

PRINT Your Name: _____

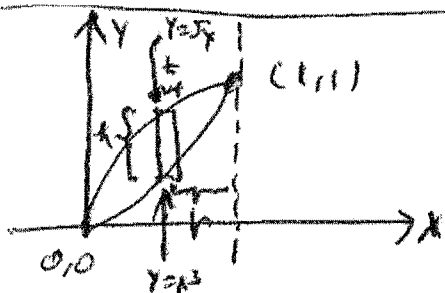
Quiz 7 — October 14, 2013 — Section 1 — 3:30 — 4:20

Remove everything from your desk except a pencil or pen.

Circle your answer. Show your work. Your work should be correct and coherent. Draw a meaningful picture.

The quiz is worth 5 points.

Consider the region bounded by $y = \sqrt{x}$ and $y = x^3$. Revolve the region about $x=1$. Find the volume of the resulting solid. You must draw a meaningful picture.



Chop the x-axis from $x=0$ to $x=1$.
 over each piece of the x-axis draw a
 rectangle.
 Spin the rectangle with x-coordinate x
 Get a shell of Volume $2\pi r h t$



$$\begin{aligned} \text{width } t &= dx \\ h &= 1-x \\ h &= \sqrt{x} - x^3 \end{aligned}$$

The volume of our shell is $2\pi r h t$

$$= 2\pi (1-x)(\sqrt{x} - x^3) dx$$

The use of the solid is

$$2\pi \int_0^1 (\sqrt{x} - x^3 - x^{\frac{3}{2}} + x^{\frac{5}{2}}) dx$$

$$= 2\pi \left(\frac{2}{3} x^{\frac{3}{2}} - \frac{x^4}{4} - \frac{2}{5} x^{\frac{5}{2}} + \frac{x^5}{5} \right) \Big|_0^1$$

$$= 2\pi \left(\frac{2}{3} - \frac{1}{4} - \frac{2}{5} + \frac{1}{5} \right)$$

$$= 2\pi \left(\frac{40 - 15 - 24 + 12}{60} \right) = 2\pi \frac{13}{60} = \boxed{\frac{13\pi}{30}}$$