6. [10 points] The Rodin Coil is a fantastic device that (supposedly) creates unlimited free energy. The rate at which it creates this energy is a function of the volume of the coil.

  a. [5 points] Suppose a prototype of the Rodin Coil is the solid whose base is the circle $x^2 + y^2 = 2$ (where x and y are measured in meters), and whose cross sections perpendicular to the x–axis are squares. Write, but do **not** compute, an expression involving one or more integrals which gives the volume, in cubic meters, of this prototype.

  b. [5 points] One of Rodin's students was able to come up with an even more efficient free energy machine. Suppose the student's prototype was made by taking the same circle $x^2 + y^2 = 2$ and rotating it around the vertical line $x = 3$. Write, but do **not** compute, an expression involving one or more integrals which gives the volume, in cubic meters, of this prototype.