Problem 1 on WeBWorK set 8.
Find the volume of the solid whose base is the region enclosed by y=x^2 and y=1, and the cross sections perpendicular to the y-axis are squares.

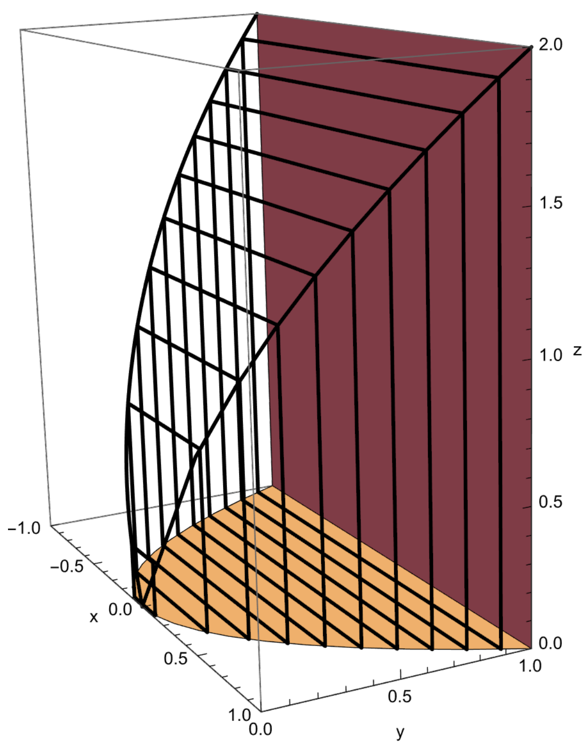
Note that it talked about the cross section perpendicular to the **y-axis**, not the x-axis.

In this figure, the base is orange. The cross section at y = y_i is a square with side length $2\sqrt{y_i}$, so A(y_i) = $4\,y_i$ and the volume of the slice between y = y_i and y = $y_i + \Delta y$ is $\Delta V_i = 4\,y_i\,\Delta y$. Adding the volume of all these slices, and taking the limit of $\Delta y \to 0$ gives V = $\int_0^1 4\,y\,dy = 2$

In[ ]:=

```
Graphics3D[ {(*base*) Polygon[Table[{x, x², 0}, {x, -1, 1, .1}]],
   (*face at y = 1 *)Polygon[{{1, 1, 0}, {1, 1, 2}, {-1, 1, 2}, {-1, 1, 0}}],
   (* square slices at y = constant *), Thick, Table[
    Line[{{√y , y, 0}, {√y , y, 2 √y}, {- √y , y, 2 √y}, {- √y , y, 0}, {√y , y, 0}}],
    {y, .01, 1, .1} ],
   (* edge on right *)
   Line[Table[{ √y , y, 2 √y}, {y, 0, 1, .1}]],
   (* edge on left *)
   Line[Table[{- √y , y, 2 √y}, {y, 0, 1, .01}]]},
  PlotRange → {{-1, 1}, {0, 1}, {0, 2}}, Axes → True, AxesLabel → {"x", "y", "z"} ]
```

Out[ ]=



For 3 points of extra credit, find A(x) for this solid and compute the volume by integrating V = $\int_{-1}^{1} A(x)\, dx$.

Submit a paper version of the computation to Prof. Swift by Friday, September 28 at the beginning of class.