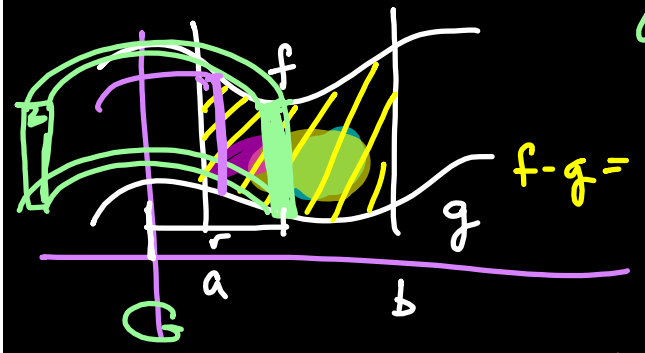
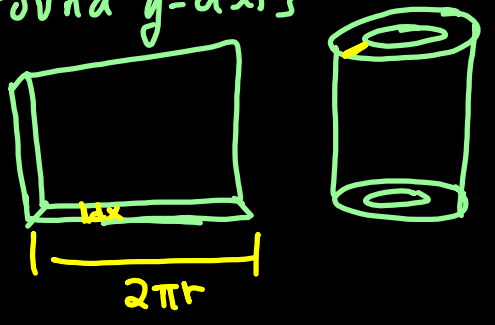
SHELL METHOD - Volume by Cylindrical Shells



around y-axis



$f - g = h$

Disk Method

$\pi \int_a^b (r_o^2 - r_i^2)\,dx$ Formula:

Rectangle is $\perp$ to axis of rev.

Shell

$2\pi r \cdot (f-g)\,dx$

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

Rectangle is $\parallel$ to axis of rev.

Rectangle is vertical

$y = x$'s

Rect. is horiz.

$x = y$'s

$y = x^3 \quad y = 1 \quad x = 2$

around y-axis

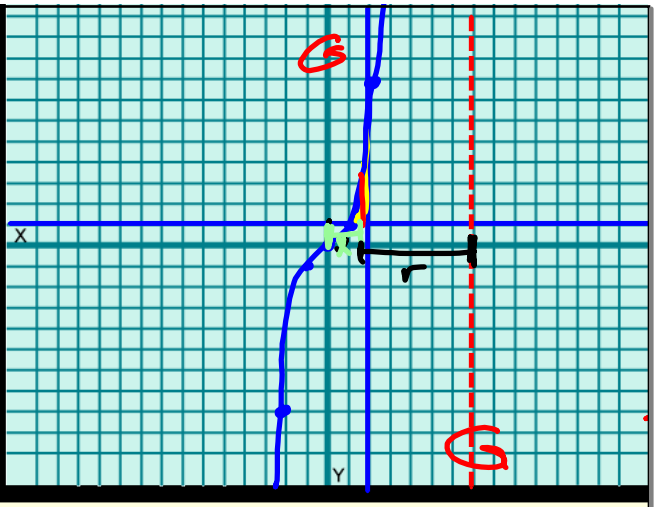
Rect. is vertical

$y = x^3 \quad y = 1$

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

$$2\pi \int_1^2 x\left(x^3-1\right)dx$$

$$= \frac{47}{5}\pi \text{ units}^3$$



Go around $x = 7$

$$2\pi \int_1^2 (7-x)\left(x^3-1\right)dx$$

R-L Top-Bottom

February 26, 2024

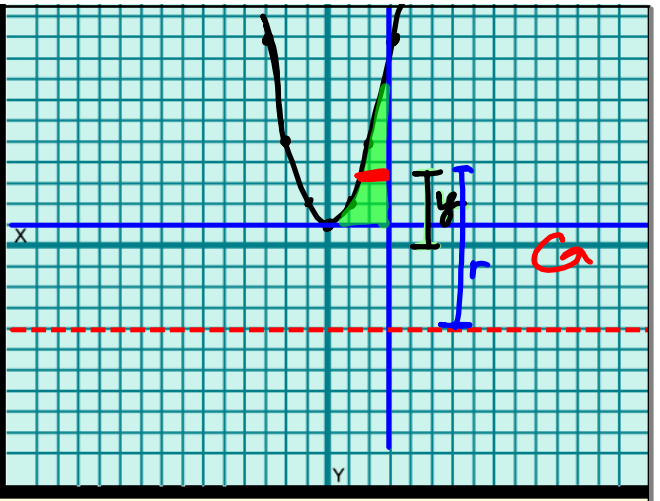
$y = x^2 + 1 \quad y = 1 \quad x = 3$

around x-axis

$\sqrt{y-1} = \sqrt{x^2}$

$\pm\sqrt{y-1} = x \qquad x = 3$

$$2\pi \int_1^{10} y\,(3 - \sqrt{y-1})\,dy$$



Around the line $y = -4$

$$2\pi \int_1^{10} (y-(-4))\,(3 - \sqrt{y-1})\,dy$$

T-B R-L