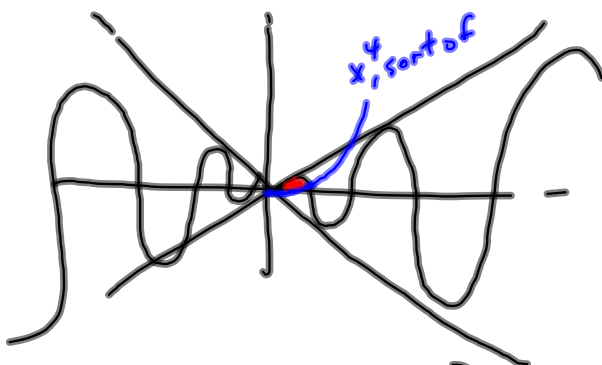
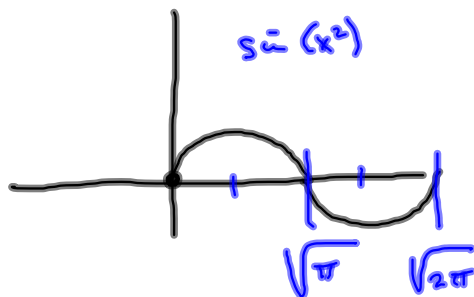


§6.1 # 35 sort of

$$y = x \sin(x^2), y = x^4$$



$x \sin(x^2)$ is ODD
 odd even

$$x \sin(x^2) = x^4$$

$$x(\sin(x^2) - x^3) = 0$$

$$x=0 \quad \sin(x^2) - x^3 = 0$$

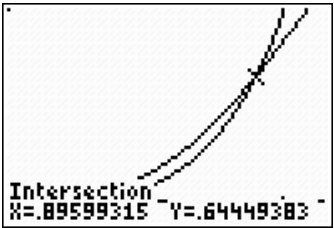
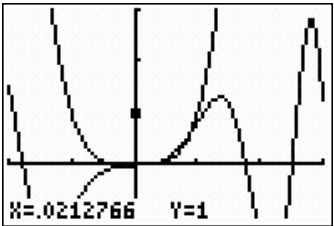
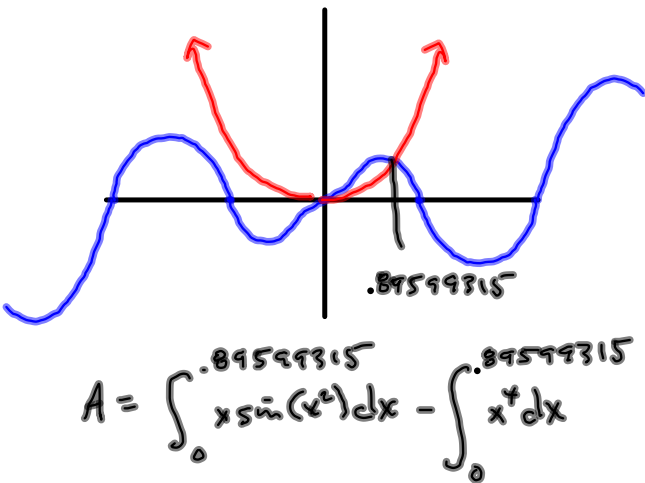
~~True~~

Graphing Calculator
 is almost essential
 for this one.

$$\int x \sin(x^2) dx$$

$$= \frac{1}{2} \int \sin(u) \cdot \underbrace{2x dx}_{du}$$

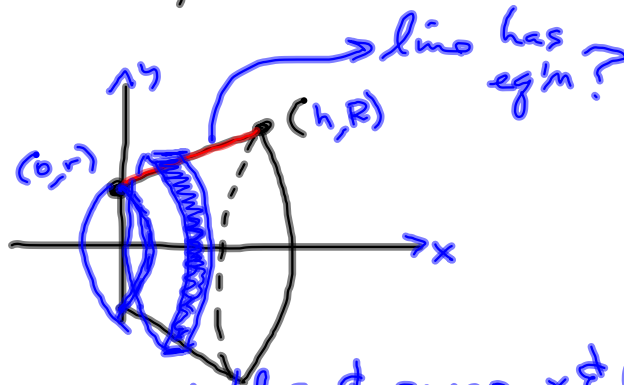
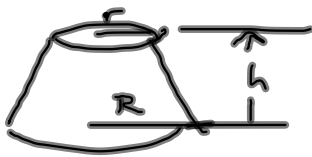
$$= \frac{1}{2} (-\cos(x^2)) + C$$



§6.2 #50

I advise MORE SS5 practice

Find Vol of



#5 You can change variables & swap x & y .
But THEN go back to the original &
do it sideways.

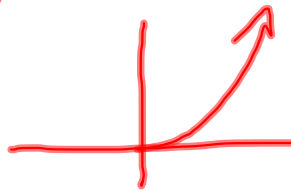
$$x = 2\sqrt{y}$$

$$x^2 = 4y$$

$$y = \frac{1}{4}x^2$$



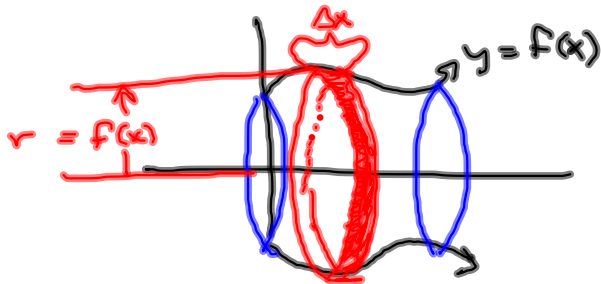
$$x, y \text{ & } x \geq 0$$



§6.1 Area between curves.

§6.2 rotated about
some line.

Find volumes by cross-sectional areas
times Δx . Disks & Washers.



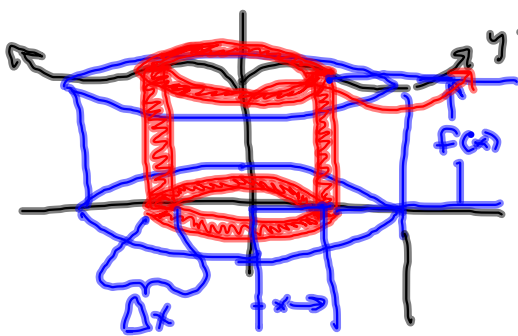
about x-axis

$$\pi r^2 \cdot \Delta x$$

$$\sum \pi r^2 \Delta x = \pi \sum f(x)^2 \Delta x$$

$$\Rightarrow \pi \int_a^b f(x)^2 dx$$

§6.3 Volume by cylindrical shells

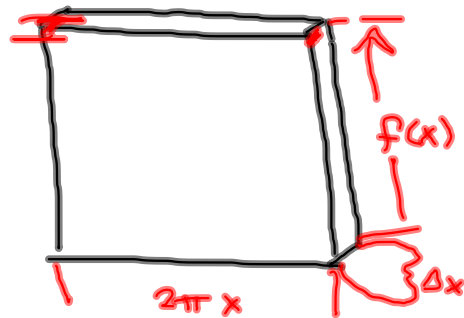
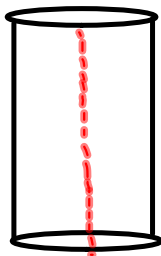


about y-axis

$$2\pi \sum x f(x) \Delta x$$

$$\rightarrow 2\pi \int_a^b x f(x) dx$$

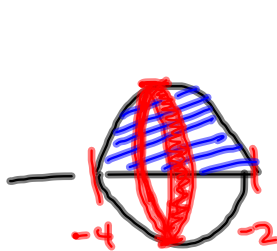
Volume of a cylinder of radius x ,
height $f(x)$ and thickness Δx



$$\text{Volume} = 2\pi x f(x) \Delta x$$

$$f(x) = -x^2 - 6x - 8 \text{ about } x\text{-axis} \quad \text{of } y=0$$

$$= -(x^2 + 6x + 8) = -(x+2)(x+4)$$



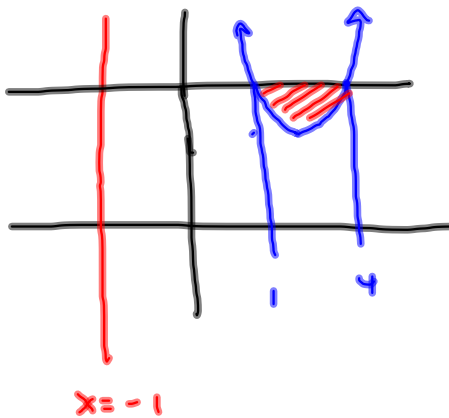
$r = f(x)$
 $\Delta x = \text{thickness}$

$$\pi \sum f(x)^2 \Delta x \approx$$

$$\text{Volume} = \pi \int_{-4}^{-2} (-x^2 - 6x - 8)^2 dx$$

Region bdd by

$$y = 5, y = x^2 - 5x + 9, \text{ about } x = -1$$



$$y = x^2 - 5x + 9 = ax^2 + bx + c$$

$$y = 5 = x^2 - 5x + \left(\frac{5}{2}\right)^2 - \frac{25}{4} + \frac{36}{4}$$

$$= \left(x - \frac{5}{2}\right)^2 + \frac{11}{4}$$

$$= (x - 2.5)^2 + 2.75$$

$$= \left(x + \frac{b}{2a}\right)^2 + f\left(-\frac{b}{2a}\right)$$

$$x^2 - 5x + 9 = 5$$

$$x^2 - 5x + 4 = 0$$

$$(x-4)(x-1) = 0$$

