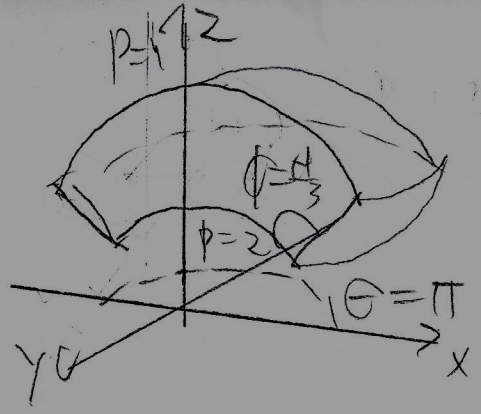
(13) $\rho \in [2,4] \quad \phi \in [0, \frac{\pi}{3}] \quad \theta \in [0, \pi]$



(15) $z = \sqrt{x^2+y^2} \qquad x^2+y^2+z^2 = z$

$x^2+y^2+z^2 = z$

$\rho^2\sin^2\phi + \rho^2\cos^2\phi = \rho\cos\phi$

$\rho^2 = \rho\cos\phi$

$\rho = \cos\phi$

$z = \sqrt{x^2+y^2}$

$\rho\cos\phi = \sqrt{\rho^2\sin^2\phi(1)}$

$\rho\cos\phi = \rho\sin\phi$

$1 = \tan\phi$

$\phi = \frac{\pi}{4}$

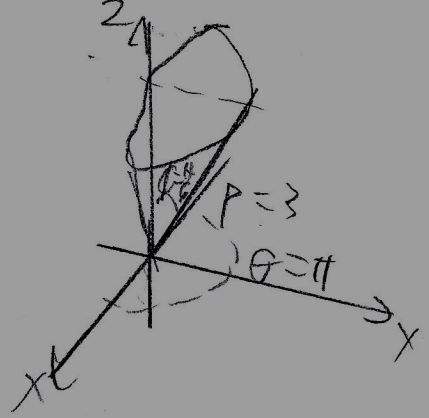
$\rho = \frac{\sqrt{2}}{2}$

$$\boxed{\phi \in [0, \tfrac{\pi}{4}] \quad \rho \in [0, \cos\phi]}$$

(17) $$\int_0^{\frac{\pi}{6}} \int_0^{\frac{\pi}{2}} \int_0^3 \rho^2 \sin\phi \, d\rho \, d\theta \, d\phi = \int_0^{\frac{\pi}{6}} \sin\phi \, d\phi \int_0^{\frac{\pi}{2}} d\theta \int_0^3 \rho^2 \, d\rho$$

$$= \left(-\cos\phi\right]_0^{\frac{\pi}{6}}\left)\left(\frac{\pi}{2}\right)\left(\frac{27}{3}-0\right) = \frac{9\pi}{2}\left(1-\cos\left(\frac{\pi}{6}\right)\right) = \frac{9\pi}{2}\left(1-\frac{\sqrt{3}}{2}\right)$$

$$= \boxed{\frac{9\pi}{4}\left(2-\sqrt{3}\right)}$$



$\phi \in [0, \frac{\pi}{6}] \quad \theta \in [0, \frac{\pi}{2}] \quad \rho \in [0, 3]$