Good afternoon: check hw answers

1a. 4

1b. $x^3 - 4x = -2$ at $r = 0.5391889$ and $s = 1.6751309$

The area of the stated region is $\int_r^s \left(-2 - \left(x^3 - 4x\right)\right) dx$

6a. 6.817

6b. 168.179

3. A

5a. 18

5b. $= \pi \int_0^9 \left((7 - 2\sqrt{x})^2 - (7 - 6)^2 \right) dx$

Going to forego the eLab project, it will take too much time -_- especially with a class of 32 and the AP test coming up. Sorry

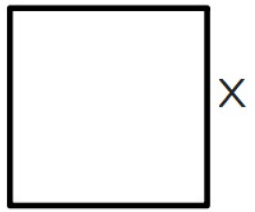
First Q4 assessment: Thursday

tomorrow: review + applying average value/MVTi

Volume by cross section

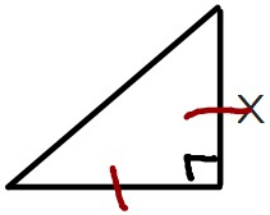
Review from Geometry

Find the area of a square with side x x^2



Find the area of an isosceles right triangle with leg x

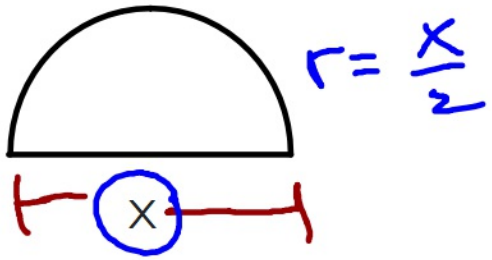
$\frac{1}{2}x^2$

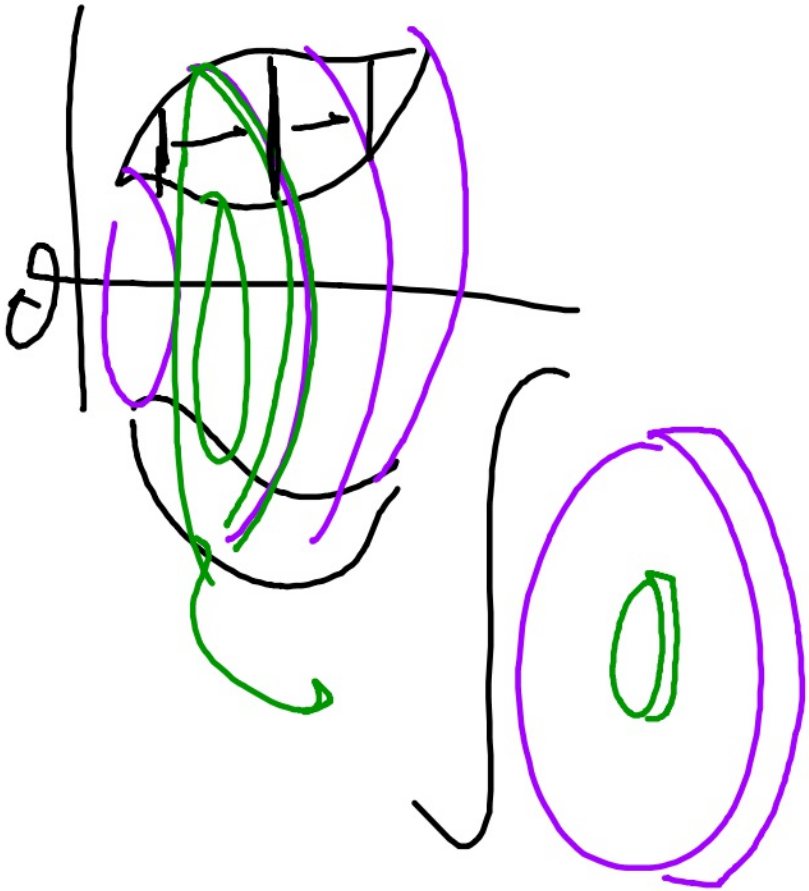


Find the area of a semicircle with diameter x

$A = \frac{1}{2}\pi(r)^2$

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



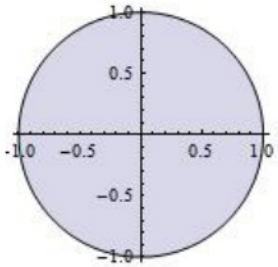


washer method

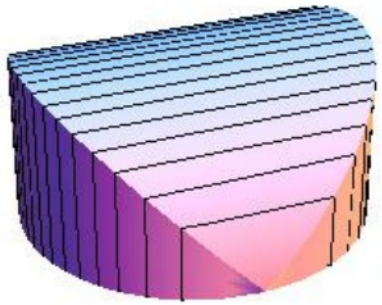
each 'cross section' is a washer
or difference in two cylinders

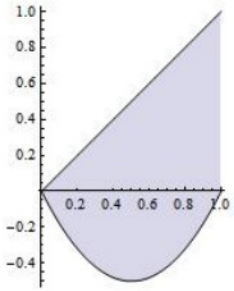
integral of: area of two circles subtracted

What do shapes with non-cylindrical cross sections look like?

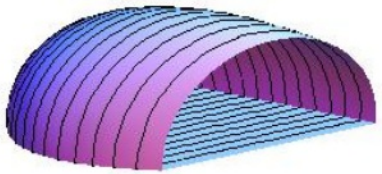


base region



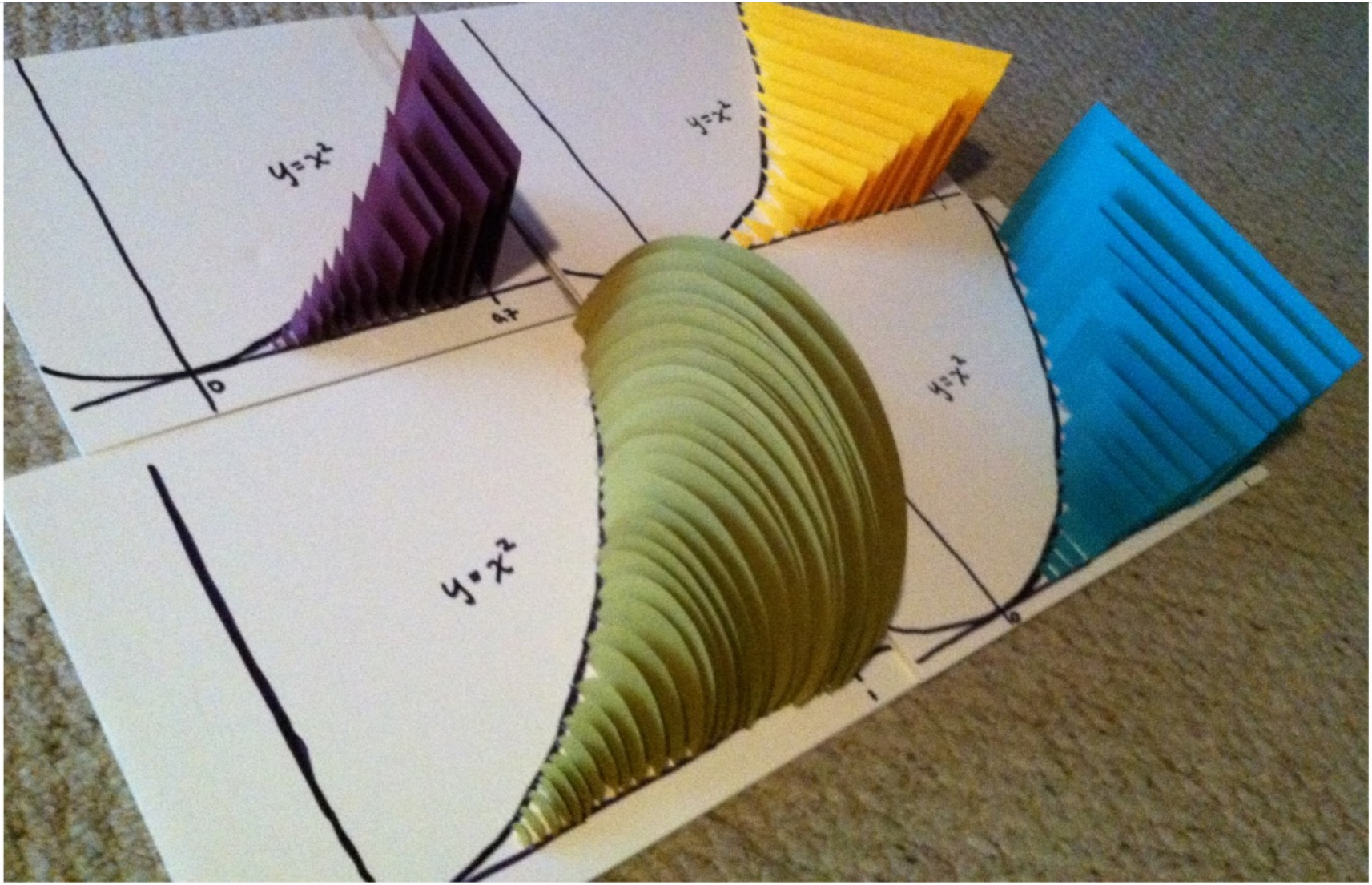


base region



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

(2) the graph is flat BASE of the solid

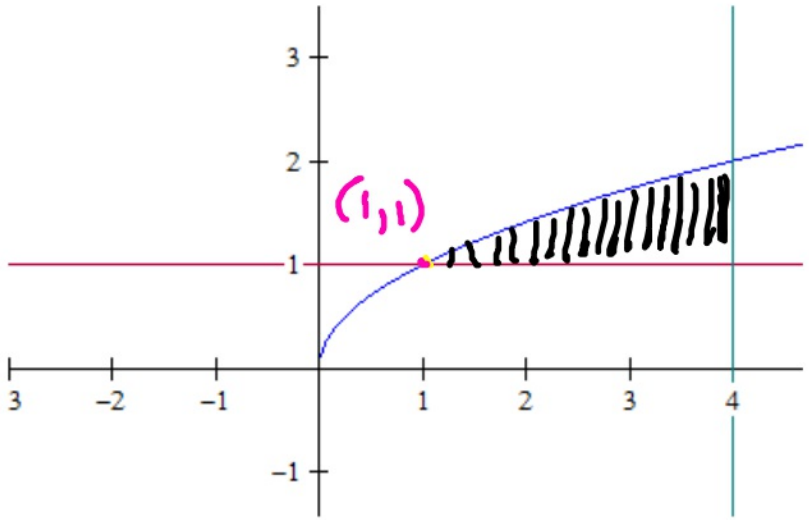

y=x²
y=x²
y=x²
y=x²
0
1
1
0
1
1

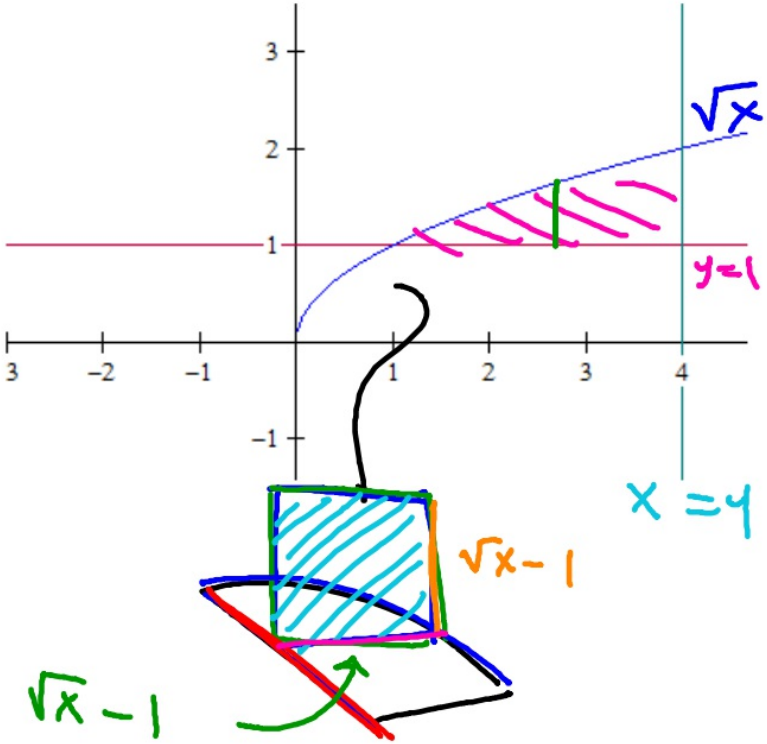
https://www.geogebra.org/m/XFgMaKTy

https://www.geogebra.org/m/nKbHnter

my first volume by cross sections

The region R is bound by $y=\sqrt{x}$, $y=1$, 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.

* Express Algebraically the "Face Area" of a single cross section.

$A(x) = (\sqrt{x}-1)^2$

$(\sqrt{x}-1)(\sqrt{x}-1)$

$= x - 2\sqrt{x} + 1$

$\int_1^4 A(x)\,dx$

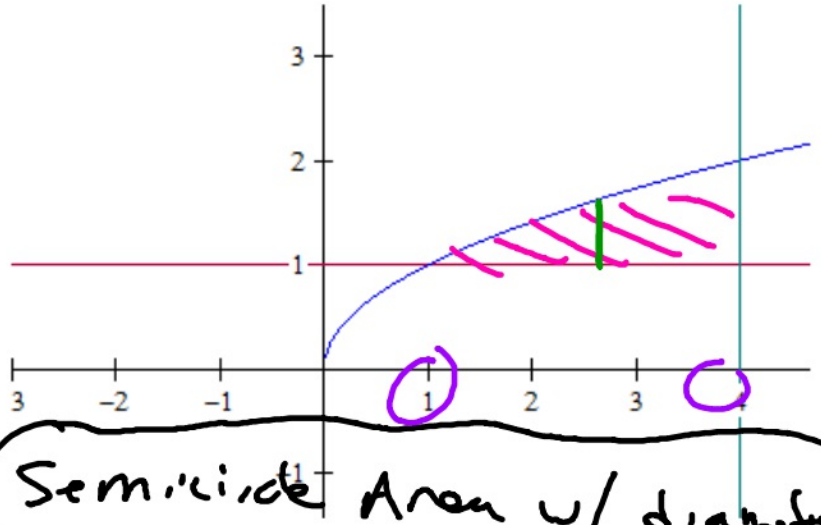
$\int_1^4 x - 2x^{\frac{1}{2}} + 1\,dx$

etc.

Volume by Cross Section:

$$V = \int_a^b A(x)\,dx$$

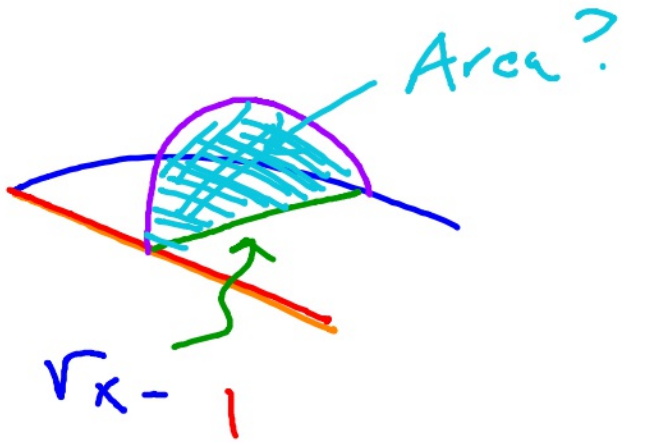
where * $A(x)$ = face area of one slice.



Semicircle Area w/ diameter x:

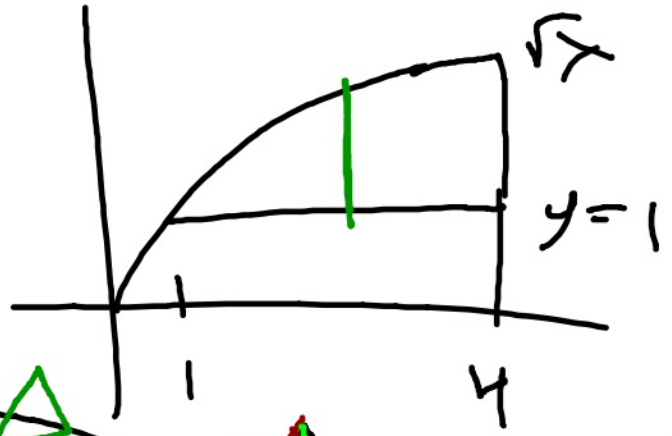
$\frac{\pi}{8}x^2$

Cross sections this time are semicircles, find the volume



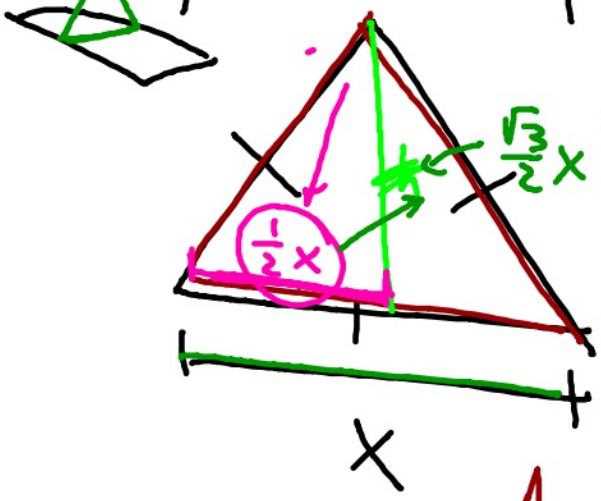
$$A(x) = \frac{\pi}{8}(\sqrt{x}-1)^2$$

$$V = \frac{\pi}{8}\int_1^4 (\sqrt{x}-1)^2 \cdot dx$$



cross-sections

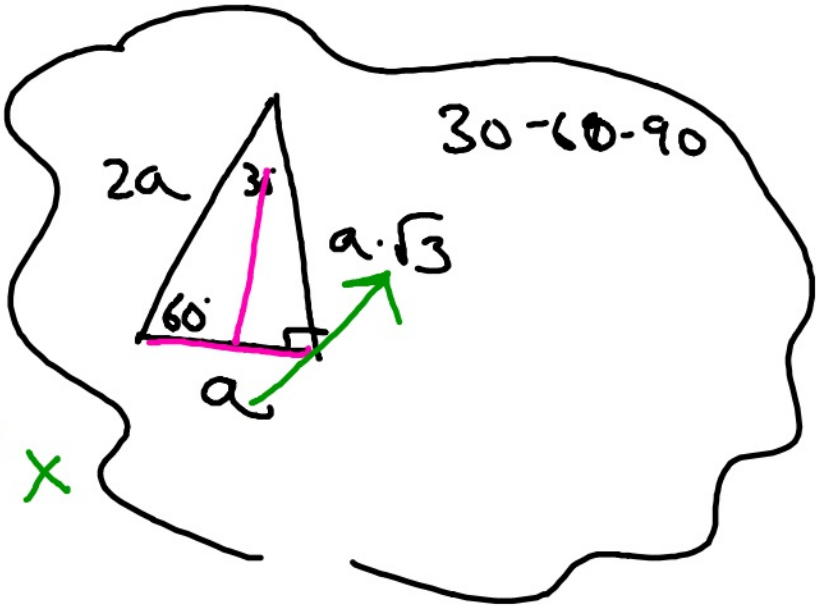
Eq. Δ's.



$A = \frac{1}{2} b \cdot h$

$= \frac{1}{2} x \cdot h$

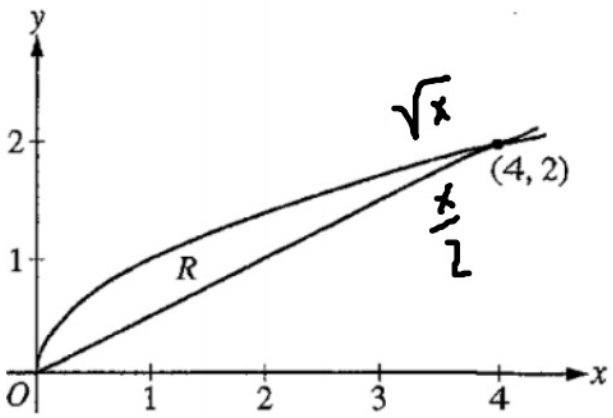
$\frac{1}{2} \cdot x \; \frac{\sqrt{3}}{2} x$



$A_{\Delta} = \frac{\sqrt{3}}{4} (x)^2$

$$V = \int_0^4 \frac{\sqrt{3}}{4} (\sqrt{x} - 1)^2 \, dx$$

Revisiting this:



Find volume of solid with base R and cross sections perpendicular to x-axis are

- Rectangles twice as tall as wide
- Isosceles triangles with a hypotenuse in R

What you should be able to do:

- disc method, x-axis
- disc method, y-axis
- washer method, either axis
- washer method, vert/horizontal line right/left/above/below region
- cross sectional volume

HW: rest of the handout from last class

#1c, 2, 4, 5c, 6c

Test: Thursday