

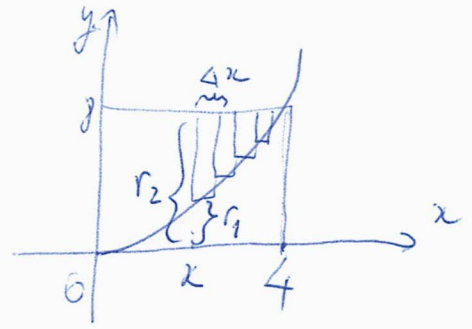
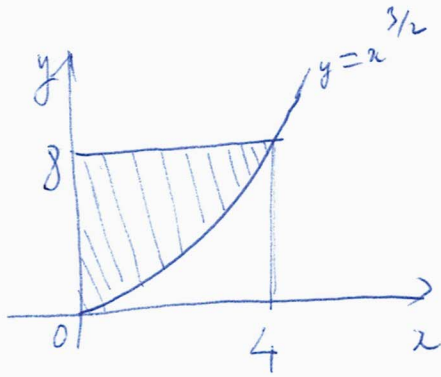
Name _____

December 13, 2016

Quiz 11

1. Find the volume of the solid obtained by rotating the region bounded by the curves $y = x^{3/2}$, $y = 8$, $x = 0$ about the x -axis.

①



Approximating the region by vertical rectangles. The flat annulus obtained by rotating each rectangle about the x -axis has volume

$$\begin{aligned} \Delta V(x) &= \pi (r_2^2 - r_1^2) \Delta x = \pi (8^2 - (x^{3/2})^2) \Delta x \\ &= \pi (64 - x^3) \Delta x. \end{aligned}$$

Summing all these volumes and letting $\Delta x \rightarrow 0$,

$$\begin{aligned} \text{Volume} &= \int_0^4 \pi (64 - x^3) dx \\ &= \pi \left(64x - \frac{x^4}{4} \right) \Big|_0^4 \\ &= 192\pi \end{aligned}$$