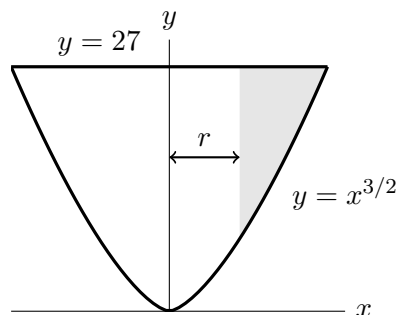


6. [12 points] Ryan Rabbitt is making a smoothie with his new electric drink mixer. Mathematically, the container of the mixer has a shape that can be modeled as the surface obtained by rotating the region in the first quadrant bounded by the curves $y = 27$ and $y = x^{3/2}$ about the y -axis, where all lengths are measured in centimeters.
- a. [7 points] Write, but do not evaluate, two integrals representing the total volume, in cm^3 , the mixer can hold: one with respect to x , and one with respect to y .

Answer (with respect to x): _____

Answer (with respect to y): _____

- b. [5 points] Ryan adds 1600 cubic centimeters of liquid to his mixer. The container spins around the y -axis at a very high speed, causing the liquid to move away from the center of the container. The result is the solid made by rotating the shaded region around the y -axis in the diagram below. Note that this means that there is an empty space inside the liquid that has the shape of a cylinder.



Let r be the radius of this cylinder of empty space. Set up an equation involving one or more integrals that you would use to solve to find the value of r . **Do not solve for r .**

Answer: _____