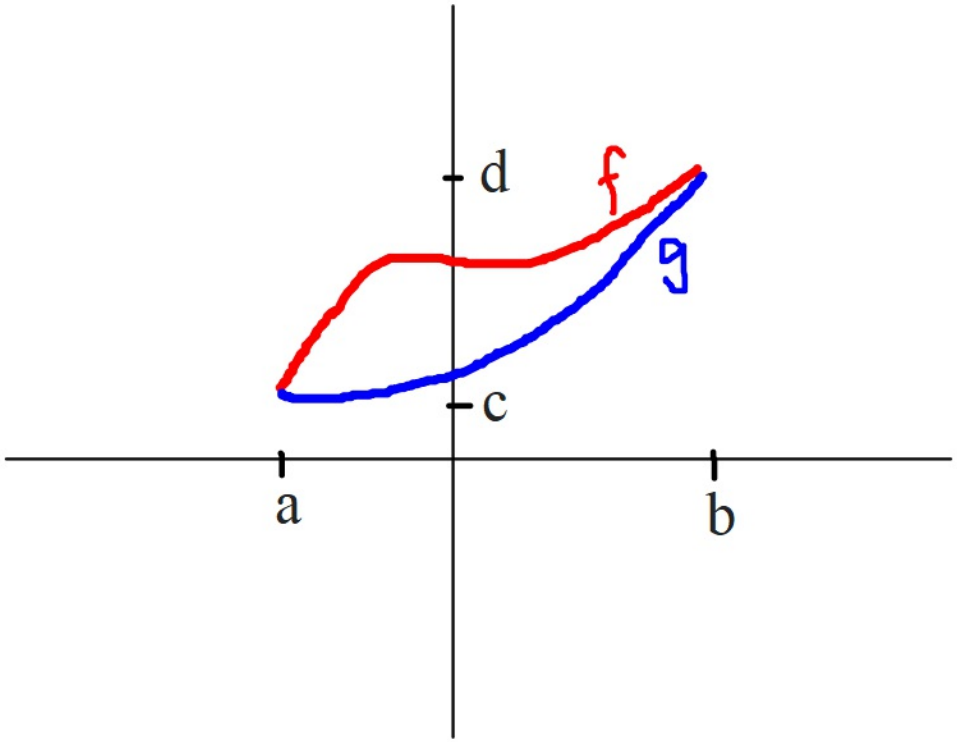
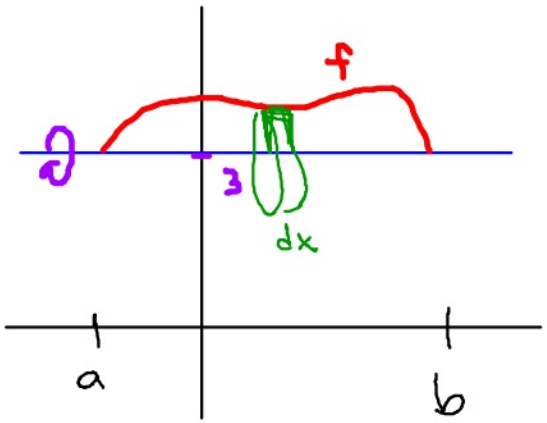
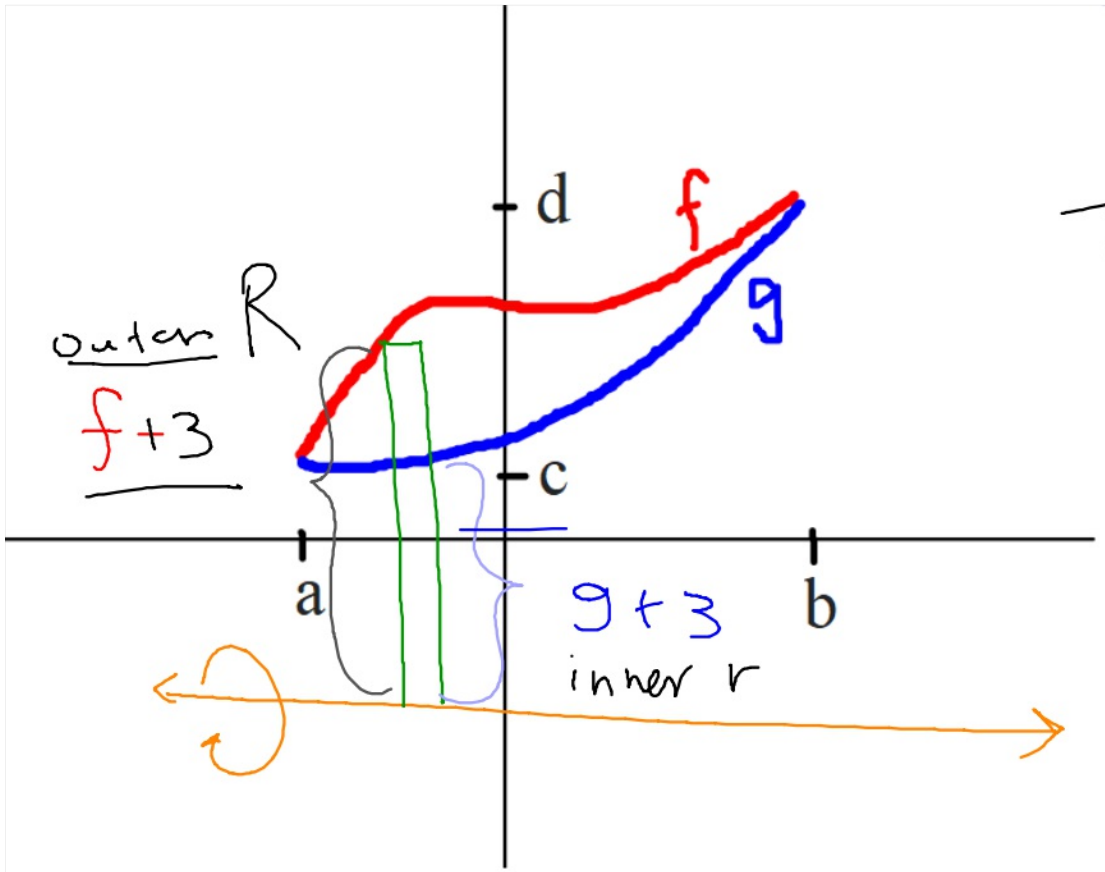
Calculus Mini Lesson: more volume examples





revolve about y=3

$$\pi \int_a^b \left(f(x)-3\right)^2 \, dx$$

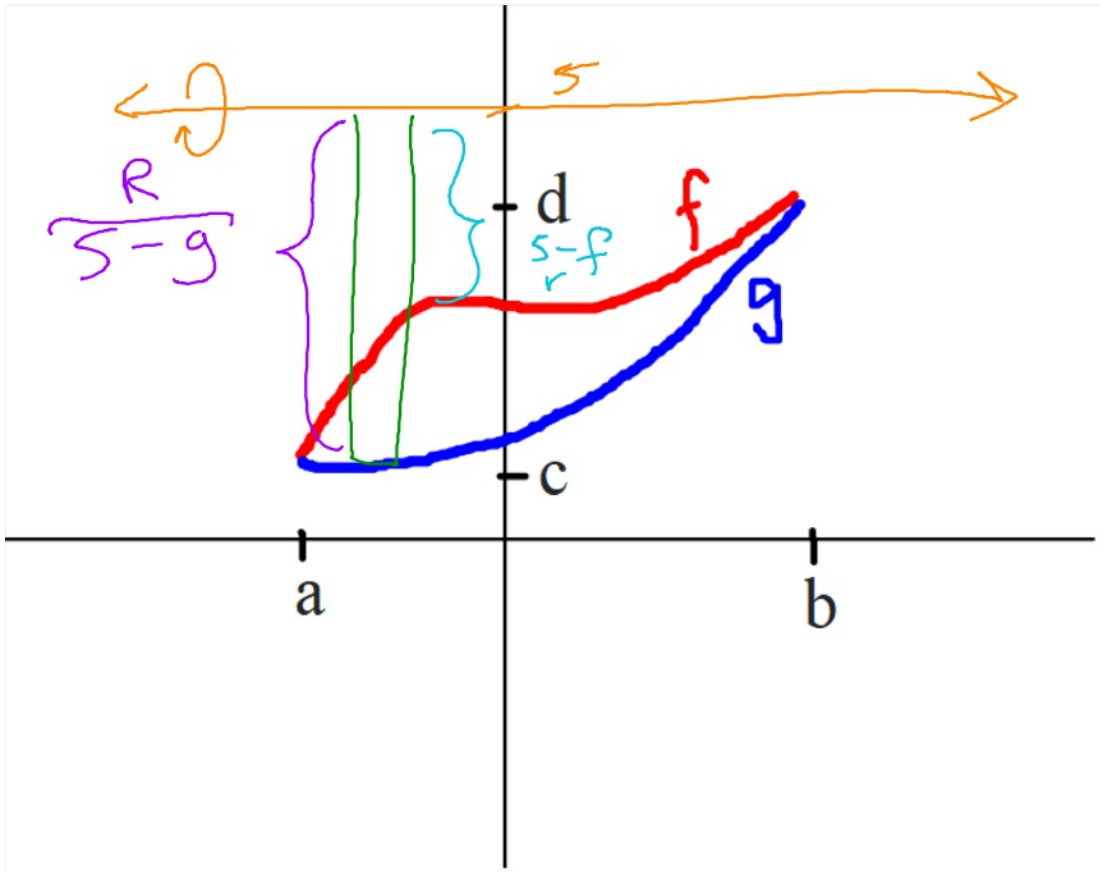


revolve about y = -3

$$\pi \int_a^b R^2 - r^2 \, dx$$

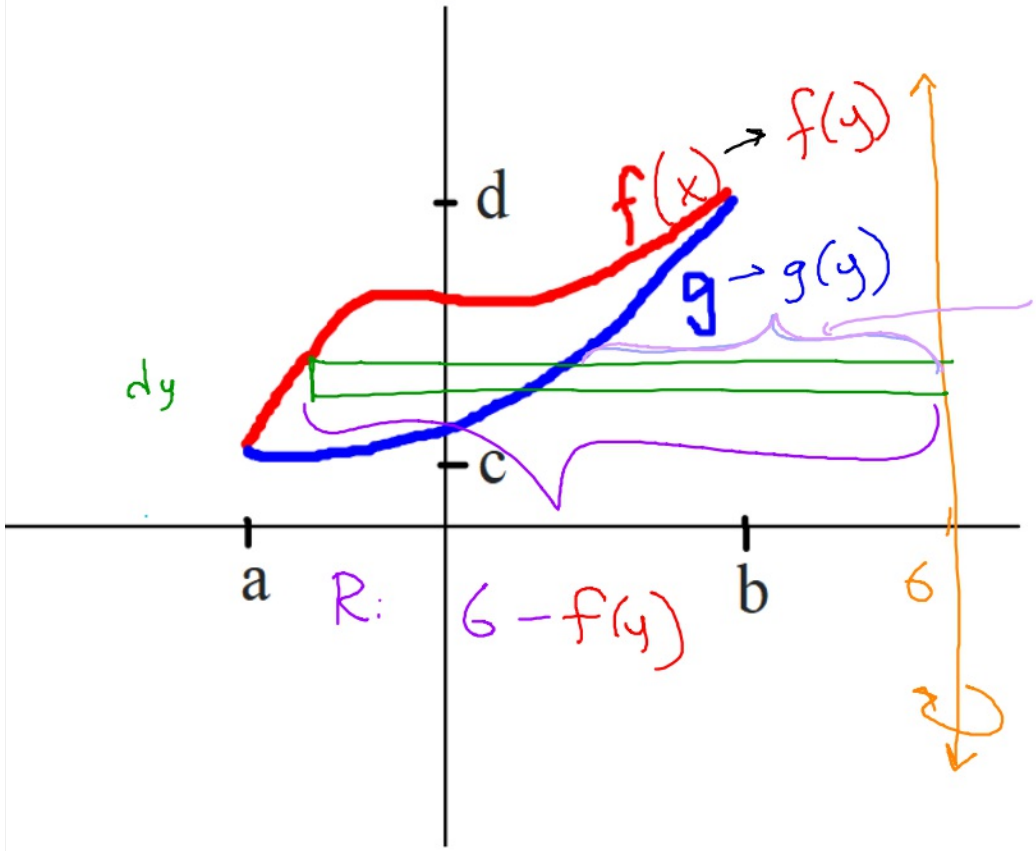
$$\pi \int_a^b (f+3)^2 - (g+3)^2 \, dx$$

math 9



revolve about y = 5

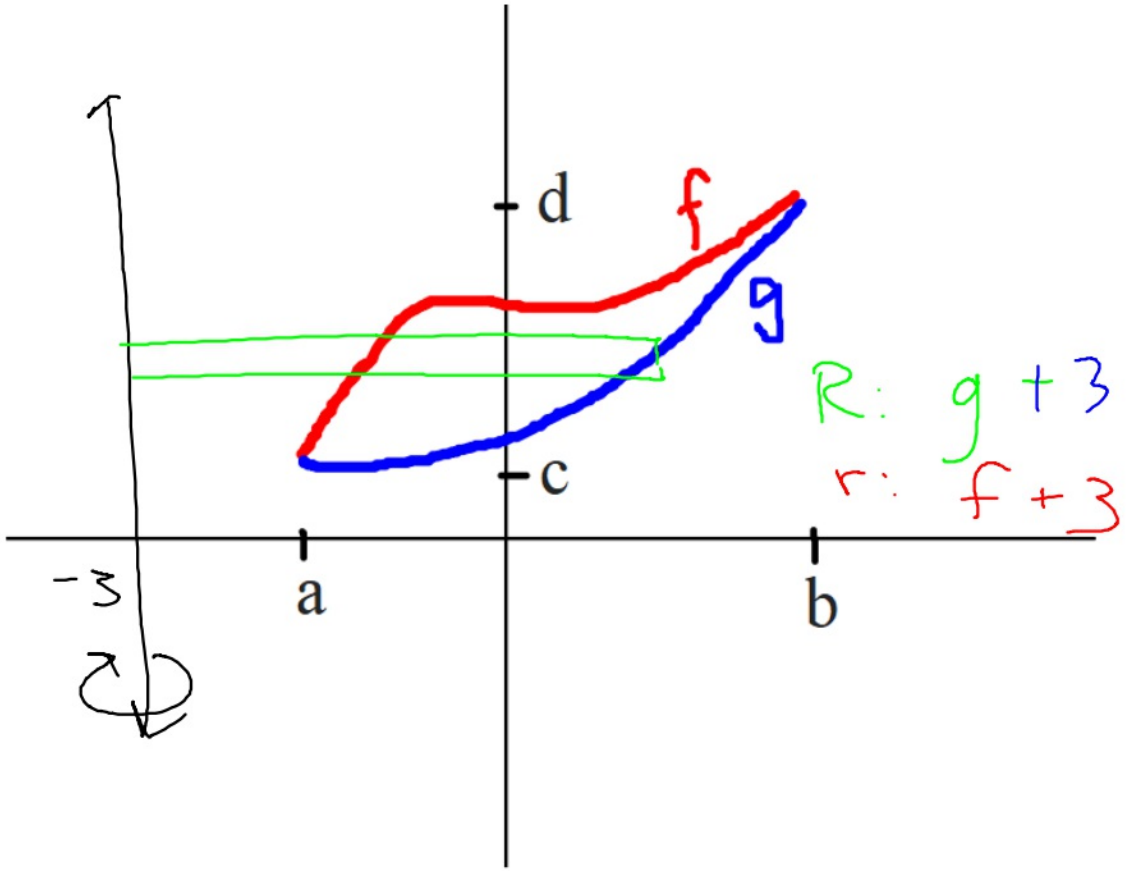
$$\pi \int_a^b (5-g)^2 - (5-f)^2 \, dx$$



revolve about x=6

$$V = \pi \int_c^d (6 - f(y))^2 - (6 - g(y))^2 \, dy$$

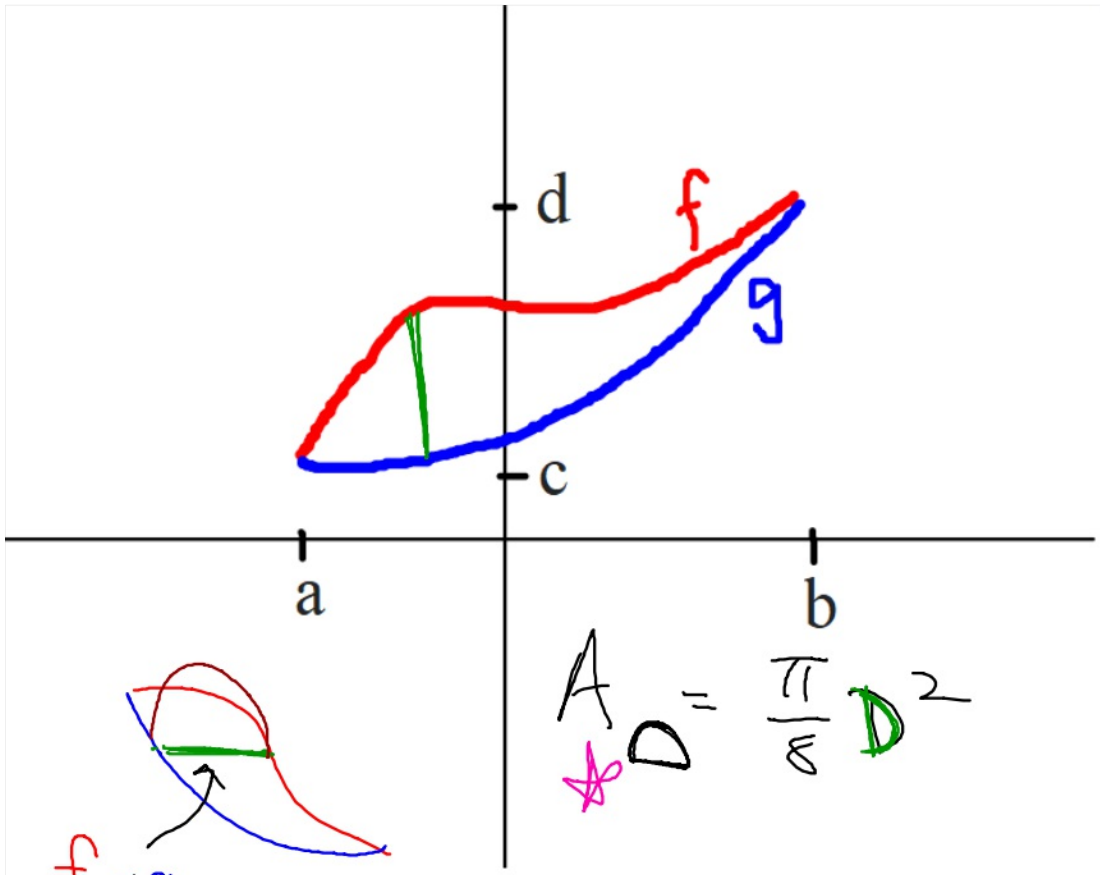
must make sure functions are solved for x!



revolve about x = -3

$$\pi \int_c^d (g+3)^2 - (f+3)^2 \, dy$$

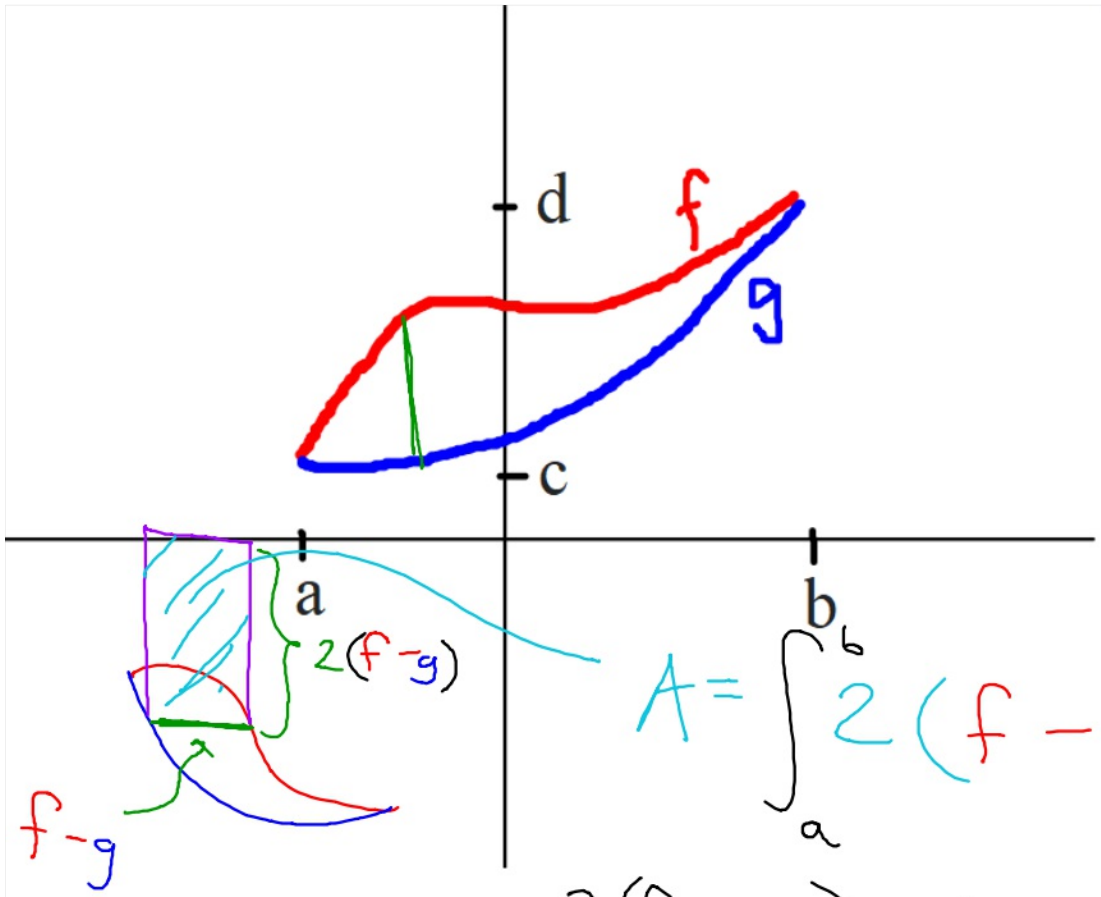
must make sure functions are solved for x!



$A_\Delta = \frac{\sqrt{3}}{4} D^2$

cross sections perpendicular to x-axis are semicircles

$$A = \int_a^b \frac{\pi}{8} (f - g)^2 \, dx$$



cross sections perpendicular to x-axis
are rectangles with height twice as tall as base

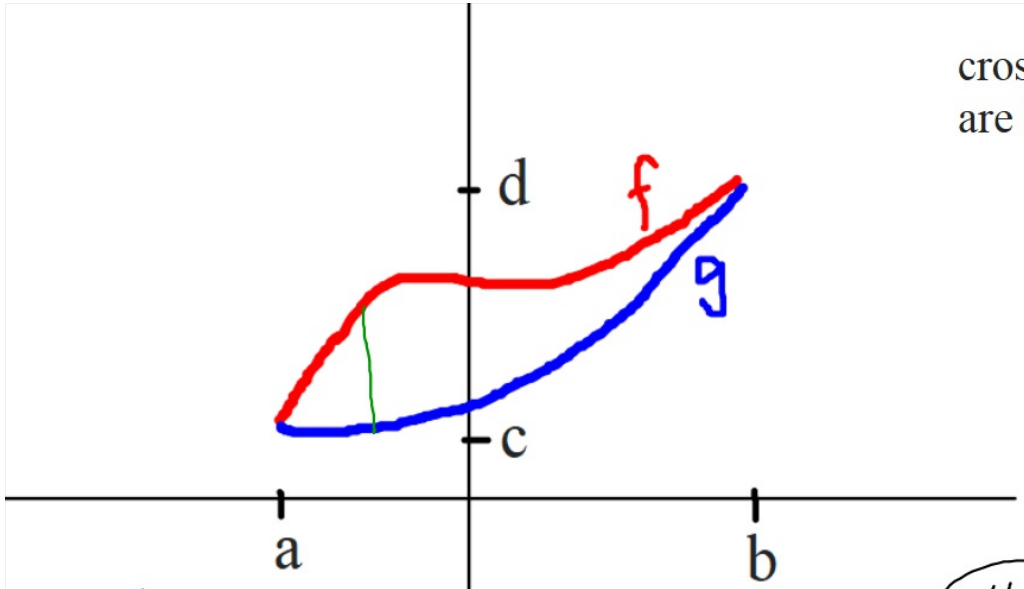
→ Semicl.
→ Eq. Δ *
→ Isos Δ
→ Sq.

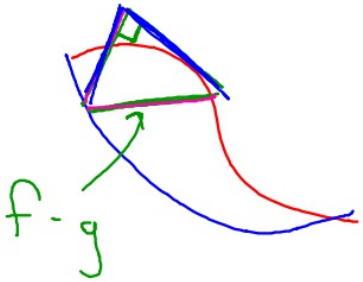
$$A = \int_a^b 2(f-g)^2 \, dx$$

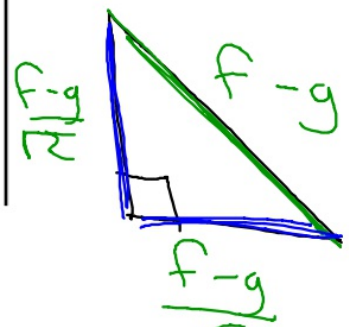
→ Rectangles (w/ Ratio)

$2(f-g)\cdot(f-g)$

cross sections perpendicular to x-axis
are isosceles triangles with a hypotenuse in the plane



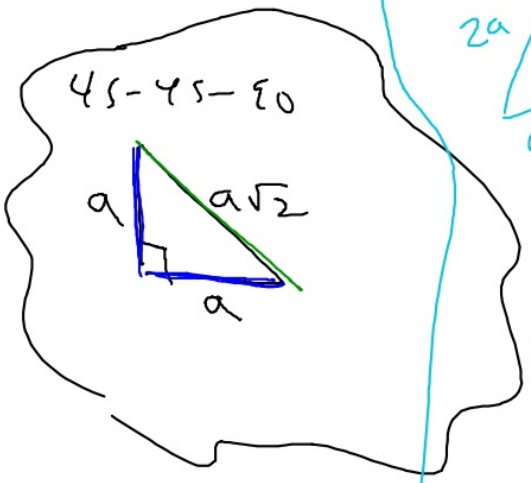


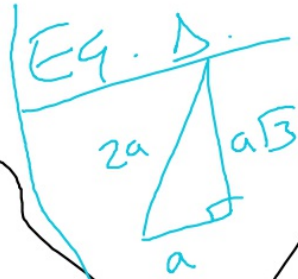


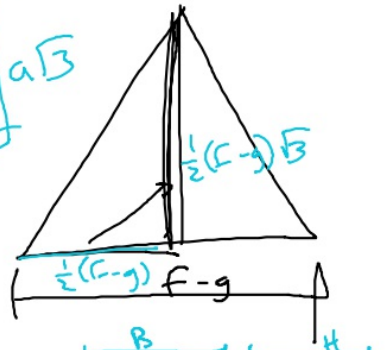
$$\therefore A_{\Delta} = \frac{1}{2}\,\frac{(f-g)}{\sqrt{2}}\cdot\frac{(f-g)}{\sqrt{2}}$$

$$\frac{1}{2}\,\frac{(f-g)^2}{2}$$

$$\rightarrow \int_a^b \frac{1}{4}(f-g)^2\,dx$$







$$A = \frac{1}{2}(f-g)\,\frac{1}{2}(f-g)\sqrt{3}$$

$$\frac{\sqrt{3}}{4}(f-g)^2$$

Use remaining time to work on the practice test

Note that #1 requires a calculator to integrate (sorry, oversight on my part)

After Thursday's test, we'll start our last topic: differential equations
Then it's AP test review!