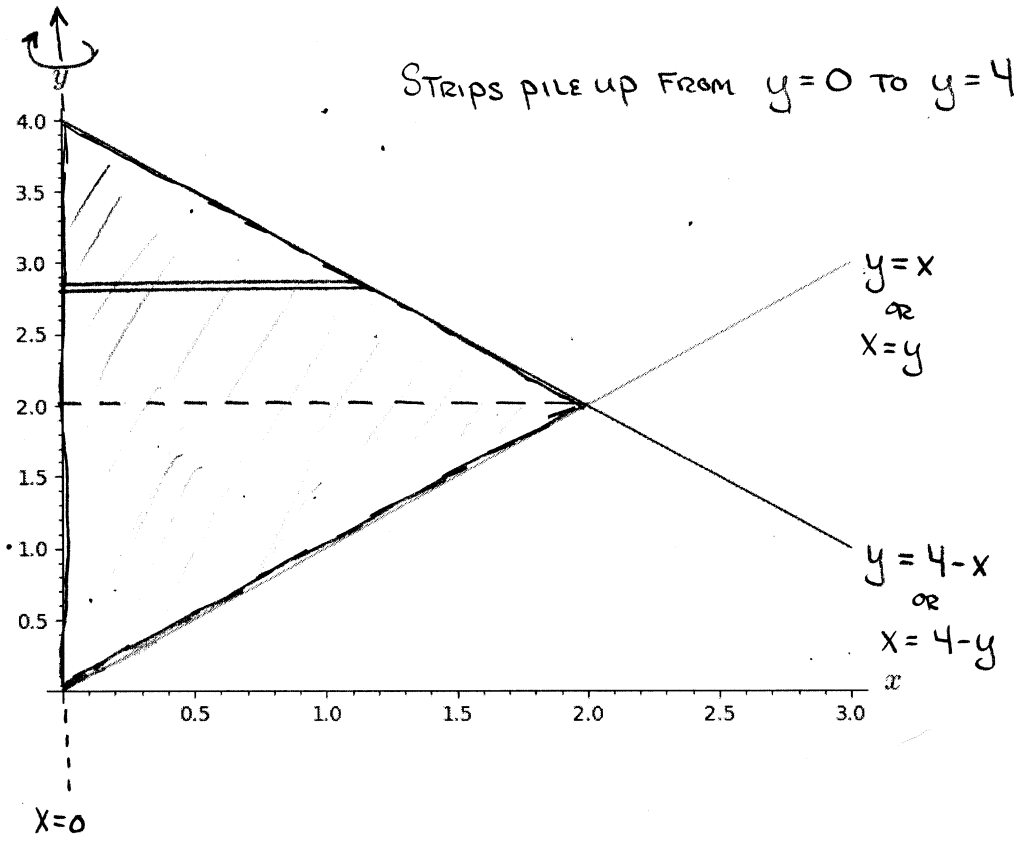
Example

The region bounded by the graphs of $y = 4 - x$, $y = x$, and $x = 0$ is rotated about the y-axis. Find the volume of the solid that is generated.

Solution



DISKS... WE NEED TO USE 2 INTEGRALS BECAUSE THE LEFT SIDE CURVE CHANGES AS WE MOVE THROUGH THE INTEGRATION REGION.

$$V = \pi \int_0^2 (y)^2 \, dy + \pi \int_2^4 (4-y)^2 \, dy$$

$$= \pi \int_0^2 y^2 \, dy + \pi \int_2^4 (16 - 8y - y^2) \, dy = \text{----}$$

$$= \frac{8}{3}\pi + \frac{8}{3}\pi = \boxed{\frac{16\pi}{3}}$$