# 1 | **A surface integral**

We are defining a function:

$$f(x,y,z) = y^2 \tag{1}$$

and slicing out a vertical organ pipe shape with a sliced edge. That is:

$$x^2 + z^2 = 1 \tag{2}$$

bounded by $y > 0$ and $y < 3 - x$.

Let's plot this:

```
var('x,y,z')
f = y^2

implicit_plot3d(x^2+z^2 == 1, (y,-1,1), (x,-1,1), (z, -1,1), region=(lambda x,y,z: y > 0 and y<3-x), co
```

This looks like the following: