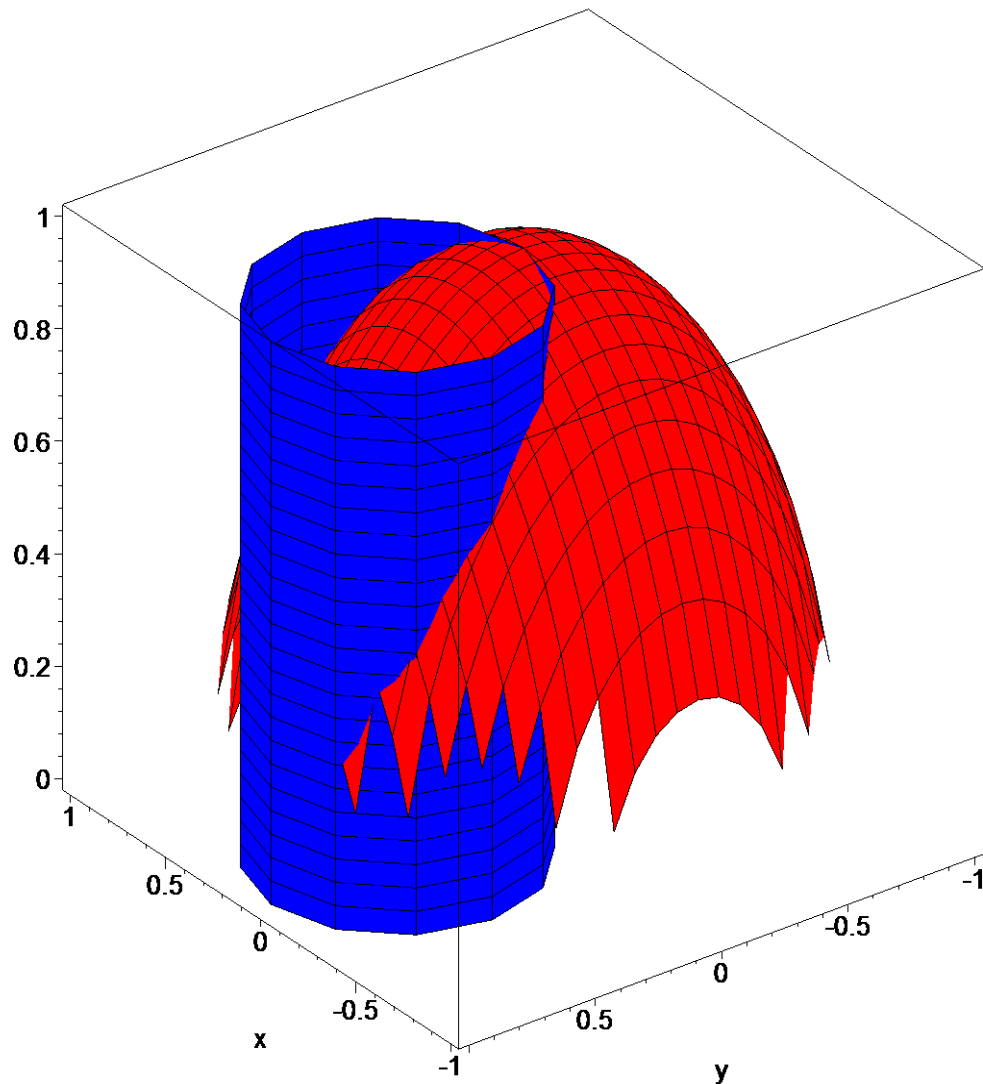


```
[ > with(student):  
  with(plots):# solutions hw P 1127 EX 47  
[ >  
[ > #47  
[ >  
[ >  
[ > P1:=plot3d(sqrt(1-x^2-y^2), x= -1 .. 1,y=-1 .. 1,color =  
  red,style=patch,axes = boxed):  
[ > P2:=plot3d(sin(theta),theta=0..2*Pi,z= 0..1, coords=cylindrical,  
  color=blue,style=patch,axes=boxed):  
[ > display3d(P1,P2);
```



```
> 2*Int(Int(Int(1, z = 0..sqrt(1-x^2-y^2)),x= 0 .. sqrt(y-y^2)),
y=0..1)
= 2*int(int(int(1, z = 0..sqrt(1-x^2-y^2)),x= 0 .. sqrt(y-y^2)),
y=0..1) ;
```

$$2 \int_0^1 \int_0^{\sqrt{y-y^2}} \int_0^{\sqrt{1-x^2-y^2}} 1 \, dz \, dx \, dy = -\frac{4}{9} + \frac{\pi}{3}$$

```
> Int(Int(Int(r, z = 0.. sqrt(1-r^2)),r=0 .. sin(theta)), theta =
0..Pi)
= int(int(int(r, z = 0.. sqrt(1-r^2)),r=0 .. sin(theta)), theta =
0..Pi);
```

$$\int_0^\pi \int_0^{\sin(\theta)} \int_0^{\sqrt{1-r^2}} r \, dz \, dr \, d\theta = -\frac{4}{9} + \frac{\pi}{3}$$

>

```
> 2*(Int(Int(Int(rho^2*sin(phi), rho = 0..1), phi=0 .. theta), theta
= 0..Pi/2) + Int(Int(Int(rho^2*sin(phi), rho =
0..sin(theta)/sin(phi)), phi=theta .. Pi/2), theta = 0..Pi/2))=
2*( int(int(int(rho^2*sin(phi), rho = 0..1), phi=0 .. theta), theta
= 0..Pi/2) + int(int(int(rho^2*sin(phi), rho =
0..sin(theta)/sin(phi)), phi=theta .. Pi/2), theta = 0..Pi/2));
```

>

$$2 \int_0^{\frac{\pi}{2}} \int_0^\theta \int_0^1 \rho^2 \sin(\phi) \, d\rho \, d\phi \, d\theta + 2 \int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \int_0^{\frac{\sin(\theta)}{\sin(\phi)}} \rho^2 \sin(\phi) \, d\rho \, d\phi \, d\theta = -\frac{4}{9} + \frac{\pi}{3}$$

>

>