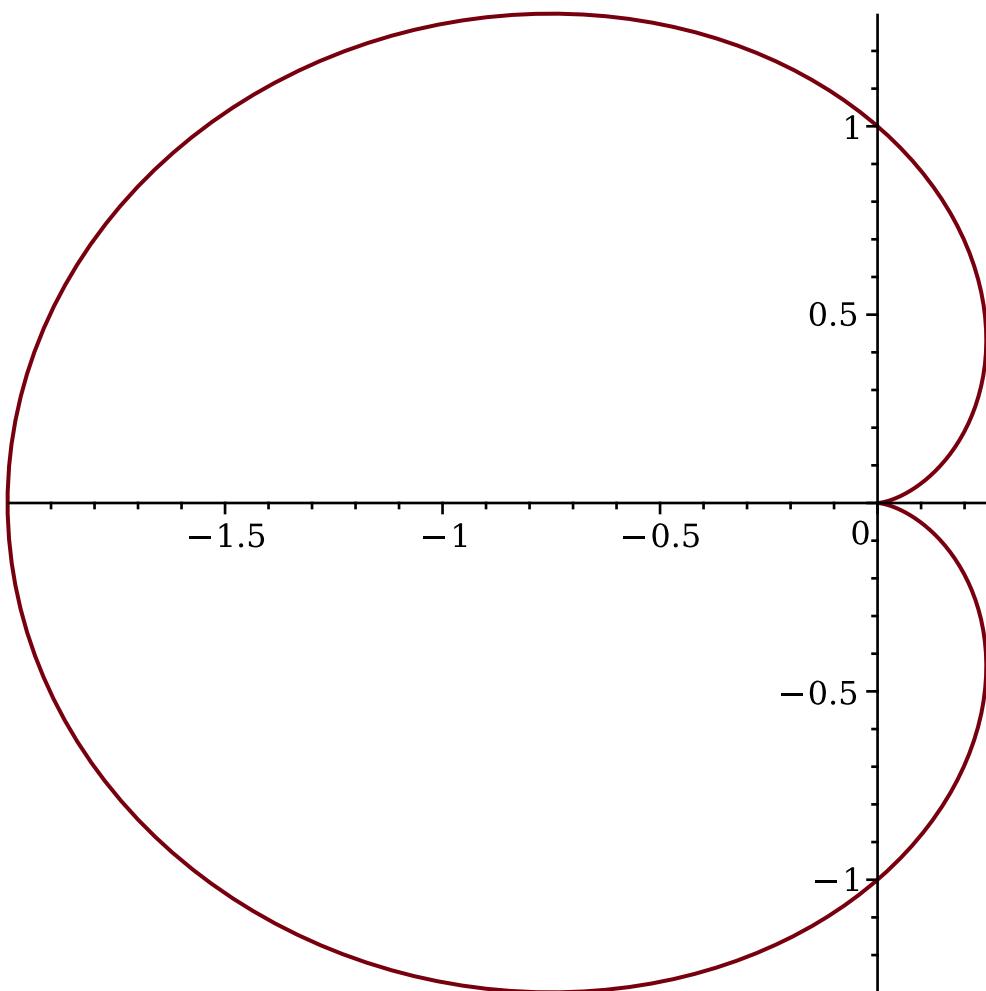
(21)

```
> with(plots):
```

```
> plot(f(x),x=-3..3)
```



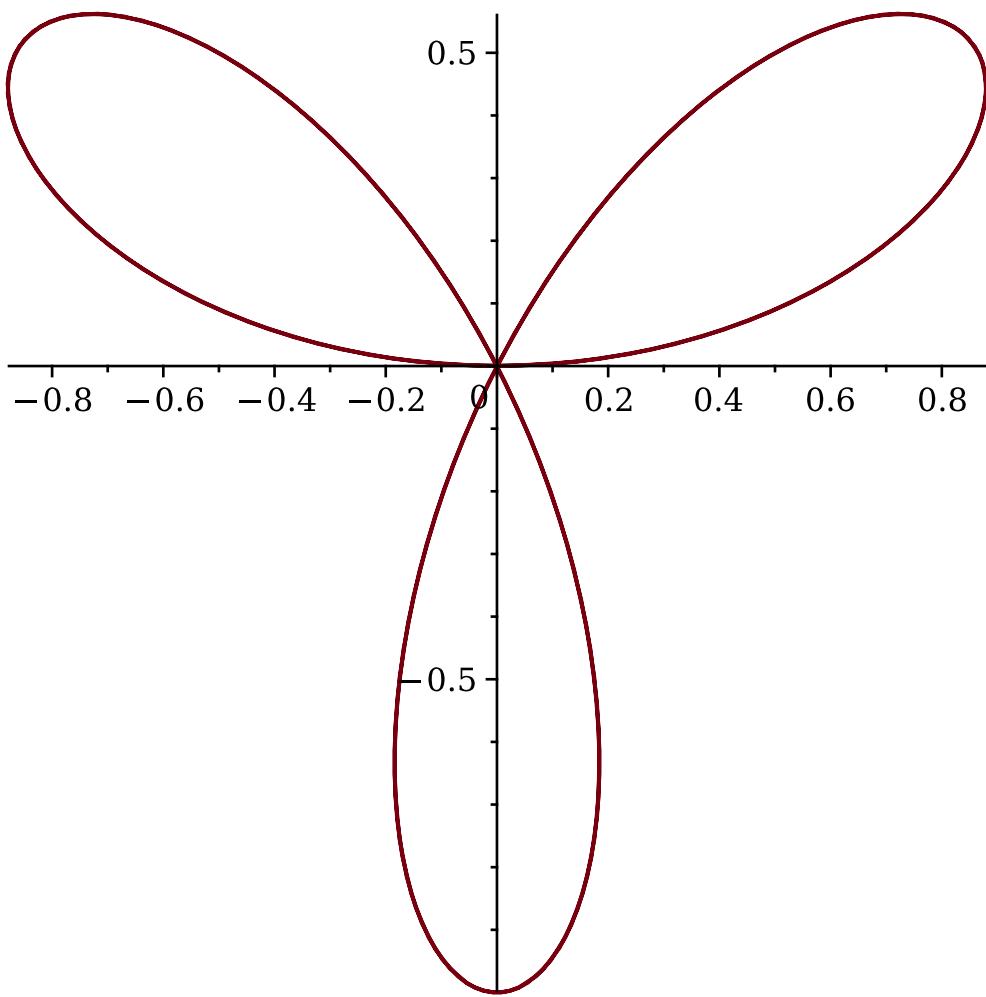
```
> with(plots):  
> plot([x(t),y(t),t=0..2*Pi])
```



```
> x:=t->sin(3*t)*cos(t) x := t → sin(3·t)·cos(t) (22)
```

```
> y:=t->sin(3*t)*sin(t) y := t → sin(3·t)·sin(t) (23)
```

```
> with(plots):  
> plot([x(t),y(t),t=0..2*Pi])
```



```
> x:=t->t-sin(t)
```

$$x := t \mapsto t - \sin(t)$$

(24)

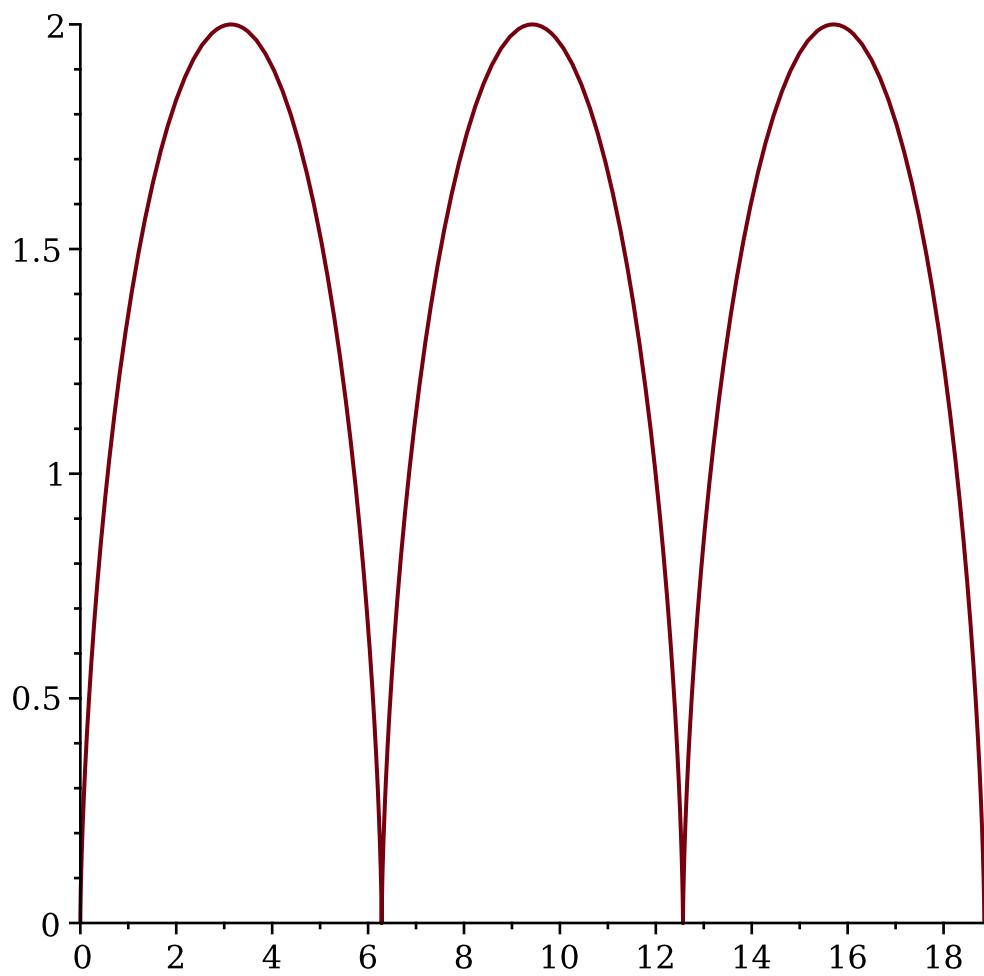
```
> y:=t->1-cos(t)
```

$$y := t \mapsto 1 - \cos(t)$$

(25)

```
> with(plots):
```

```
> plot([x(t),y(t),t=0..6*Pi])
```



```
> f:=(t,s)->1-(s*cos(4*t)*cos(t))/sqrt(1-s^2*(cos(4*t))^2*(sin(t))^2)
```

$$f := (t, s) \mapsto 1 - \frac{s \cdot \cos(4 \cdot t) \cdot \cos(t)}{\sqrt{1 - s^2 \cdot \cos(4 \cdot t)^2 \cdot \sin(t)^2}} \quad (26)$$

```
> x:=(t,s)->f(t-(Pi/2),s)
```

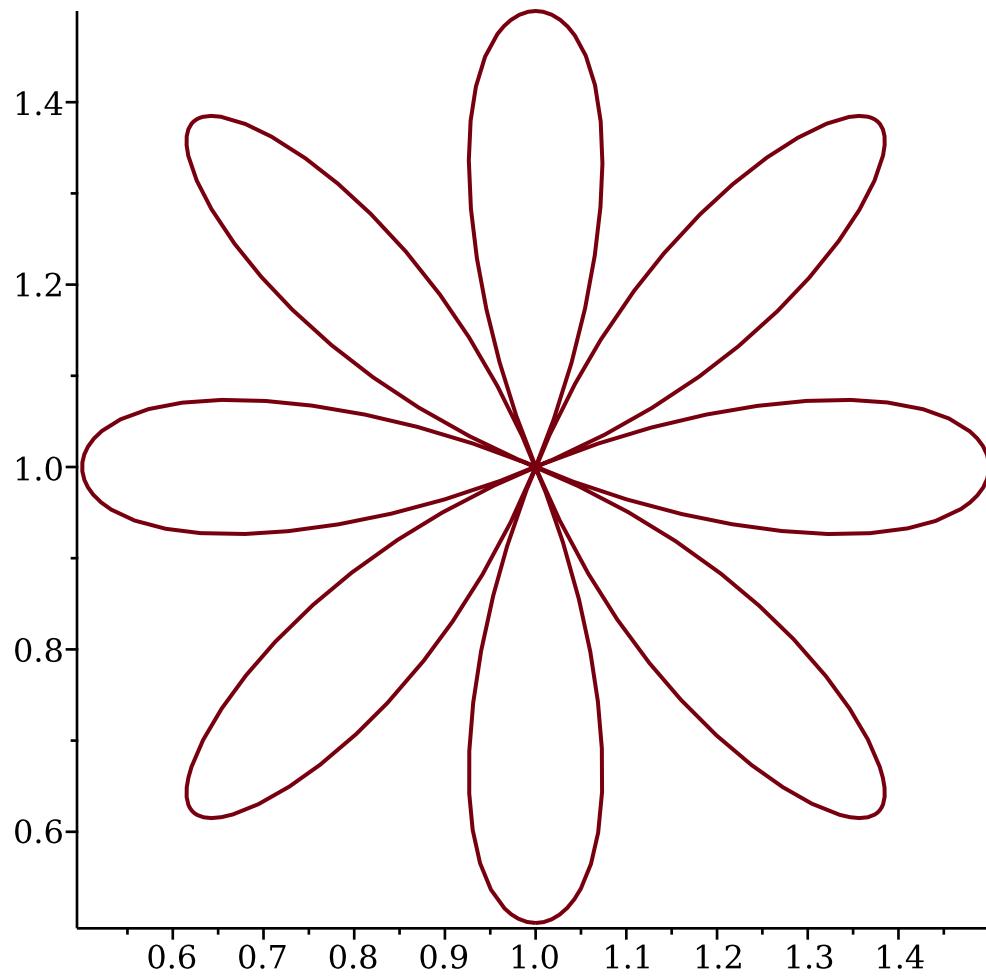
$$x := (t, s) \mapsto f\left(t - \frac{\pi}{2}, s\right) \quad (27)$$

```
> y:=(t,s)->f(t,s)
```

$$y := (t, s) \mapsto f(t, s) \quad (28)$$

```
> with(plots):
```

```
> plot([x(t,0.5),y(t,0.5),t=0..2*Pi])
```



> **listaCurbe:=**[x(t,s/10),y(t,s/10),t=0..2*Pi]\$s=1..10

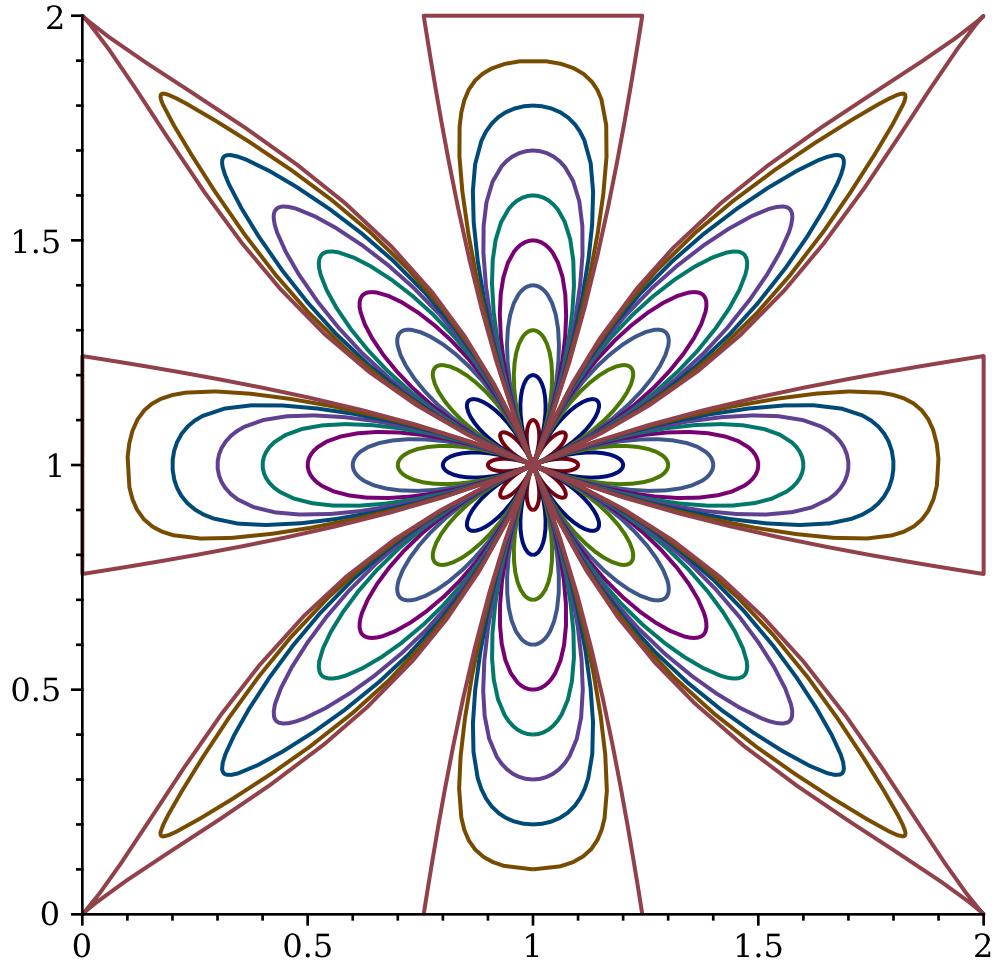
$$\begin{aligned}
 listaCurbe &:= \left[1 - \frac{\cos(4t)\sin(t)}{\sqrt{100 - \cos(4t)^2\cos(t)^2}}, 1 - \frac{\cos(4t)\cos(t)}{\sqrt{100 - \cos(4t)^2\sin(t)^2}}, t \right. \quad (29) \\
 &= 0..2\pi], \left[1 - \frac{2\cos(4t)\sin(t)}{\sqrt{100 - 4\cos(4t)^2\cos(t)^2}}, 1 \right. \\
 &\quad \left. - \frac{2\cos(4t)\cos(t)}{\sqrt{100 - 4\cos(4t)^2\sin(t)^2}}, t = 0..2\pi \right], \left[1 \right. \\
 &\quad \left. - \frac{3\cos(4t)\sin(t)}{\sqrt{100 - 9\cos(4t)^2\cos(t)^2}}, 1 - \frac{3\cos(4t)\cos(t)}{\sqrt{100 - 9\cos(4t)^2\sin(t)^2}}, t = 0..2\pi \right], \\
 &\left[1 - \frac{4\cos(4t)\sin(t)}{\sqrt{100 - 16\cos(4t)^2\cos(t)^2}}, 1 - \frac{4\cos(4t)\cos(t)}{\sqrt{100 - 16\cos(4t)^2\sin(t)^2}}, t = 0 \right. \\
 &\quad \left. ..2\pi \right], \left[1 - \frac{5\cos(4t)\sin(t)}{\sqrt{100 - 25\cos(4t)^2\cos(t)^2}}, 1 - \frac{5\cos(4t)\cos(t)}{\sqrt{100 - 25\cos(4t)^2\sin(t)^2}}, \right. \\
 &\quad \left. t = 0..2\pi \right], \left[1 - \frac{6\cos(4t)\sin(t)}{\sqrt{100 - 36\cos(4t)^2\cos(t)^2}}, 1 \right]
 \end{aligned}$$

$$\begin{aligned}
& - \frac{6 \cos(4t) \cos(t)}{\sqrt{100 - 36 \cos(4t)^2 \sin(t)^2}}, t = 0..2\pi \Big], \Big[1 \\
& - \frac{7 \cos(4t) \sin(t)}{\sqrt{100 - 49 \cos(4t)^2 \cos(t)^2}}, 1 - \frac{7 \cos(4t) \cos(t)}{\sqrt{100 - 49 \cos(4t)^2 \sin(t)^2}}, t = 0 \\
& ..2\pi \Big], \Big[1 - \frac{8 \cos(4t) \sin(t)}{\sqrt{100 - 64 \cos(4t)^2 \cos(t)^2}}, 1 - \frac{8 \cos(4t) \cos(t)}{\sqrt{100 - 64 \cos(4t)^2 \sin(t)^2}}, \\
& t = 0..2\pi \Big], \Big[1 - \frac{9 \cos(4t) \sin(t)}{\sqrt{100 - 81 \cos(4t)^2 \cos(t)^2}}, 1 \\
& - \frac{9 \cos(4t) \cos(t)}{\sqrt{100 - 81 \cos(4t)^2 \sin(t)^2}}, t = 0..2\pi \Big], \Big[1 \\
& - \frac{10 \cos(4t) \sin(t)}{\sqrt{100 - 100 \cos(4t)^2 \cos(t)^2}}, 1 - \frac{10 \cos(4t) \cos(t)}{\sqrt{100 - 100 \cos(4t)^2 \sin(t)^2}}, t = 0 \\
& ..2\pi \Big]
\end{aligned}$$

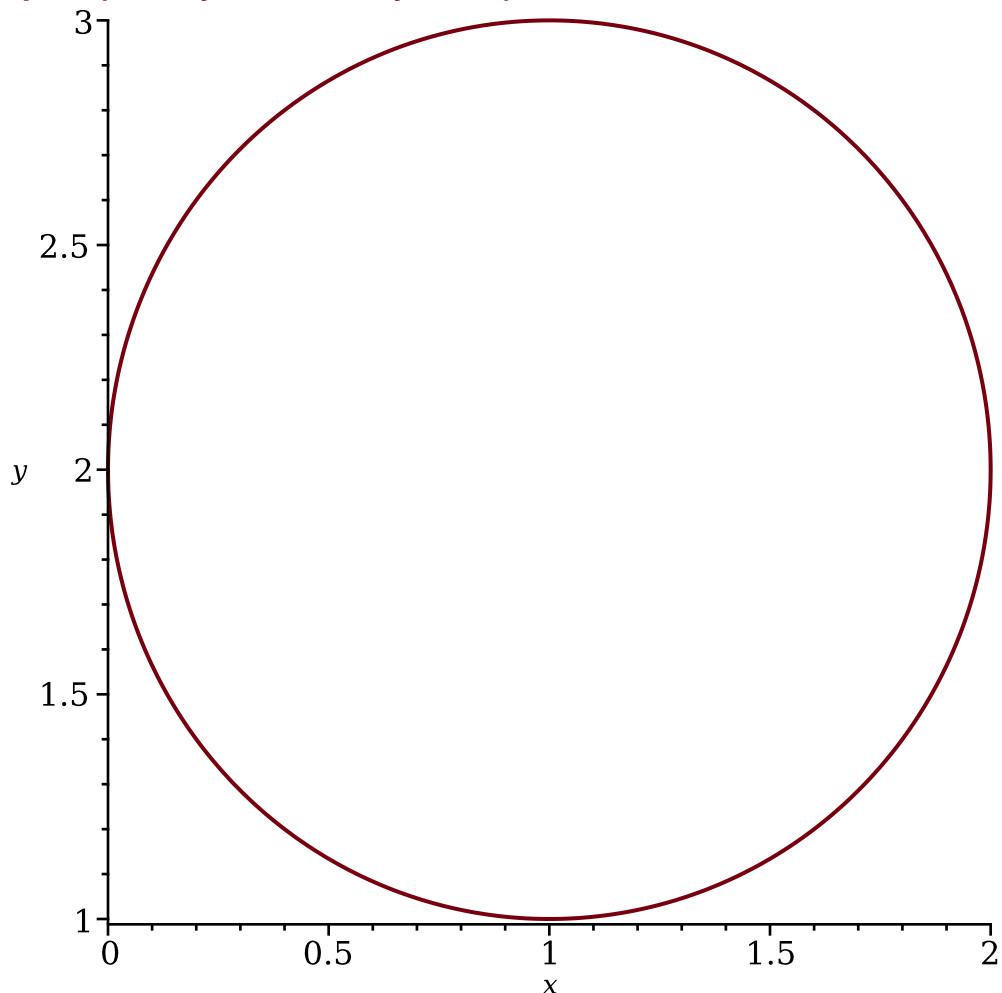
```

> with(plots):
> plot([listaCurbe])

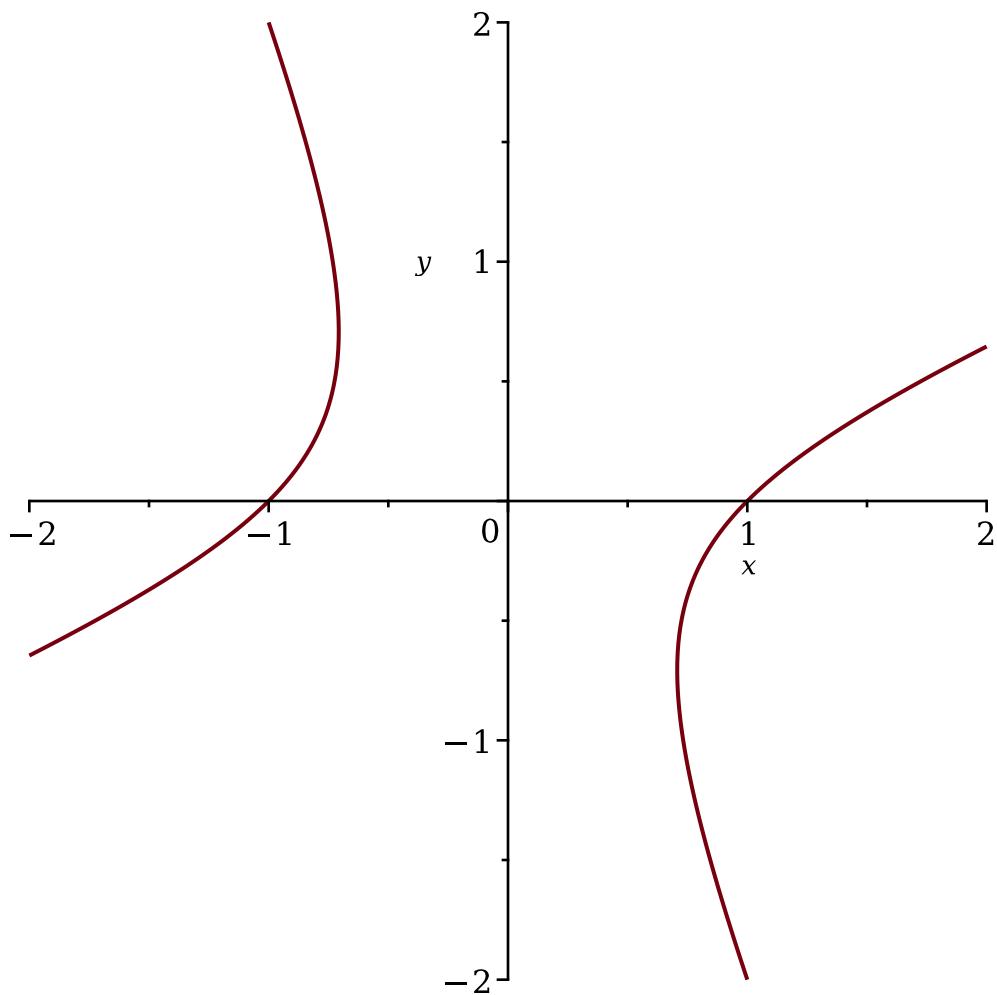
```



```
> with(plots):  
> implicitplot(x^2+y^2-2*x-4*y+4=0)
```



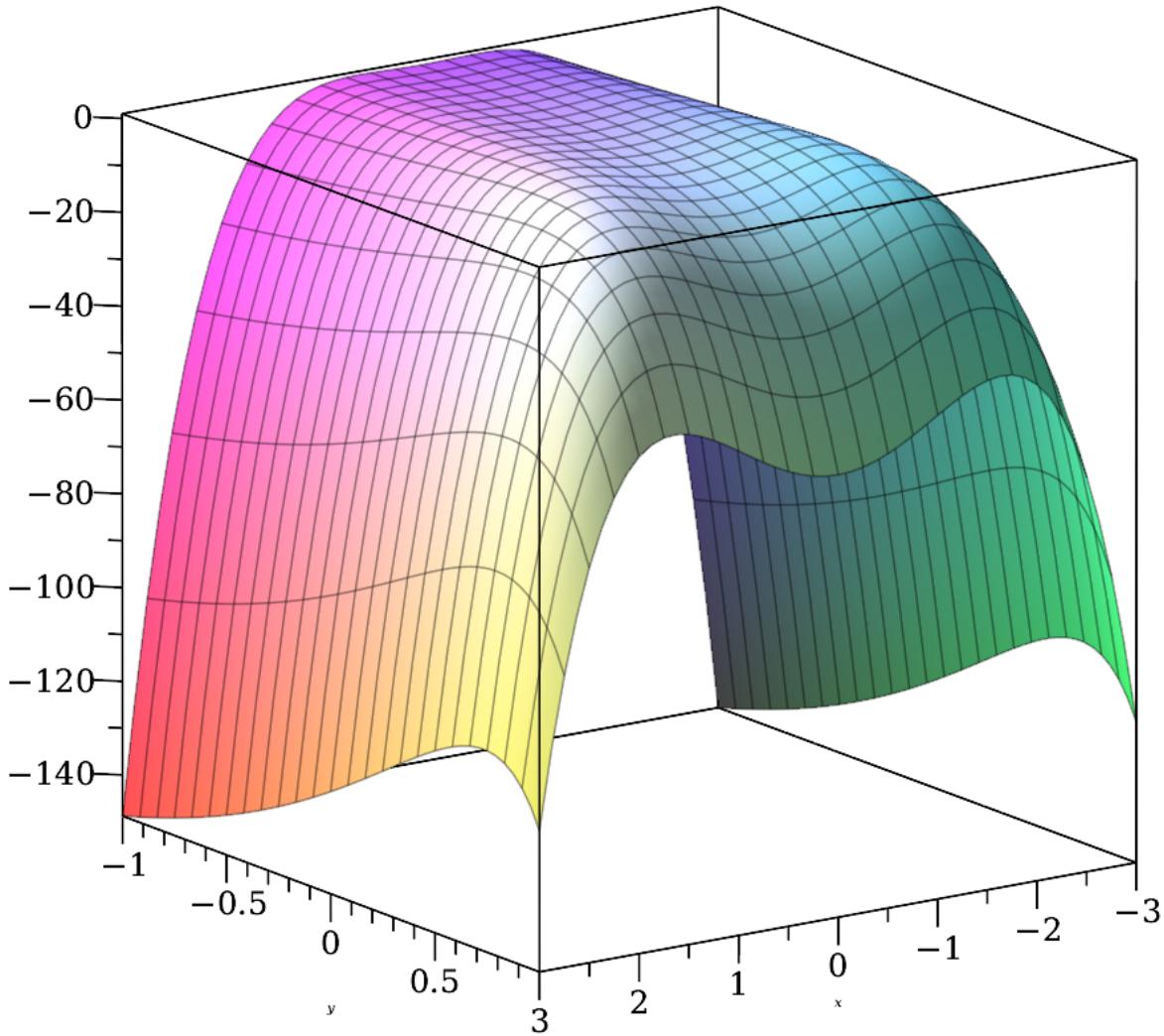
```
> with(plots):  
> implicitplot(x^2-2*x*y-y^2=1)
```



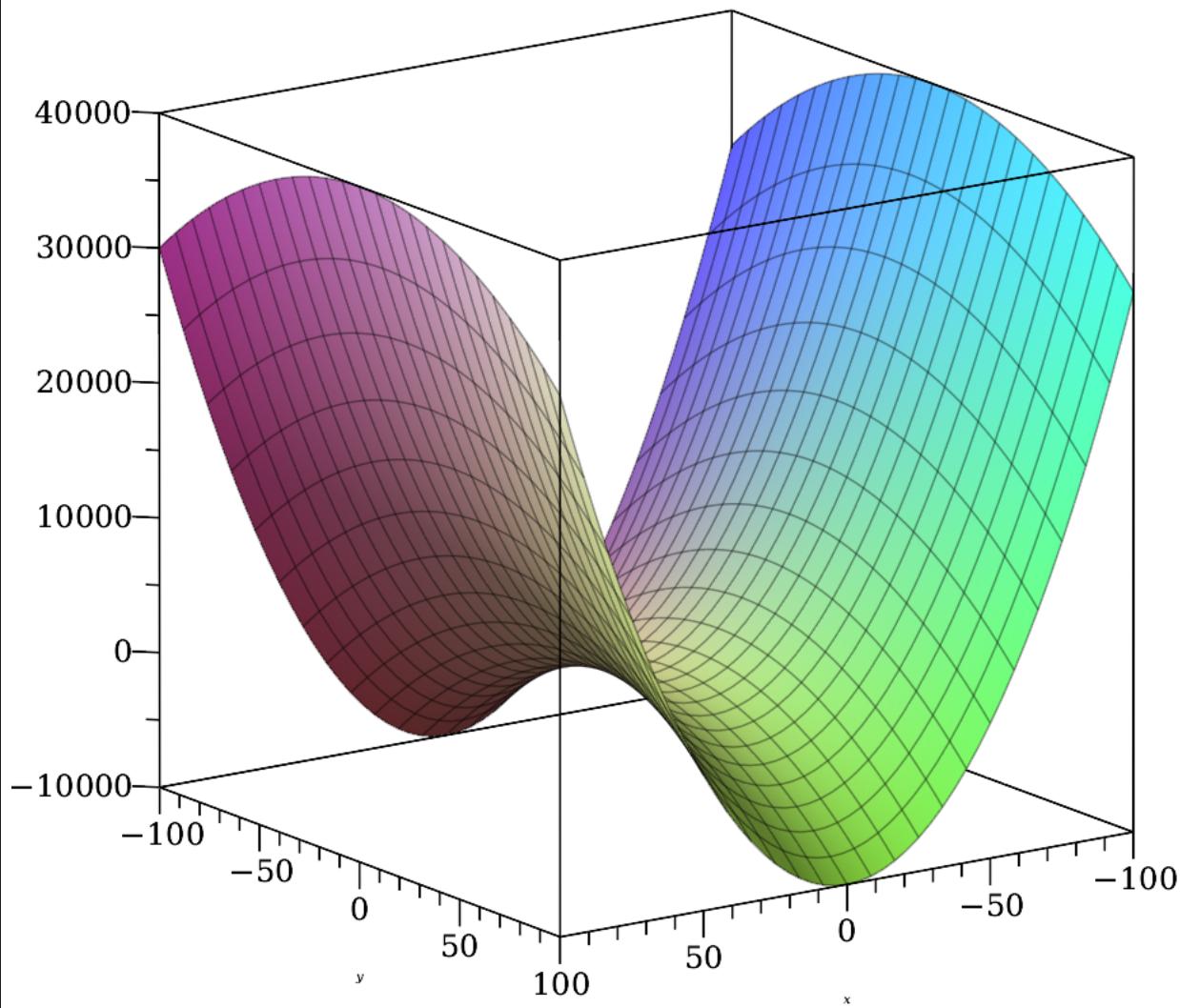
```
> z:=(x,y)->4*(x^2)*exp(y)-2*(x^4)-exp(4*y)
      z := (x, y)  $\mapsto$  4  $\cdot$  x2  $\cdot$  ey  $-$  2  $\cdot$  x4  $-$  e4  $\cdot$  y
```

(30)

```
> with(plots):
> plot3d(z(x,y),x=-3..3,y=-1..1,axes=boxed)
```



```
> z:=(x,y)->4*(x^2)-y^2  
z := (x, y)  $\mapsto$  4· $x^2 - y^2$  (31)  
> with(plots):  
> plot3d(z(x,y),x=-100..100,y=-100..100,axes=boxed)
```



```
> A:=matrix([[1,2,-1],[0,1,0],[3,-1,2]])
```

$$A := \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 0 \\ 3 & -1 & 2 \end{bmatrix}$$

(32)

```
> B:=matrix([[1,2,3],[1,1,2],[2,1,1]])
```

(33)

$$B := \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 2 \\ 2 & 1 & 1 \end{bmatrix} \quad (33)$$

```
> C:=mat2qerewtrix([[2,1,1],[0,1,-1],[4,2,2]])
```

$$C := \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & -1 \\ 4 & 2 & 2 \end{bmatrix} \quad (34)$$

```
> evalm(evalm(2*A)-evalm(B &* C))
```

$$\begin{bmatrix} -12 & -5 & -7 \\ -10 & -4 & -4 \\ -2 & -7 & 1 \end{bmatrix} \quad (35)$$

```
> evalm(B^-1)
```

$$\begin{bmatrix} -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ \frac{3}{2} & -\frac{5}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{3}{2} & -\frac{1}{2} \end{bmatrix} \quad (36)$$

```
> with(linalg):
> eigenvals(C)
```

$$0, 3, 2 \quad (37)$$

```
> with(linalg):
> eigenvects(C)
```

$$\left[[2, 1, \left\{ \begin{bmatrix} 1 & -2 & 2 \end{bmatrix} \right\}] \right], \left[[0, 1, \left\{ \begin{bmatrix} -1 & 1 & 1 \end{bmatrix} \right\}] \right], \left[[3, 1, \left\{ \begin{bmatrix} -1 & 1 & -2 \end{bmatrix} \right\}] \right] \quad (38)$$