Final Test

HOR 107 (113?)

10 am - 6 pm

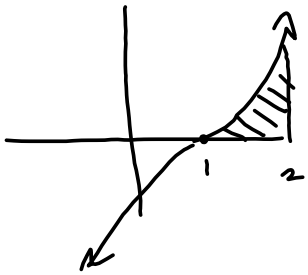
Monday, May 11th.

$$\int_a^b f(x)\,dx = \int_a^b y\,dx$$

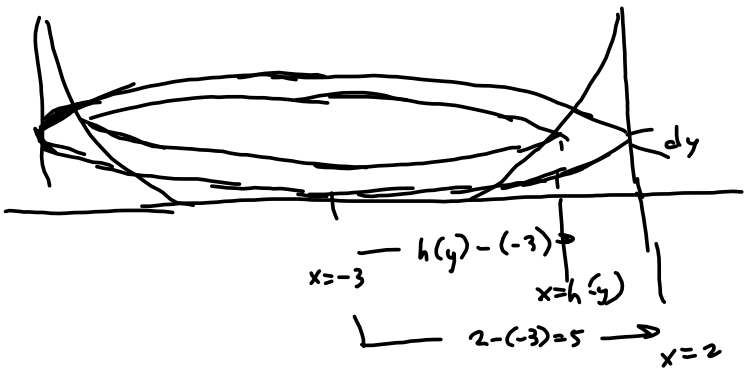
$$\text{Volume} = \pi \int_a^b f(x)^2\,dx = \pi \int_a^b y^2\,dx$$

$$\pi \int_c^d g(y)^2\,dy = \pi \int_c^b x^2\,dy$$

$y = (x-1)^3$, $x=1$, $x=2$



Revolve about $x=-3$



$g(x) = (x-1)^3 = y$ $(2-1)^3$

$x-1 = \sqrt[3]{y}$

$x = \sqrt[3]{y} + 1$

$$\text{Volume} = \pi \int o^2 - i^2 = \pi \int_0^1 \left(5^2 - \left(y^{\frac{1}{3}} + 1 - (-3)\right)^2\right) dy$$

$$\left(y^{\frac{1}{3}} + 4\right)^2 = y^{\frac{2}{3}} + 8y^{\frac{1}{3}} + 16$$

$$= \pi \int_0^1 \left(25 - \left(y^{\frac{2}{3}} + 8y^{\frac{1}{3}} + 16\right)\right) dy$$

$$= \pi \left[25y - \frac{3}{5}y^{\frac{5}{3}} - 6y^{\frac{4}{3}} - 16y\right]_0^1$$

$$= \pi \left[25 - \frac{3}{5} - 6 - 16\right]$$

$$= \pi \left[3 - \frac{3}{5}\right] = \frac{12\pi}{5}$$