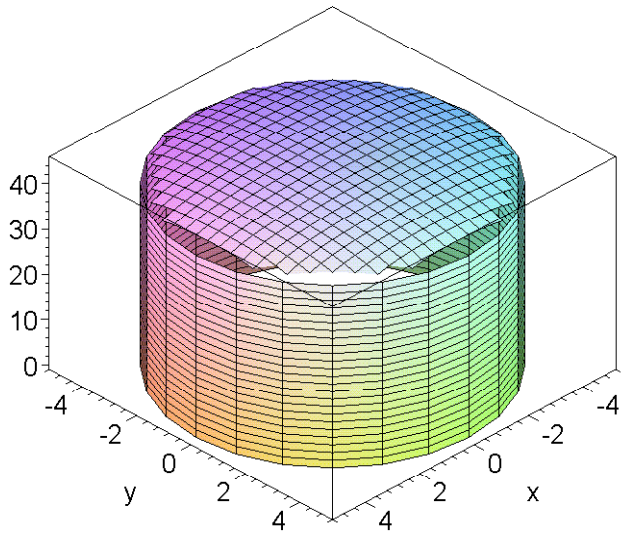
```
> restart:with(student):with(plots):
Warning, the name changecoords has been redefined
```

```
> g:= (x,y) -> 40 + sqrt(25-x^2-y^2);
```

$$g := (x, y) \to 40 + \sqrt{25 - x^2 - y^2}$$

```
>
```

```
> plot1:=plot3d(g(x,y),x=-5..5,y=-5..5,axes=boxed):
  plot2:=plot3d(5,theta=0..2*Pi,z=0..40,coords=cylindrical,axes=BOXED):display(plot1,plot2)
  ;
```




```
> 4*Int( Int(g(x,y), y=0 .. sqrt(25-x^2)),x=0..5) =4*int( int(g(x,y), y=0 ..
  sqrt(25-x^2)),x=0..5);evalf(%) ;
```

$$4 \int_0^5 \int_0^{\sqrt{25-x^2}} 40 + \sqrt{25 - x^2 - y^2}\, dy\, dx = \frac{3250}{3} \pi$$

$$3403.392041 = 3403.392041$$

```
> G:= (r,theta)-> 40 +sqrt(25-r^2);
```

$$G := (r, \theta) \to 40 + \sqrt{25 - r^2}$$

```
> 4*Int( Int(r*G(r,theta), theta=0 .. Pi/2),r=0..5) =4*int( int(r*G(r,theta), theta=0
  ..Pi/2),r=0..5);evalf(%) ;
```

$$4 \int_0^5 \int_0^{1/2\,\pi} r\,(40 + \sqrt{25 - r^2})\, d\theta\, dr = \frac{3250}{3} \pi$$

$$3403.392041 = 3403.392041$$

```
> 4*Int( Int(r*G(r,theta), r=0 .. 5),theta=0 .. Pi/2) =4*int( int(r*G(r,theta), r=0
  ..5),theta=0 ..Pi/2) ;evalf(%);
```

$$4 \int_0^{1/2\,\pi} \int_0^5 r\,(40 + \sqrt{25 - r^2})\, dr\, d\theta = \frac{3250}{3} \pi$$

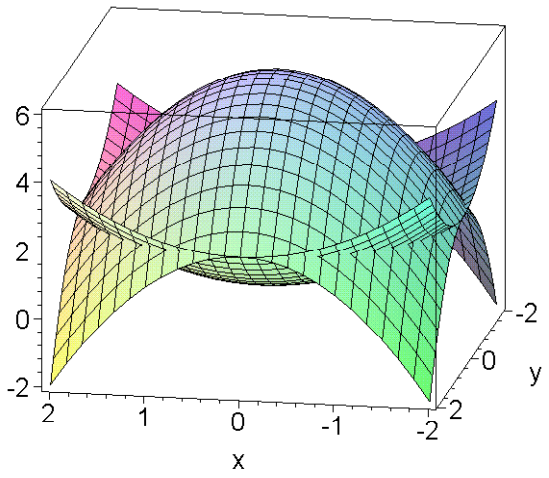
$$3403.392041 = 3403.392041$$

```
> # hen egg
> top:= (x,y) -> 6-x^2-y^2;plot1:=plot3d(top(x,y),x=-2..2,y=-2..2,axes=boxed):
```

$$top := (x, y) \to 6 - x^2 - y^2$$

```
> bot:=(x,y) ->
  (x^2+y^2)/2;plot2:=plot3d(bot(x,y),x=-2..2,y=-2..2,axes=boxed):display(plot1,plot2);
```

$$bot := (x, y) \to \frac{1}{2}y^2 + \frac{1}{2}x^2$$




```
> 4*Int( Int(top(x,y)-bot(x,y), y=0 .. sqrt(4-x^2)),x=0..2) =4*int( int(top(x,y)-bot(x,y),
  y=0 .. sqrt(4-x^2)),x=0..2);evalf(%) ;
```

$$4\int_0^2\int_0^{\sqrt{4-x^2}} 6 - \frac{3}{2}x^2 - \frac{3}{2}y^2\, dy\, dx = 12\,\pi$$

$$37.69911184 = 37.69911185$$

```
> top:= (r,theta) -> 6-r^2;
> bot:=(r,theta) -> r^2/2;
```

$$top := (r, \theta) \to 6 - r^2$$

$$bot := (r, \theta) \to \frac{1}{2}r^2$$

```
> Int( Int(r*(top(r,theta)-bot(r,theta)), r=0 .. 2),theta=0..2*Pi) =int(
  int(r*(top(r,theta)-bot(r,theta)), r=0 .. 2),theta=0..2*Pi);evalf(%) ;
```

$$\int_0^{2\,\pi}\int_0^2 r\left(6 - \frac{3}{2}r^2\right) dr\, d\theta = 12\,\pi$$

$$37.69911184 = 37.69911185$$

```
>
>
>
```