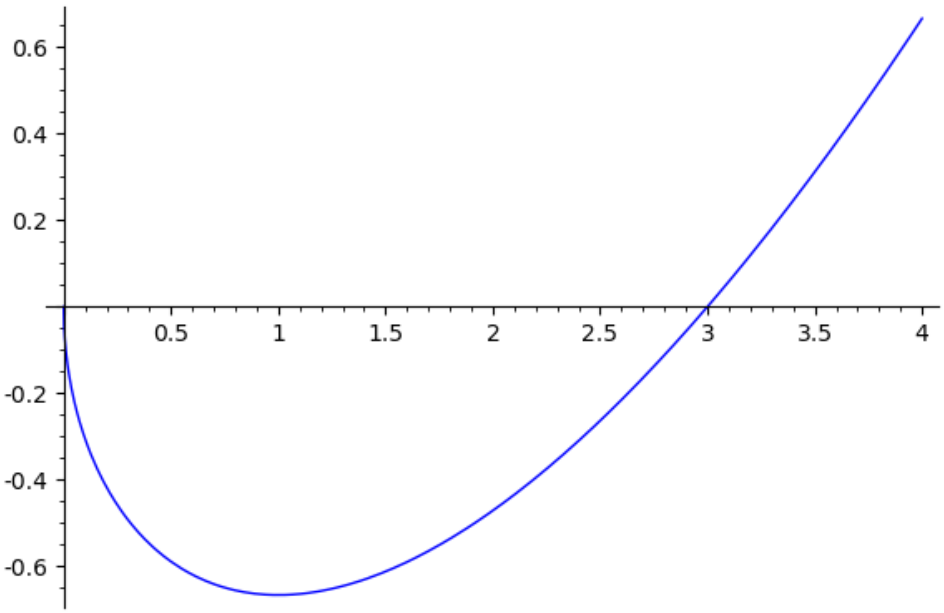
In [1]:
```
f(x)=1/3*sqrt(x)*(x-3)
show(f)
```

Out[1]:

$$x \mapsto \frac{1}{3}\,(x-3)\sqrt{x}$$

In [2]:
```
plot(f(x),x,0,4)
```

Out[2]:



In [3]:
```
fdash(x)=diff(f(x),x)
show(fdash)
```

Out[3]:

$$x \mapsto \frac{x-3}{6\sqrt{x}} + \frac{1}{3}\sqrt{x}$$

In [4]:
```
af(x)=sqrt((1+fdash(x)^2).factor())
show(af)
```

Out[4]:

$$x \mapsto \frac{1}{2}\sqrt{\frac{(x+1)^2}{x}}$$

In [5]:
```
show(integrate(af(x),x,0,3))
```

Out[5]:

$$2\sqrt{3}$$

In [6]:
```
# rewrite af into a form easier to integrate by hand
# see the first example shown in
# https://www.polyu.edu.hk/ama/profile/hwlee/AMA1007/TwoIntegrationExamples.pdf
af2(x)=1/2*(sqrt(x)+1/sqrt(x))
show(af2)
```

Out[6]:

$$x \mapsto \frac{1}{2}\sqrt{x} + \frac{1}{2\sqrt{x}}$$

In [7]:
```
show(integrate(af2(x),x,0,3))
```

Out[7]:

$$2\sqrt{3}$$