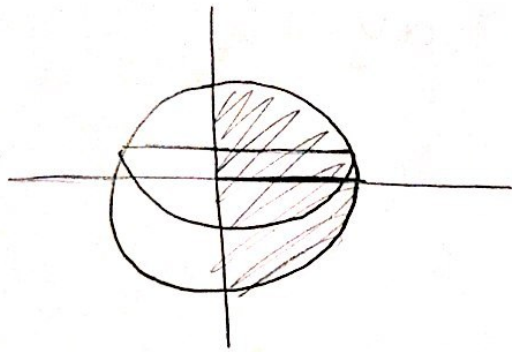


a) Volume of solid whose base is $x^2 + y^2 = 1$ enclosed by circle and cross sections \perp to base are semicircles. *



$$A = \frac{1}{2} \pi r^2$$

$$x^2 = 1 - y^2$$

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

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

$$A = \frac{1}{2} \pi (\sqrt{1 - y^2})^2 dy$$

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

$$= \pi \int_0^1 (1 - y^2) dy = \pi \left(y - \frac{y^3}{3} \Big|_0^1 \right)$$

$$= \pi \left(1 - \frac{1}{3} \right) = \frac{2\pi}{3}$$

$$\frac{\frac{4}{3} \pi (1)^3}{2}$$