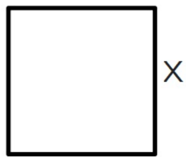
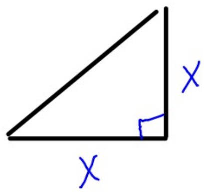
Review from Geometry (NOTES)

Find the area of a square with side x $\quad x^2$



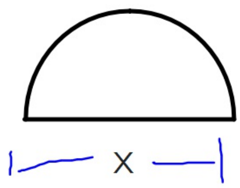
Find the area of an isosceles right triangle with leg x

$\frac{1}{2}x^2$



Find the area of a semicircle with diameter x

$\frac{1}{2}\pi r^2 \Rightarrow \frac{1}{2}\pi\left(\frac{x}{2}\right)^2 \Rightarrow \frac{1}{2}\pi\,\frac{x^2}{4} \rightarrow \pi\frac{x^2}{8}$



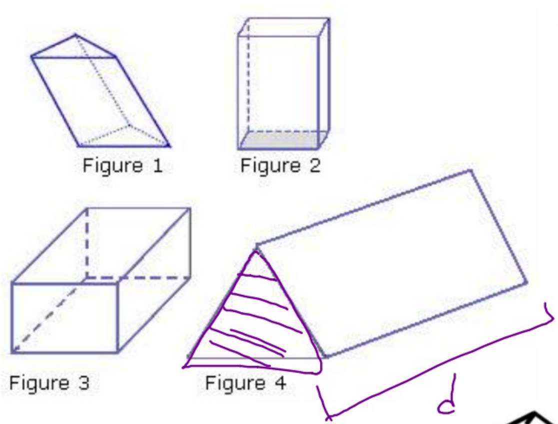
Find the area of an equilateral triangle with side x

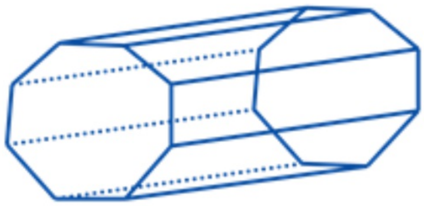
$A = \frac{1}{2}\cdot b\cdot h$ ✓ ?

$\frac{1}{2}\cdot x\cdot\frac{1}{2}x\cdot\sqrt{3}$

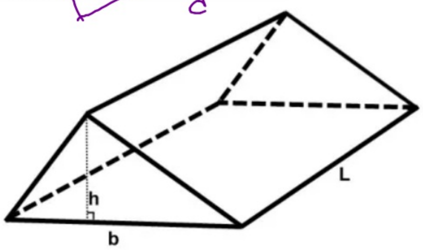
$\frac{1}{4}x^2\sqrt{3} \longrightarrow \boxed{\frac{\sqrt{3}}{4}x^2}$

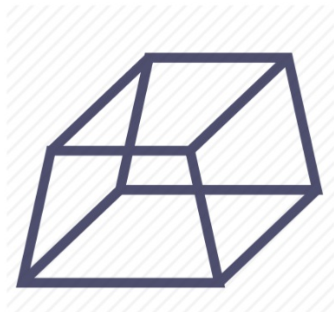
How do you find the volume of a Prism?





$V = B \cdot h$

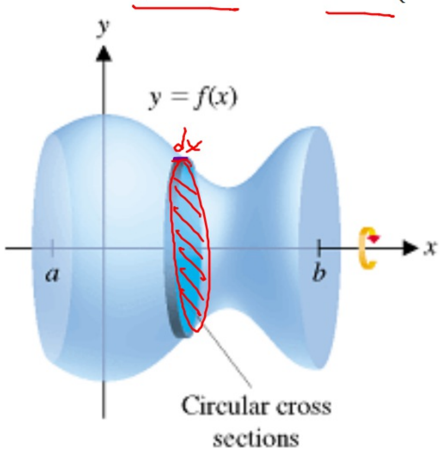




The basic premise of integrating to find volume:

Sum of disk volumes

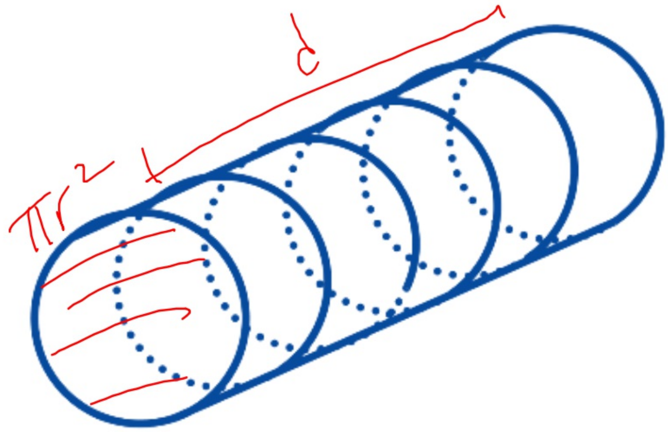
Sum of disk area * dx (depth)



Basically just:

$$\int_a^b \underline{\pi (r)^2}\, \underline{dx}$$

But isn't a disk (cylinder) just a circular prism?



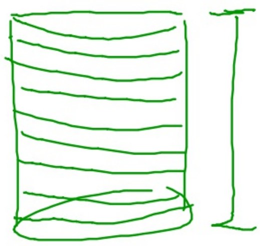
$$\int_a^b \pi(\ell)^2 \cdot dx$$

So to find volume, we integrate

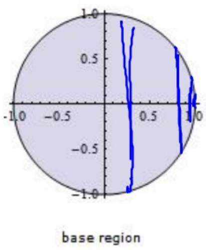
$$\int_a^b \underbrace{\overbrace{A(x)}^{\text{face area}}\,\overbrace{dx}^{\text{depth}}}_{\text{prism volume}}$$

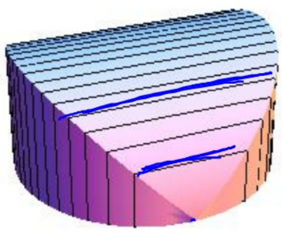
sum.

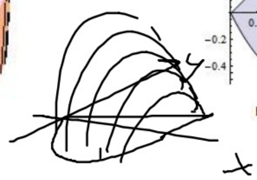
Where A(x) is the AREA of the face of a cross section (slice)

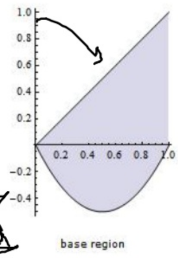


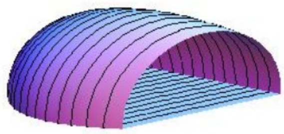
But what do shapes with non-cylindrical cross sections look like?





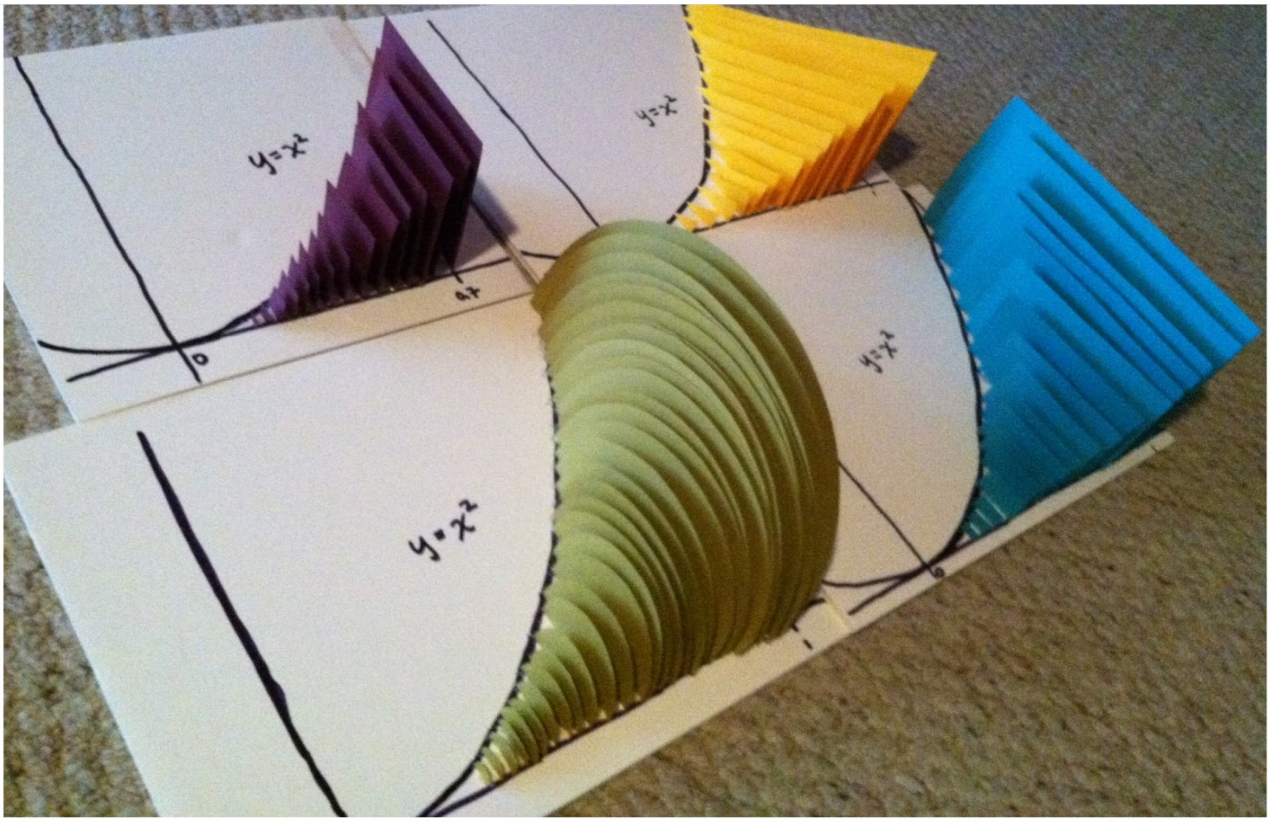






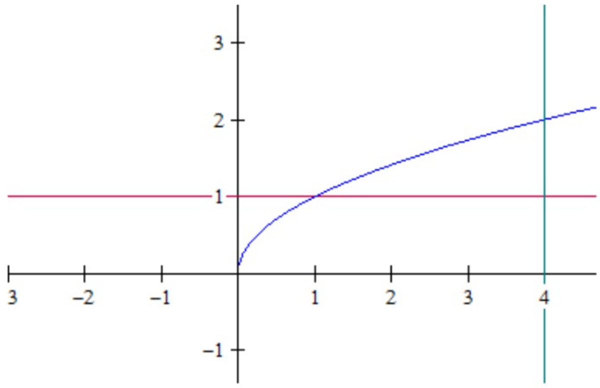
Two key things to remember: (1) no revolution/spinning involved

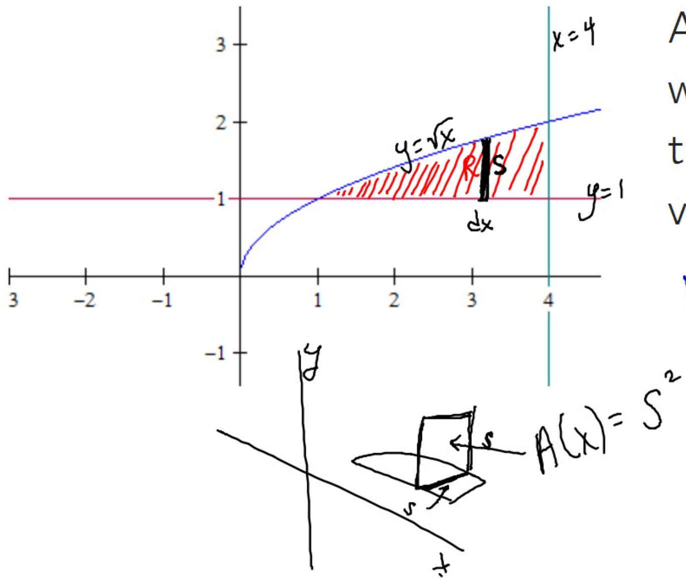
(2) the graph is flat BASE of the solid


y=x²
y=x²
y=x²
y=x²

My first volume by cross sections

The region R is bound by y= x , y=1, and x=4.





A solid with R as its base is formed where cross sections perpendicular to the x-axis are squares. Find the volume of such a solid.

$$V = \int_a^b \underbrace{A(x)}_{\text{face Area}}\,dx = \int_1^4 \left(\sqrt{x}-1\right)^2 dx$$

$$= \underbrace{\boxed{}}_{\text{Answ.}}$$

Homework:

- Finish review packet: turn in tomorrow if you will be gone Fri
- Pick up worksheet from me if gone Friday
- Must attend DS tomorrow

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