

XIV d $\int_{-2}^2 dy \int_0^{\sqrt{4-y^2}} (x^3 + y^3) dx =$

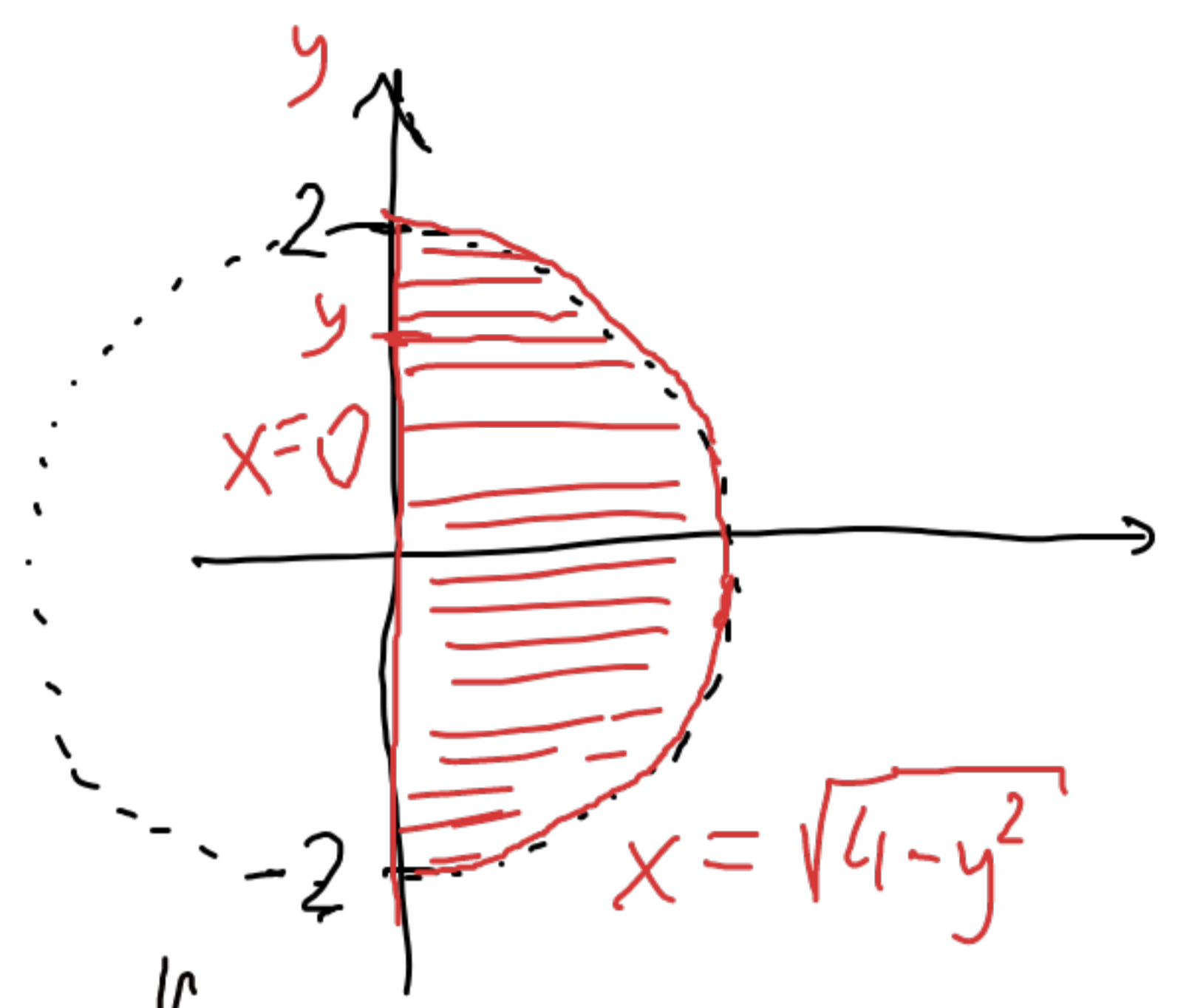
$$= \int_{-2}^2 dy \left(\frac{x^4}{4} + y^3 x \right) \Big|_{x=0}^{x=\sqrt{4-y^2}} =$$

$$= \int_{-2}^2 \left(\frac{(4-y^2)^2}{4} + \sqrt{4-y^2} \cdot y^3 - 0 \right) dy =$$

$$= \frac{1}{4} \int_{-2}^2 (16 - 8y^2 + y^4) dy + \int_{-2}^2 \sqrt{4-y^2} y^3 dy = \begin{cases} t = 4 - y^2 \\ dt = -2y dy \\ y^2 = 4 - t \end{cases}$$

$$= \frac{1}{4} \left(16y - \frac{8}{3}y^3 + \frac{y^5}{5} \right) \Big|_{-2}^2 + \int_{-2}^2 \sqrt{4-y^2} \cdot \frac{-y^2}{2} (-2y) dy =$$

$$= \frac{1}{4} \left(32 - \frac{8}{3} \cdot 8 + \frac{32}{5} - \left(-32 - \frac{8}{3} \cdot (-8) + \frac{(-32)}{5} \right) \right) + \int_0^0 \sqrt{t} \frac{-(4-t)}{2} dt = 0$$



$$\rightarrow \boxed{x = \sqrt{4-y^2}} \Big| ^2$$

$$x^2 = 4 - y^2$$

$$\rightarrow \boxed{x^2 + y^2 = 2^2}$$

