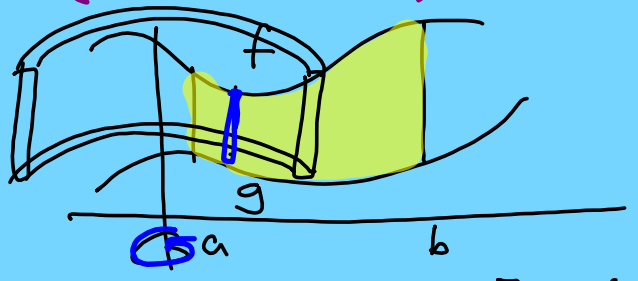
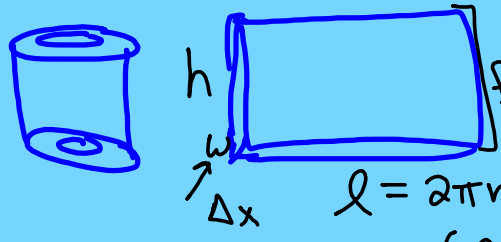
Volume By Cylindrical Shells

(Shell Method)





$V = \ell w h$

$\ell = 2\pi r$

$2\pi r \cdot (f-g) \cdot \Delta x$

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

Disk Method

$\pi \int_a^b [(r_o)^2 - (r_i)^2]\,dx$

[] is $\perp$ to axis of revolution

[] is vertical.
$y = x$'s
Top − Bottom

[] is horizontal.
$x = y$'s
R − L

Shell Method

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

[] is $\parallel$ to axis of revolution

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

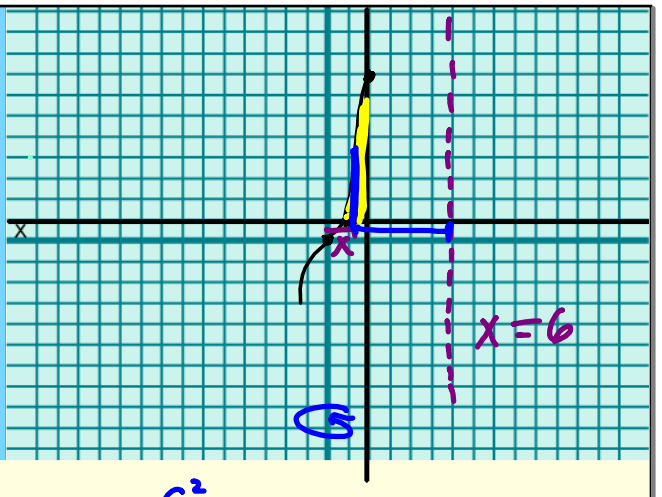
around y-axis.

0	0
1	1
2	8

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

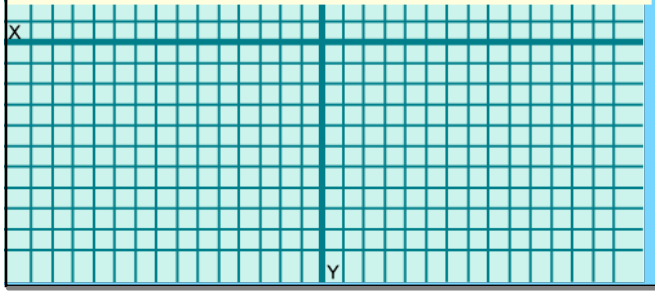
$$2\pi \int_1^2 x\,(x^3-1)\,dx$$

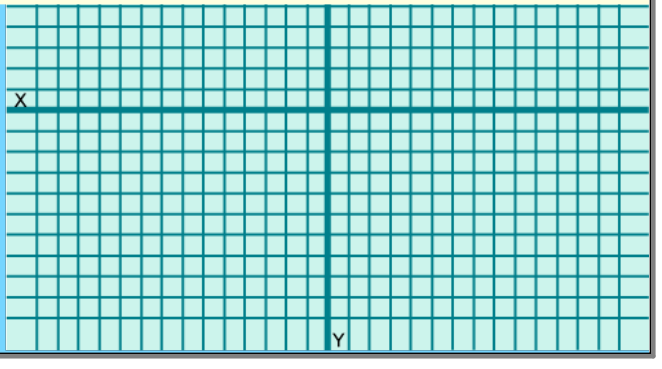
$$= \frac{47\pi}{5} \text{ units}^3$$



$$2\pi \int_1^2 (6-x)(x^3-1)\,dx$$

R-L T-B





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

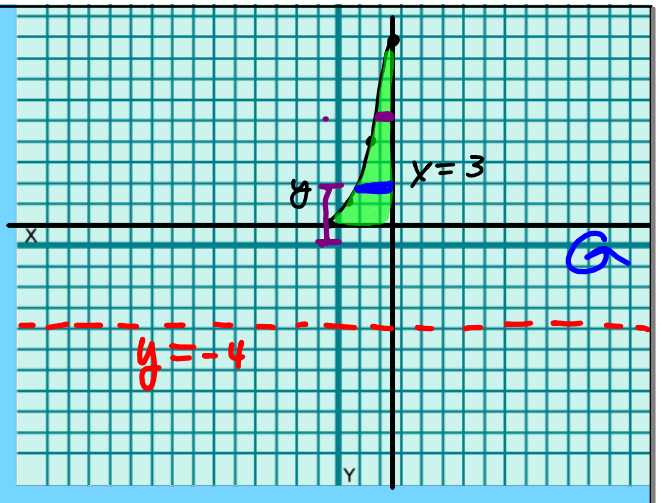
around x-axis

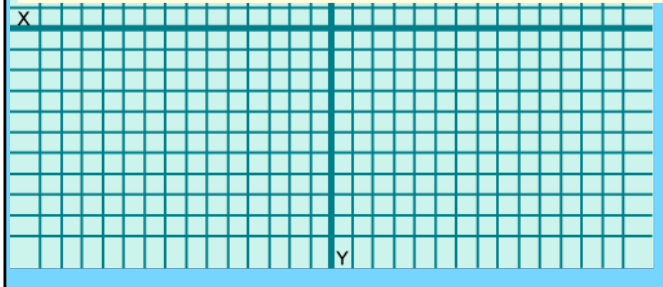
$\hookrightarrow \sqrt{x^2} = \pm\sqrt{y-1}$

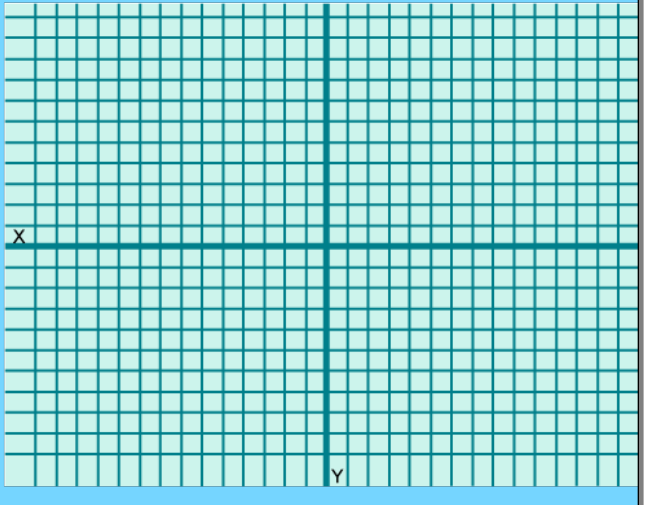
$x = \sqrt{y-1}$

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

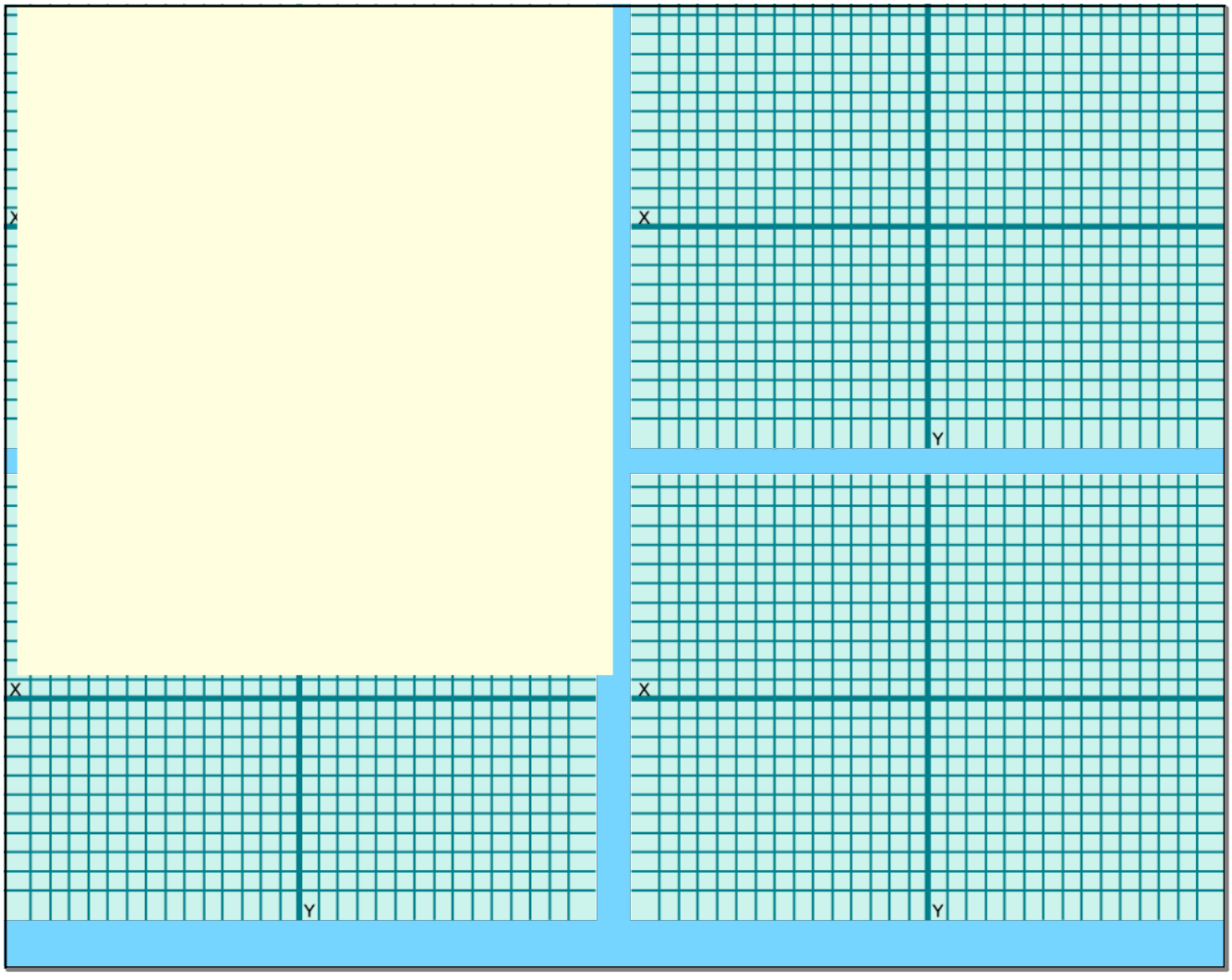
$2\pi \int_1^{10} (y+4)(3 - \sqrt{y-1})\,dy$







February 17, 2022



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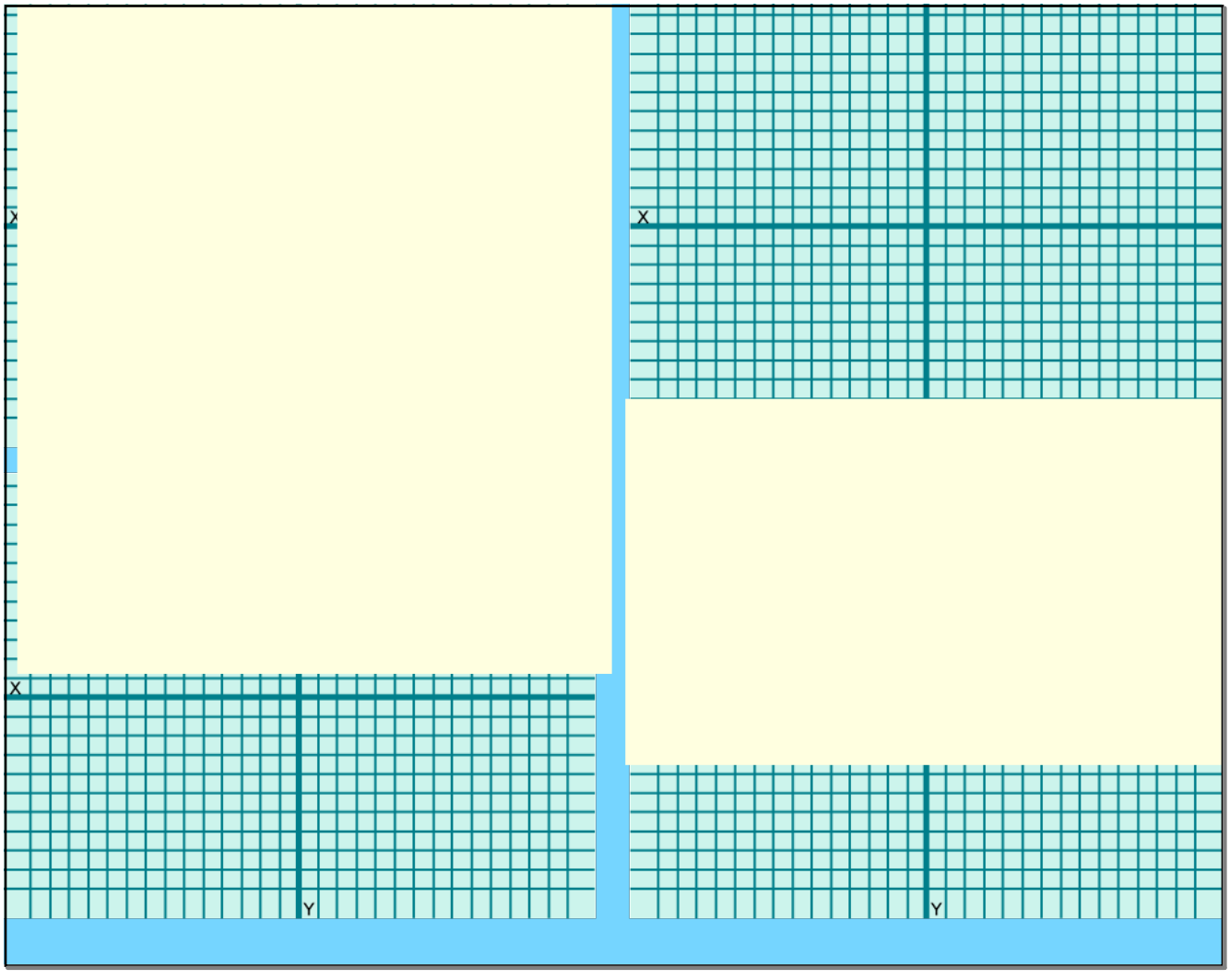

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