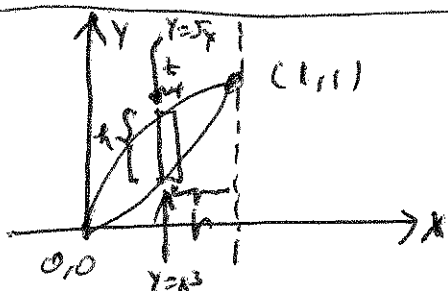


Section 8 Feb. 17, 2012

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 to x

Get a shell of volume $2\pi r h t$



where $t = dx$

$$b = 1 - x$$

$$h = \sqrt{x} - x^3$$

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

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

The volume of the solid is

$$2\pi \int_0^1 (\sqrt{x} - x^3 - x^{\frac{3}{2}} + x^4) dx$$

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

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

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