In [3]:

```
12+4-5
```

Out[3]:

```
11
```

In [4]:

```
2^10
```

Out[4]:

```
1024
```

In [5]:

```
sin(pi/2)
```

Out[5]:

```
1
```

In [72]:

```
sin(0.1)
```

Out[72]:

```
0.0998334166468282
```

In [7]:

```
14+2*(5-3)
```

Out[7]:

```
18
```

In [9]:

```
x=var('x')
p=(2*x-1)^3
p.expand()
```

Out[9]:

```
8*x^3 - 12*x^2 + 6*x - 1
```

In [12]:

```
x=var('x')
exp=x^4-3/2*x^3-x+3/2==0
solve(exp, x)
```

Out[12]:

```
[x == 1, x == (3/2), x == -1/2*I*sqrt(3) - 1/2, x == 1/2*I*sqrt(3) - 1/2]
```

In [16]:

```
x,y=var('x,y')
syst=[2*x+y==3,x+3*y==-1]
solve(syst,x,y)
```

Out[16]:

```
[[x == 2, y == -1]]
```

In [17]:

```
limit(sin(x)/x, x=0)
```

Out[17]:

```
1
```

In [20]:

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

Out[20]:

```
1/2
```

In [22]:

```
limit((cos(x)+1)/(x-pi), x=pi)
```

Out[22]:

```
0
```

In [23]:

```
y(x) = 3*x^3 + 2*x^2 - 5
diff(y(x), x)
```

Out[23]:

```
9*x^2 + 4*x
```

In [24]:

```
y(x) = sqrt(1+x^4)
diff(y(x), x)
```

Out[24]:

```
2*x^3/sqrt(x^4 + 1)
```

In [25]:

```
y(x) = e^x*sin(x)*cos(x)
diff(y(x), x)
```

Out[25]:

```
cos(x)^2*e^x + cos(x)*e^x*sin(x) - e^x*sin(x)^2
```

In [26]:

```
integrate(3*x^3+2*x^2-5,x,0,1)
```

Out[26]:

```
-43/12
```

In [27]:

```
integrate(1/(x^2), x, 1, infinity)
```

Out[27]:

```
1
```

In [28]:

```
integrate(e^(-x^2), x, -infinity, infinity)
```

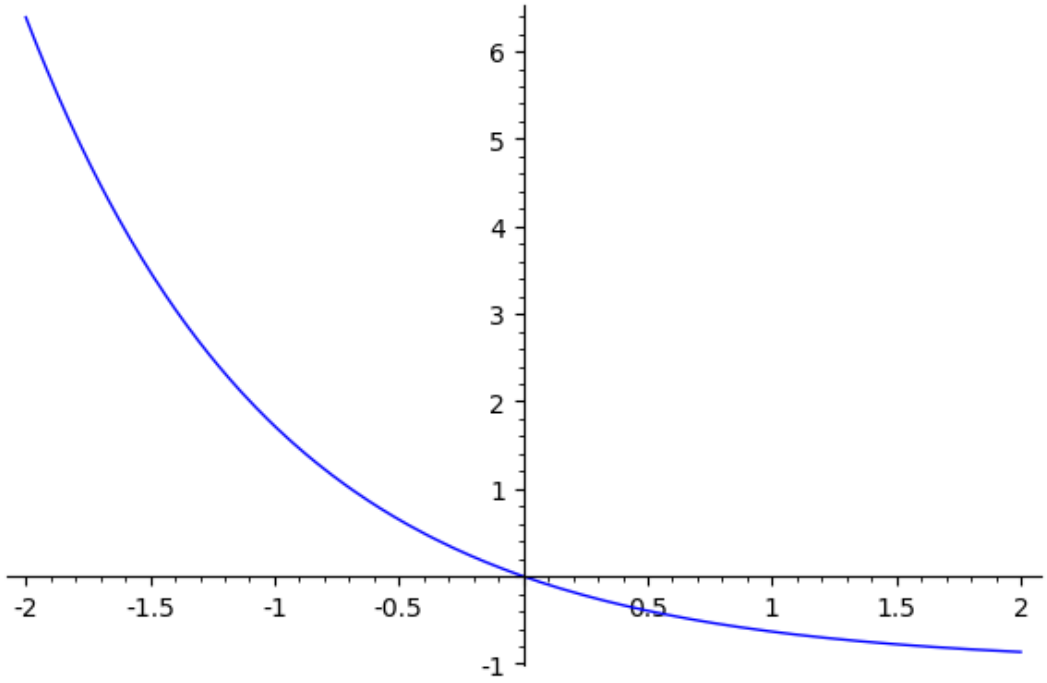
Out[28]:

```
sqrt(pi)
```

In [30]:

```
plot(e^(-x)-1,-2,2)
```

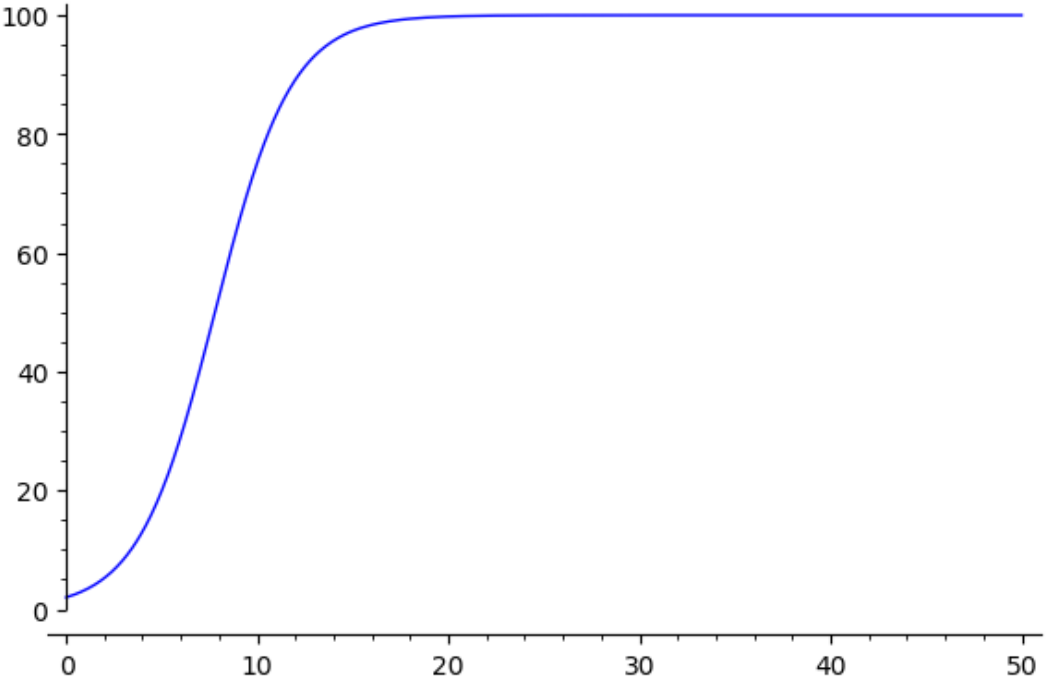
Out[30]:



In [34]:

```
r = 0.5
plot((200*e^(r*x))/(2*(e^(r*x)-1)+100),0,50)
```

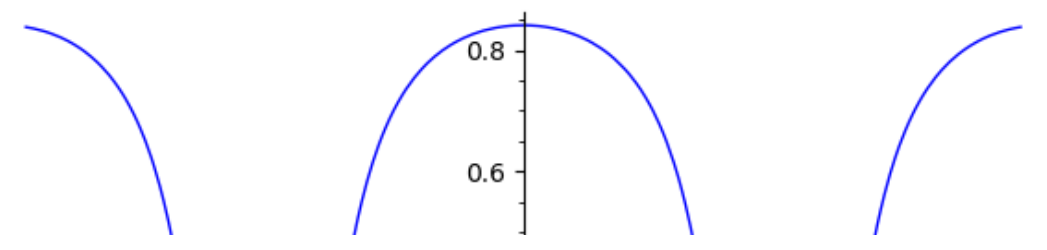
Out[34]:

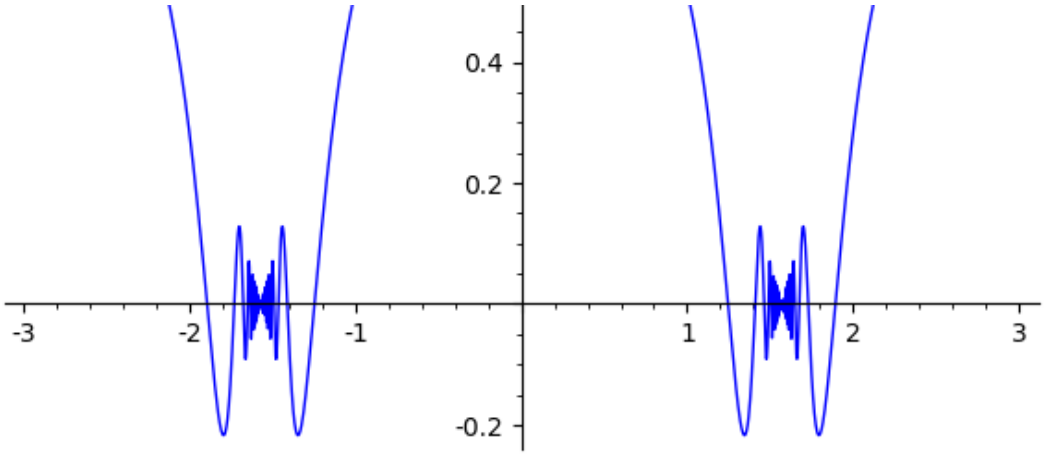


In [7]:

```
plot(x*sin(1/x), -3, 3)
```

Out[7]:

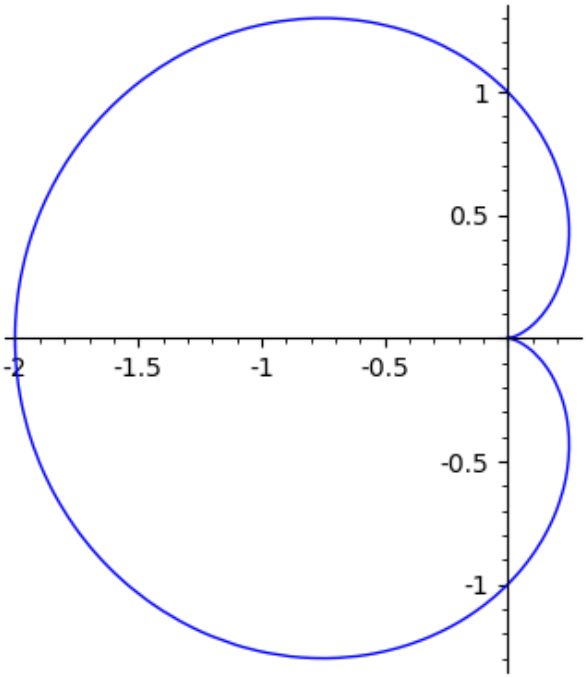




In [11]:

```
t=var('t')
x(t)=(1-cos(t))*cos(t)
y(t)=(1-cos(t))*sin(t)
parametric_plot((x(t), y(t)), (t,0,2*pi))
```

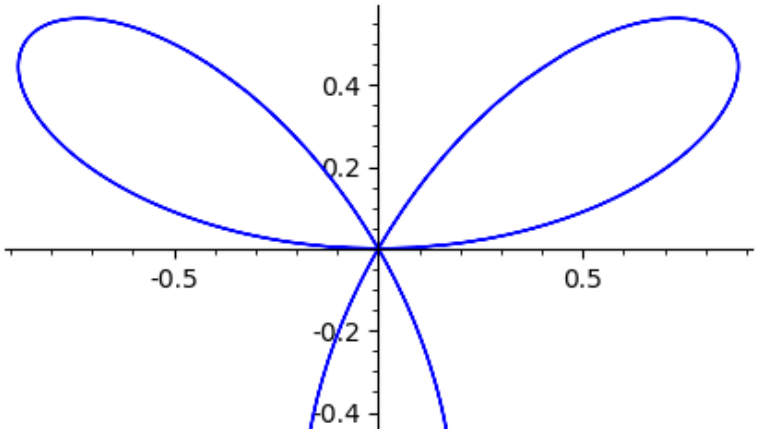
Out[11]:

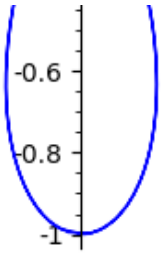


In [12]:

```
t=var('t')
x(t)=sin(3*t)*cos(t)
y(t)=sin(3*t)*sin(t)
parametric_plot((x(t), y(t)), (t, 0, 2*pi))
```

Out[12]:

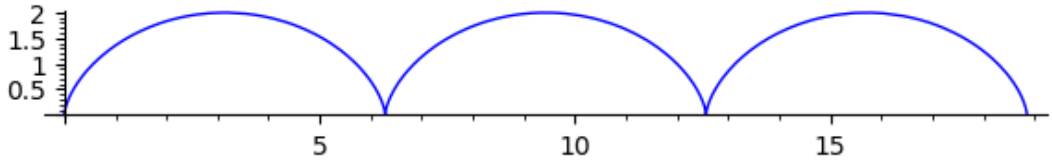




In [13]:

```
t=var('t')
x(t)=t-sin(t)
y(t)=1-cos(t)
parametric_plot((x(t),y(t)), (t,0,6*pi))
```

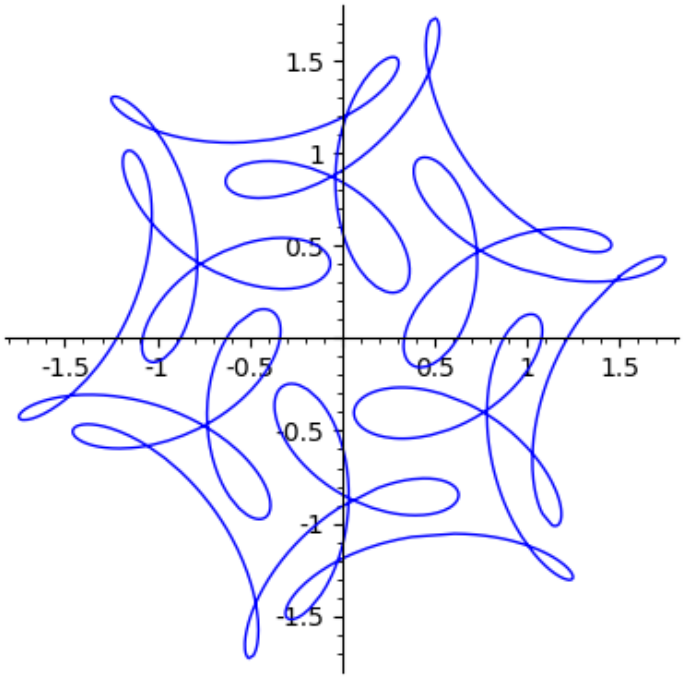
Out[13]:



In [14]:

```
t=var('t')
x(t)=cos(t)+cos(7*t)/2+sin(17*t)/3
y(t)=sin(t)+sin(7*t)/2+cos(17*t)/3
parametric_plot((x(t), y(t)), (t,0,2*pi))
```

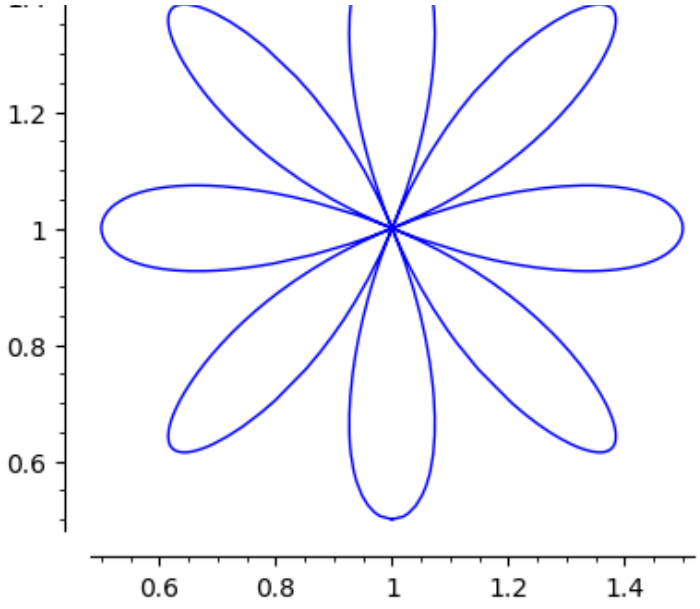
Out[14]:



In [28]:

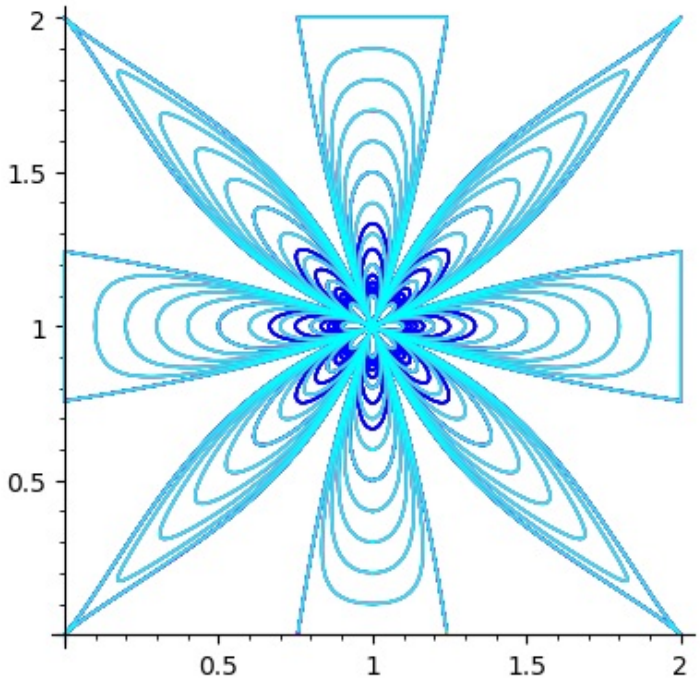
```
t,s=var('t,s')
f(t,s)=1-((s*cos(4*t)*cos(t))/(sqrt(1-s^2*(cos(4*t)^2)*(sin(t)^2))))
s = 0.5
x(t)=f(t-pi/2, s)
y(t)=f(t, s)
parametric_plot((x(t),y(t)), (t,0,2*pi))
```

Out[28]:



In [59]:

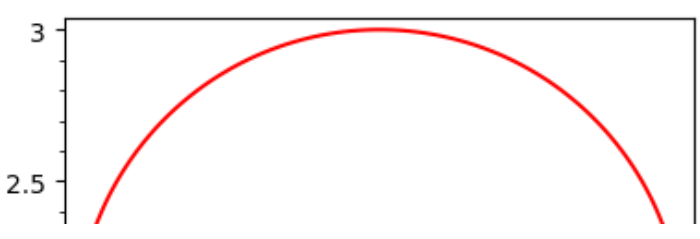
```
t,s=var('t,s')
f(t,s)=1-(s*cos(4*t)*cos(t))/(sqrt(1-s^2*(cos(4*t))^2*(sin(t))^2))
for k in [1..10]:
    k = k/10
    x(t)=f(t-pi/2, k)
    y(t)=f(t, k)
    g1=parametric_plot((x(t),y(t)), (t,0,2*pi),color='cyan')
    g=g+g1
show(g)
```

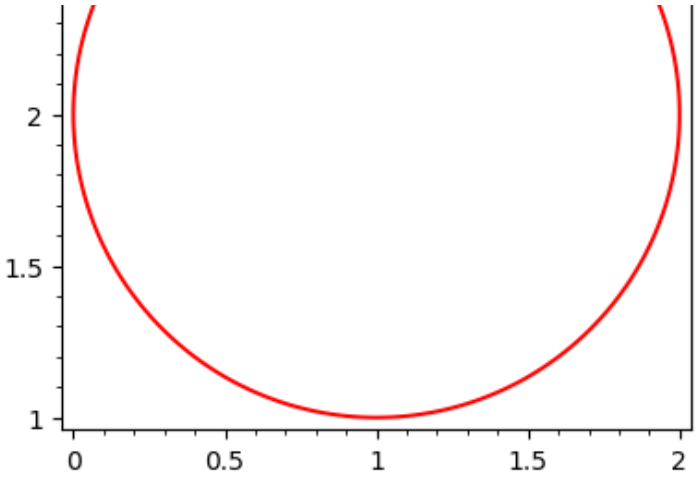


In [55]:

```
x,y=var('x,y')
f(x,y)=x^2+y^2-2*x-4*y+4
implicit_plot((f(x,y)==0), (x,0,2), (y,1,3), color='red')
```

Out[55]:

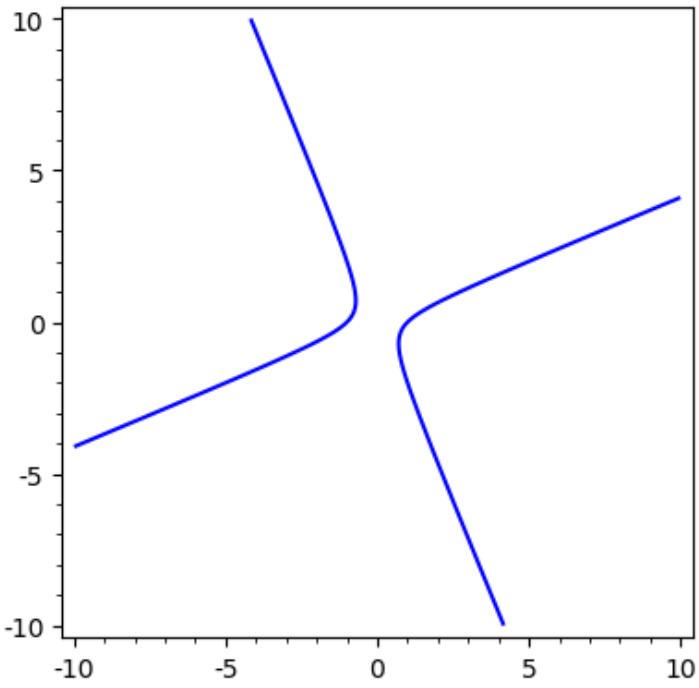




In [62]:

```
x,y=var('x,y')
f(x,y)=x^2-2*x*y-y^2
implicit_plot((f(x,y)==1),(x,-10,10),(y,-10,10))
```

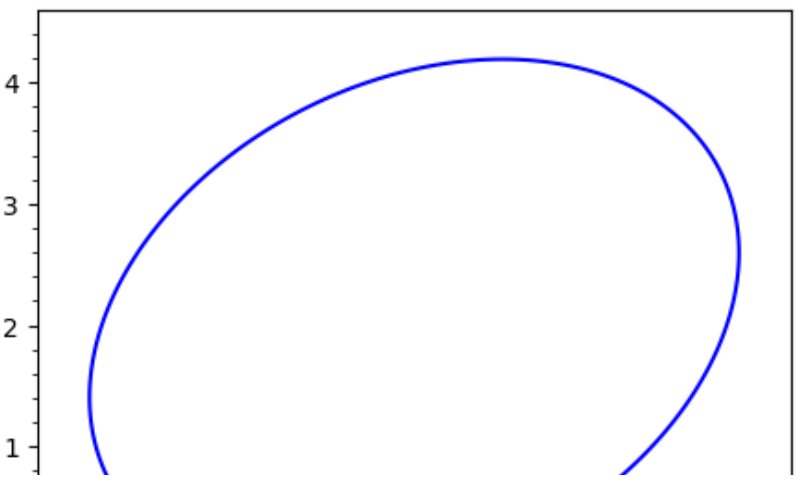
Out[62]:

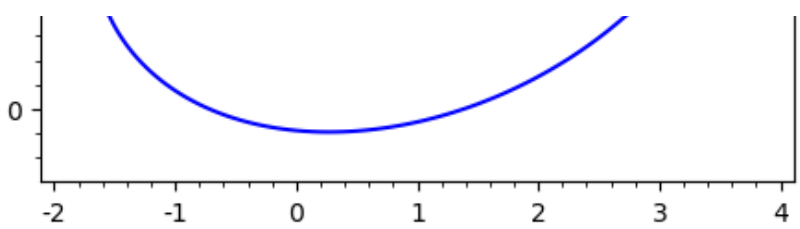


In [70]:

```
x,y=var('x,y')
f(x,y)=6*x^2-4*x*y+9*y^2-4*x-32*y-6
implicit_plot((f(x,y)==0),(x,-2,4),(y,-0.5,4.5))
```

Out[70]:





In [ ]: