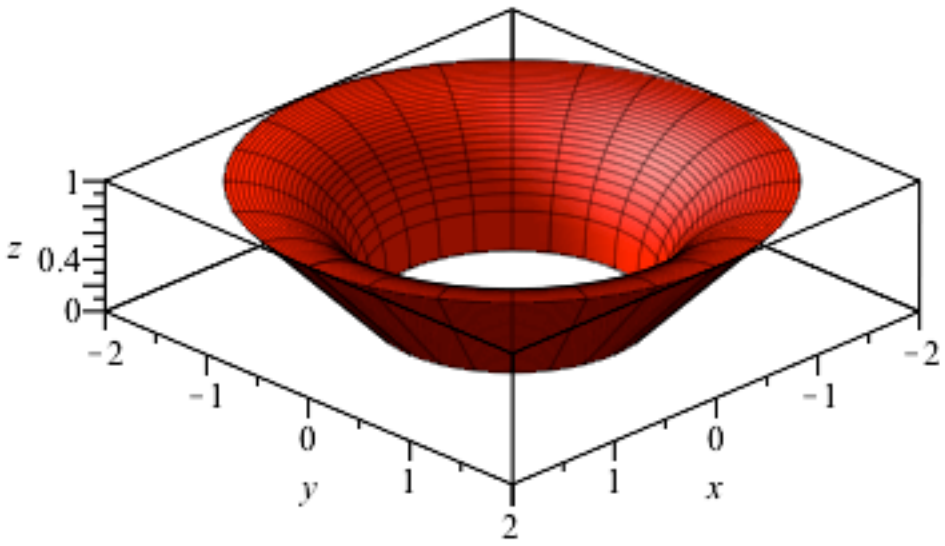
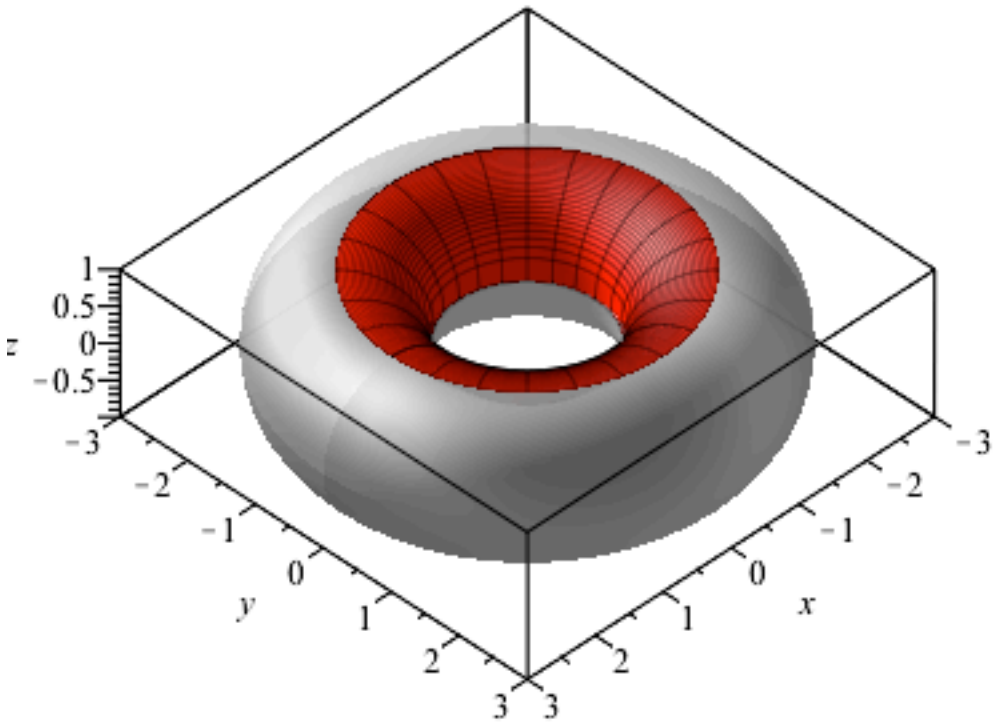
```
> with(plots):
  with(Student[MultivariateCalculus]):
> Tnede := plot3d([r, theta, r - 1], r = 1..2, theta = 0..2·Pi, coords = cylindrical, color
      = "Red"):
> Toppe := plot3d([r, theta, sqrt(1 - (r - 2)^2)], r = 1..2, theta = 0..2·Pi, coords = cylindrical,
      color = "Red"):
> display(Tnede, Toppe, scaling = constrained, axes = boxed, labels = [x, y, z], orientation = [45,
      65], caption = "Området T");
```



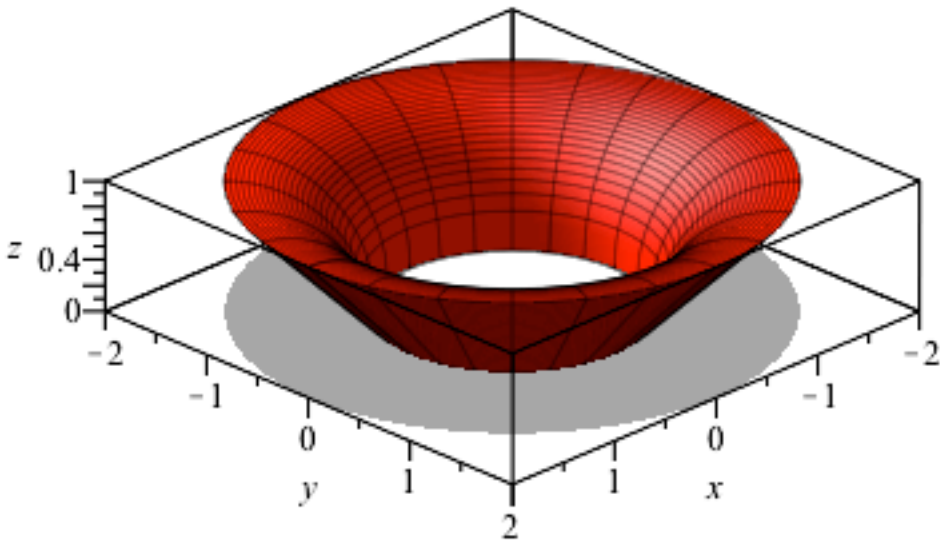
Området T

```
> TorusUnder := plot3d([r, theta, -sqrt(1 - (r - 2)^2)], r = 1..3, theta = 0..2·Pi, coords
      = cylindrical, color = "Grey", transparency = 0.2, style = patchnogrid):
> TorusOppe := plot3d([r, theta, sqrt(1 - (r - 2)^2)], r = 2..3, theta = 0..2·Pi, coords
      = cylindrical, color = "Grey", transparency = 0.2, style = patchnogrid):
> display(Tnede, Toppe, TorusUnder, TorusOppe, scaling = constrained, axes = boxed, labels
      = [x, y, z], orientation = [45, 50], caption = "Området T er en del av torus");
```



Området T er en del av torus

```
> Txy := plot3d([r, theta, 0], r = 1 ..2, theta = 0 ..2 ·Pi, coords = cylindrical, color = "Grey", style
      = patchnogrid) :
> display(Tnede, Toppe, Txy, scaling = constrained, axes = boxed, labels = [x, y, z], orientation
      = [45, 65], caption = "Området T sammen med sin projeksjon i xy-planet");
```



Området T sammen med sin projeksjon i xy-planet

> $MultiInt\left(z, z = r - 1 \,..\mathrm{sqrt}\left(1 - (r-2)^2\right), r = 1\,..2, \mathrm{theta} = 0\,..2\cdot\mathrm{Pi}, coordinates = cylindrical[r, \mathrm{theta}, z], output = steps\right);$

$$\int_0^{2\pi}\int_1^{2}\int_{r-1}^{\sqrt{-3-r^2+4r}} z\,r\,dz\,dr\,d\theta$$

$$= \int_0^{2\pi}\int_1^{2}\left(\left.\frac{z^2\,r}{2}\right|_{z=r-1\,..\sqrt{-3-r^2+4r}}\right) dr\,d\theta$$

$$= \int_0^{2\pi}\int_1^{2}\frac{r\left(-3-r^2+4r-(r-1)^2\right)}{2}\,dr\,d\theta$$

$$= \int_0^{2\pi}\left(\left.\left(-\frac{1}{4}r^4+r^3-r^2\right)\right|_{r=1\,..2}\right) d\theta$$

$$= \int_0^{2\pi}\frac{1}{4}\,d\theta$$

$$= \left.\frac{\theta}{4}\right|_{\theta=0\,..2\,\pi}$$

$$\frac{1}{2}\,\pi \qquad \textbf{(1)}$$

> $MultiInt\left(-r\cdot(r-1)+r^2, r=1\,..2, \text{theta}=0\,..2\cdot\text{Pi}, coordinates=\text{polar}[r,\text{theta}], output=steps\right);$

$$\int_0^{2\pi}\int_1^{2}\left(-r\,(r-1)+r^2\right) r\,dr\,d\theta$$

$$= \int_0^{2\pi}\left(\left.\frac{r^3}{3}\right|_{r=1\,..2}\right) d\theta$$

$$= \int_0^{2\pi}\frac{7}{3}\,d\theta$$

$$= \left.\frac{7\,\theta}{3}\right|_{\theta=0\,..2\,\pi}$$

$$\frac{14}{3}\,\pi \qquad \textbf{(2)}$$