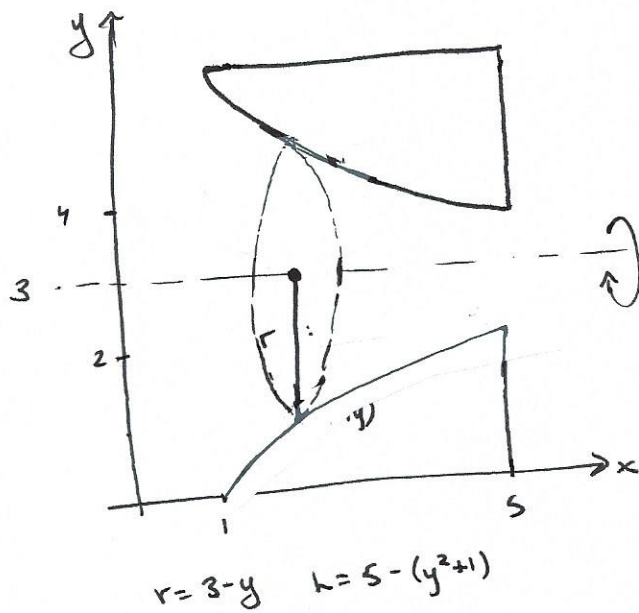


Ex $y = \sqrt{x-1}$, $y=0$, $x=5$
 rotate about line $y=3$

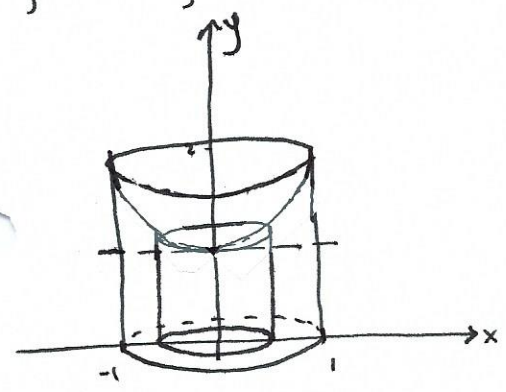
$$V = 2\pi \int_0^2 (3-y) [5-(y^2+1)] dy$$

$$= \dots = 24\pi$$



Ex. Use both disk and shell methods to find the volume of the solid

a) $y = x^2 + 1$, $y=0$, $x=1$, rotate about y axis.

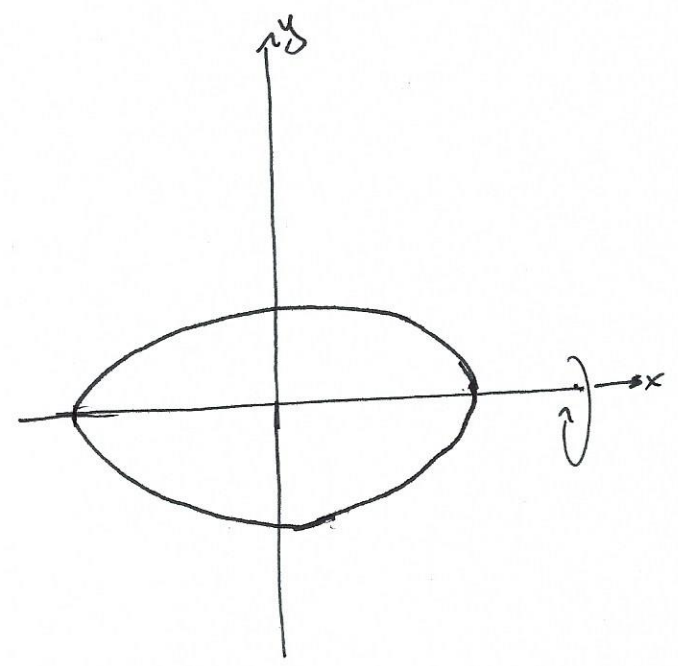


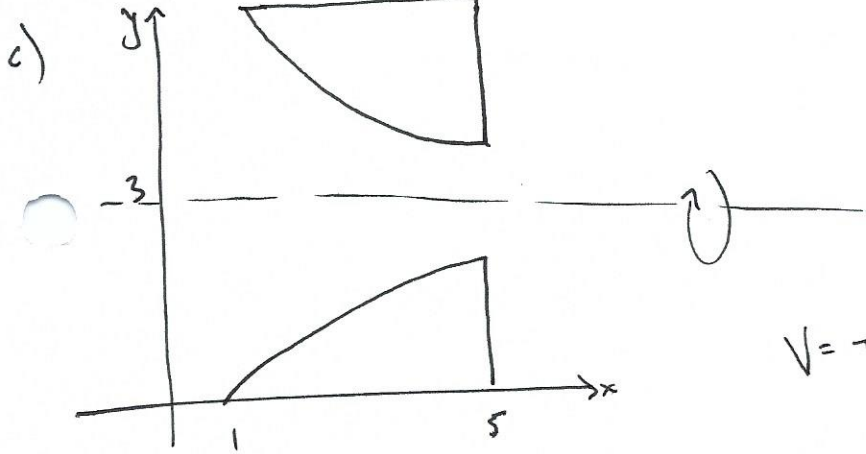
Shell: $V = 2\pi \int_0^1 x \cdot (x^2 + 1) \cdot dx = 2\pi \left[\frac{x^4}{4} + \frac{x^2}{2} \right]_0^1 = \frac{3\pi}{2}$

Disk: $V = \pi \int_0^1 (1)^2 dy + \pi \int_1^2 [(1)^2 - (\sqrt{y-1})^2] dy = \frac{3\pi}{2}$

b) $y = 1 - \frac{x^2}{16}$, $x = \pm \sqrt{16(1-y)}$

$$V = 2\pi \int_0^1 y \cdot 2\sqrt{16(1-y)} dy$$





$$V = \pi \int_1^5 \left[3^2 - (3 - \sqrt{x-1})^2 \right] dx$$