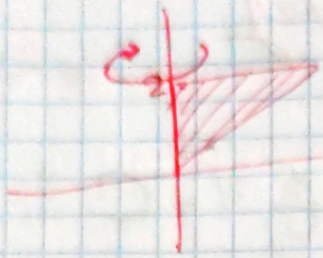
Extra 4

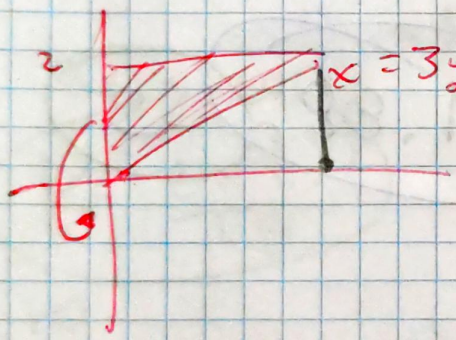
1.




$$= \int_0^2 \pi \left[\frac{3y}{2}\right]^2 dy = \pi \int_0^2 \frac{9y^2}{4}\, dy$$

$$= \frac{9}{4}\pi \left[\frac{y^3}{3}\Big|_0^2\right] = \frac{9}{4}\pi\left[\frac{8}{3}\right] = 6\pi$$

2.




$$x = \frac{3(2)}{2} = 3$$

$$x = \frac{3y}{2}$$

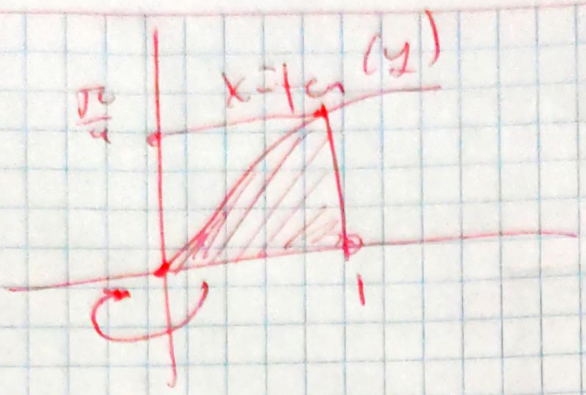
$$y = \frac{2}{3}x$$

$$V = \int_0^3 \pi\left[2^2 - \left(\frac{2}{3}x\right)^2\right] dx$$

$$= \pi \int_0^3 \left(4 - \frac{4}{9}x^2\right) dx = \frac{32}{9}\pi \int_0^3 x^2\, dx = \frac{32}{9}\pi\left[\frac{x^3}{3}\Big|_0^3\right]$$

$$= \frac{32}{9}\pi\,[9] = 32\pi$$

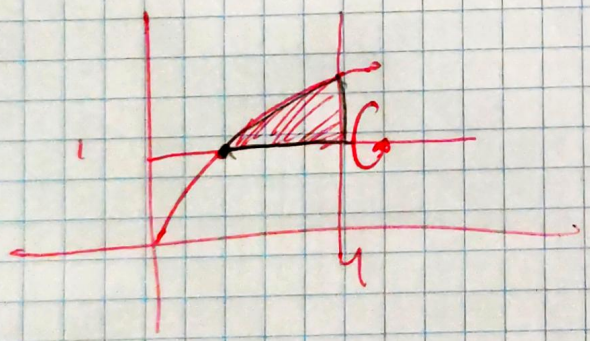
$$= \pi\left[4x - \frac{4}{27}x^3\Big|_0^3\right] = \pi\left[12 - 4\cdot\frac{27}{27}\right] = 8\pi$$




$$V=\int_0^{\frac{\pi}{4}} \pi\left[1+\tan^2(y)\right]dy$$

$$=\pi\int_0^{\frac{\pi}{4}} 2+\sec^2 y\,dy = \pi\left[2y-\tan y\Big|_0^{\frac{\pi}{4}}\right]$$

$$=\pi\left[2\frac{\pi}{4}-1\right]=\frac{\pi^2}{2}-\pi\approx 1.79$$



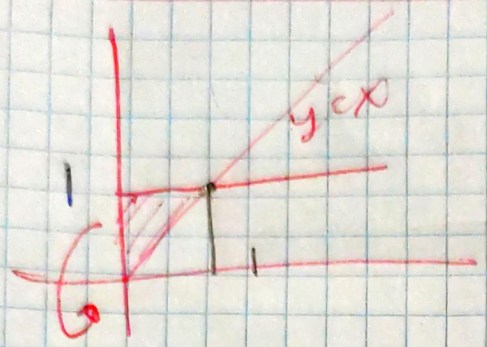

$$\sqrt{x}=1 \Rightarrow x=1$$

$$V=\int_1^4 \pi\left[\sqrt{x}-1\right]^2 dx = \pi\int_1^4 (x-2\sqrt{x}+1)\,dx$$

$$=\pi\left[\frac{x^2}{2}-\frac{4}{3}x^{3/2}+x\Big|_1^4\right]$$

$$\pi\left[8-\frac{32}{3}+4-\frac{1}{2}+\frac{4}{3}-1\right]=\frac{7}{6}\pi$$

5.




$$V = \int_0^1 \pi \left[1 - x^2\right] dx$$

$$= \pi \left[ x - \frac{x^3}{3} \Big|_0^1 \right] = \pi \left[\frac{2}{3}\right] = \frac{2}{3}\pi \approx 2.09$$