$$f^{-1\prime}(a) = \frac{1}{f'(f^{-1}(a))}$$ I think

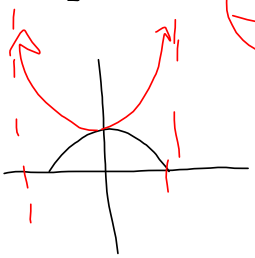
CS stuff?

Cacie wants to cheat* & take Final Part I before diving into CS & C6. I don't love it, but if it all gets done, that's fine.

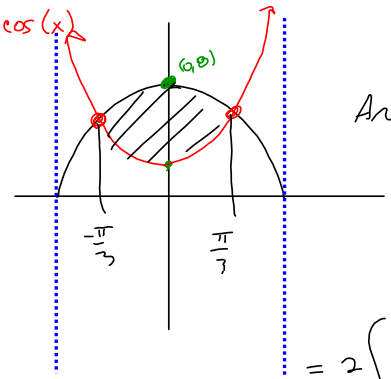
* kidding!

Deeper understanding of CS & C6 if you start it sooner. But you've handled your business just fine, so far. I trust you, Cacie!

$\sec^2(x)$ & $\cos(x)$ from $-\frac{\pi}{3}$ to $\frac{\pi}{3}$



$8\cos(x)$




Area = ////

$$= \int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \left(8\cos(x) - \sec^2(x)\right) dx$$

cosine & secant are even

$$= 2\int_0^{\frac{\pi}{3}} 8\cos(x)\,dx - 2\int_0^{\frac{\pi}{3}} \sec^2(x)\,dx$$

$$= 16\left[\sin(x)\right]_0^{\frac{\pi}{3}} - 2\left[\tan(x)\right]_0^{\frac{\pi}{3}}$$

$$= 16\left[\sin\left(\tfrac{\pi}{3}\right) - \sin(0)\right] - 2\left[\tan\left(\tfrac{\pi}{3}\right) - \tan(0)\right]$$

$$= 16\left[\tfrac{\sqrt{3}}{2} - 0\right] - 2\left[\sqrt{3} - 0\right]$$

$$= 8\sqrt{3} - 2\sqrt{3} = 6\sqrt{3}$$

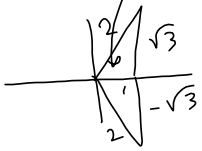
$\sec^2(x) = 8\cos(x)$

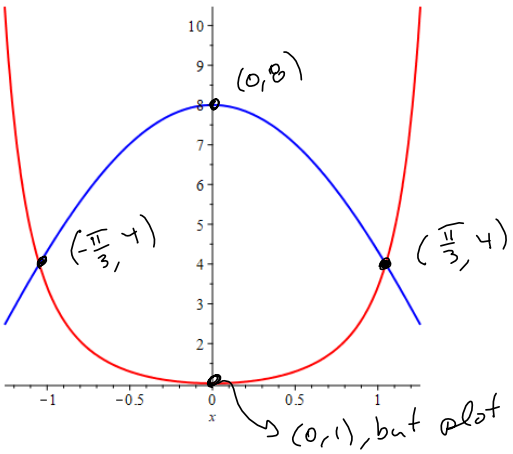
$\sec^3(x) = 8$

$\cos^3(x) = \frac{1}{8}$

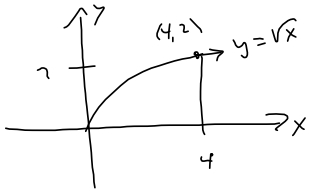
$\sqrt[3]{\quad} = \sqrt[3]{\quad}$

$\Rightarrow \cos(x) = \frac{1}{2}$ $60^\circ = \frac{\pi}{3}$

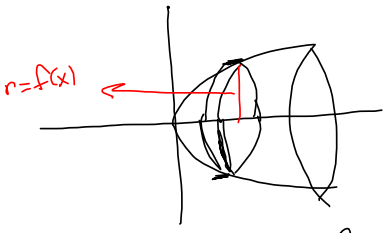


§5.2 Basically the disc method




Revolve about the x-axis:




$$V = \pi \int_0^4 (\sqrt{x})^2 dx$$

$$= \pi \int_0^4 x\,dx = \pi \cdot \frac{x^2}{2} \Big]_0^4$$

$$= 8\pi !$$

Find volume $= \lim_{n\to\infty} \sum_{k=1}^{n} A(x)\Delta x = \int \pi f(x)^2 dx$

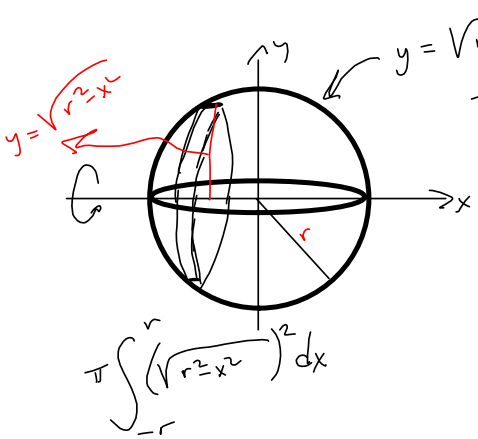
$A(x)$ = cross-sectional Area $= \pi f(x)^2 = \pi r^2$

Add up all the disc's volumes

$= \sum$((cross-sections)$(\Delta x)$)

We're making a CT-scan or tomograph.

Prove volume of a sphere is $V = \frac{4}{3}\pi r^3$




$x^2 + y^2 = r^2$

$y^2 = r^2 - x^2$

$y = \pm\sqrt{r^2 - x^2}$

$y = +\sqrt{r^2 - x^2}$ is top $\frac{1}{2}$ of circle

$\pi$

$= \pi \int_{-r}^{r} (r^2 - x^2)\, dx \quad = \pi \left[ r^2 x - \frac{x^3}{3} \right]_{-r}^{r} = \left(r^3 - \frac{r^3}{3}\right) - \left((-r)^3 - \frac{(-r)^3}{3}\right)$

$= \left(r^3 - \frac{r^3}{3} + r^3 - \frac{r^3}{3}\right) = \left(2r^3 - \frac{2r^3}{3}\right) = \left(\frac{6r^3 - 2r^3}{3}\right) = \frac{4r^3}{3}\pi = \frac{4}{3}r^3\pi = \frac{4}{3}\pi r^3$

$\pi$

Questions? I'm listening from the other room! If you leave and re-enter, I'll hear you come back in. Or you can just say something if you stay in the ZOOM session.