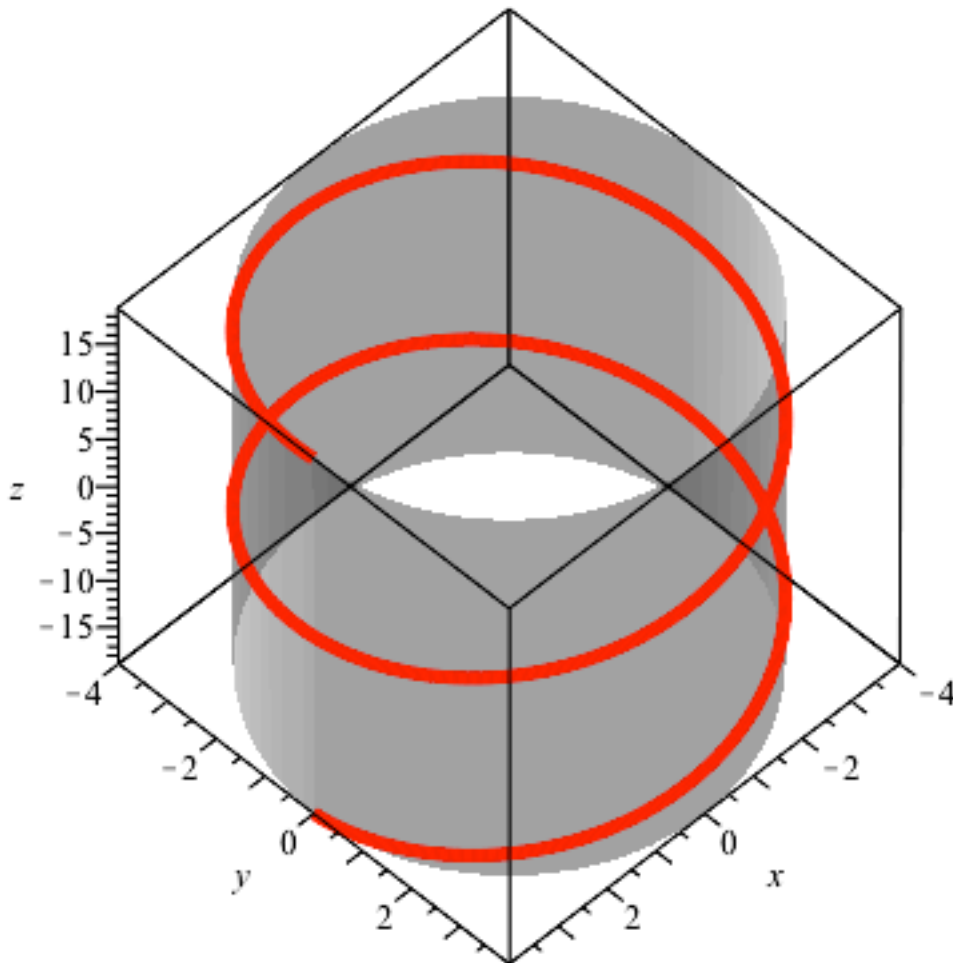


```

> with(plots) :
> Cylinder := plot3d([4, theta, z], theta = 0 .. 2·Pi, z = -6·Pi .. 6·Pi, coords = cylindrical, color
    = "Grey", transparency = 0.65, style = surface) :
> with(Student[VectorCalculus]) :
> r := t → ⟨4·cos(t), 4·sin(t), 3·t⟩ :
> C := SpaceCurve(r(t), t = -2·Pi .. 2·Pi, thickness = 5, color = "Red", numpoints = 1000) :
> display(Cylinder, C, axes = boxed, orientation = [45, 40], labels = ['x','y','z'], caption = Kurven 'C
    ')

```



Kurven C

```

> V := t → diff(r(t), t) :
> with(LinearAlgebra) :
> v := t → VectorNorm(V(t), Euclidean, conjugate = false) :
> f := t → sqrt((4·cos(t))2 + (4·sin(t))2) :
> Int(f(t)·v(t), t = -2·Pi .. 2·Pi);
Int(simplify[trig](f(t)·v(t)), t = -2·Pi .. 2·Pi);
int(f(t)·v(t), t = -2·Pi .. 2·Pi);

```

$$\int_{-2\pi}^{2\pi} 4 \sqrt{\cos(t)^2 + \sin(t)^2} \sqrt{9 + 16 \cos(t)^2 + 16 \sin(t)^2} dt$$



$$\int_{-2\pi}^{2\pi} 20 dt = 80\pi$$

**(1)**