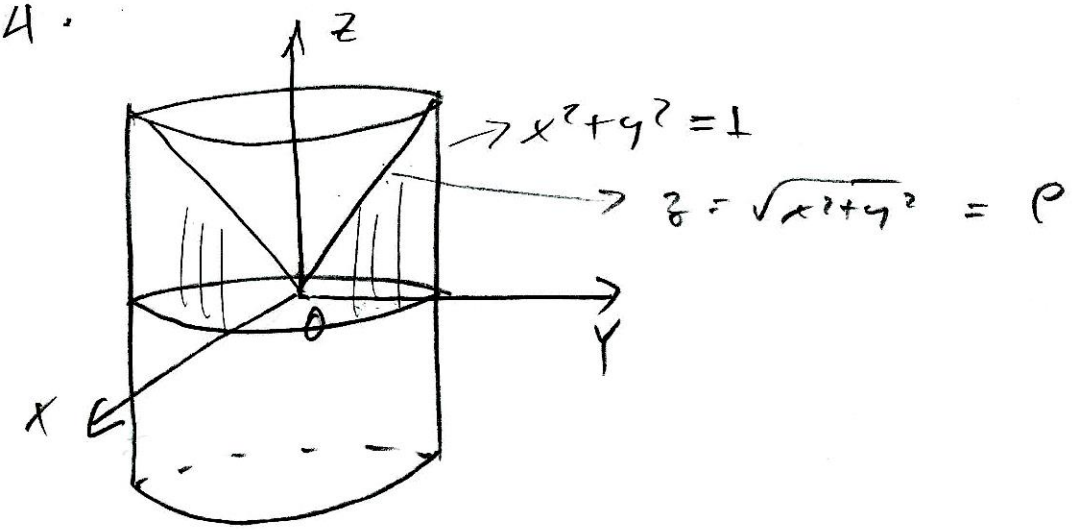
4.



$$\Omega: \begin{cases} 0 \le z \le \rho \\ 0 \le \rho \le 1 \\ 0 \le \theta \le 2\pi \end{cases}$$ 0.5점 / 0.2점

$$V = \int_{\theta=0}^{2\pi} \int_{\rho=0}^{1} \int_{z=0}^{\rho} 1 \; \rho \, dz \, d\rho \, d\theta$$

$$= \int_{\theta=0}^{2\pi} \int_{\rho=0}^{1} \left(\int_{z=0}^{\rho} \rho \, dz \right) d\rho \, d\theta$$

$$= \int_{\theta=0}^{2\pi} \int_{\rho=0}^{1} \rho z \Big|_{z=0}^{\rho} \, d\rho \, d\theta$$

$$= \int_{\theta=0}^{2\pi} \int_{\rho=0}^{1} \rho^2 \, d\rho \, d\theta$$

$$= \int_{\theta=0}^{2\pi} \frac{\rho^3}{3} \Big|_{\rho=0}^{1} d\theta = \int_{\theta=0}^{2\pi} \frac{1}{3} d\theta = \frac{1}{3}\theta \Big|_{\theta=0}^{2\pi}$$

$$= 2\pi/3$$ 0.7점