In [1]:
```
# rotate y=f(x)=sqrt(x+1) from x=0 to x=1 about y axis
# We find the volume of the "Outer Solid" using the Cylindrical Shell method
# and call it v1
#
show('v1= ',integrate(2*pi*x*sqrt(x+1),x,0,1,hold=true))
```

Out[1]:

$$\text{v1=}\int_0^1 2\,\pi\sqrt{x+1}x\,dx$$

In [2]:
```
v1=integrate(2*pi*x*sqrt(x+1),x,0,1)
show(v1)
```

Out[2]:

$$\frac{8}{15}\,\pi\left(\sqrt{2}+1\right)$$

In [3]:
```
# since y=f(x)=sqrt(x+1) from x=0 to x=1
# then, x=y^2-1, or
# x^2=(y^2-1)^2, and
# when x=0, y=1, and
# when x=1, y=sqrt(2).
#
# We can then find the volume of the "Inner Solid" using the disks method
# and call it v2
#
var('y')
show('v2= ',integrate(pi*(y^2-1)^2,y,1,sqrt(2),hold=true))
```

Out[3]:

$$\text{v2=}\int_1^{\sqrt{2}} \pi\left(y^2-1\right)^2\,dy$$

In [4]:
```
v2=integrate(pi*(y^2-1)^2,y,1,sqrt(2))
show(v2)
```

Out[4]:

$$\frac{1}{15}\,\pi\left(7\,\sqrt{2}-8\right)$$

In [5]:
```
# Add the volume of the two solids together
# we get back the volume of the cylinder
# with height sqrt(2) and cross section a circle with radius 1
#
show('volume of cylinder = v1 + v2 =  ',(v1+v2).simplify_full())
```

Out[5]:

$$\text{volume of cylinder = v1 + v2 =}\sqrt{2}\pi$$

In [0]:
```
```