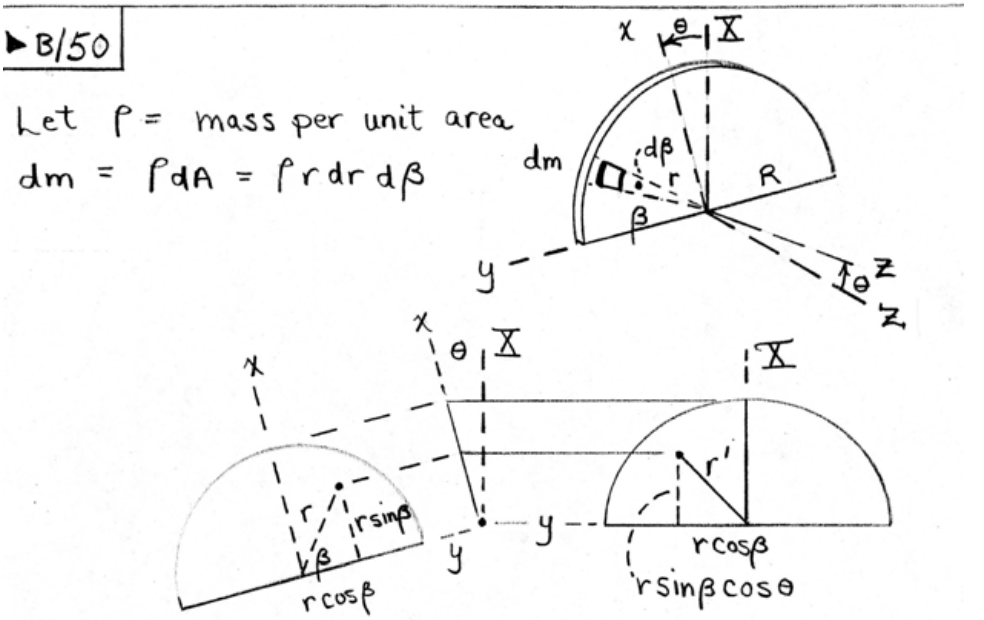
▶B/50



Let ρ = mass per unit area

$dm = \rho dA = \rho r\, dr\, d\beta$

r' = distance from dm to Z-axis.

$$r'^2 = r^2(\cos^2\theta \sin^2\beta + \cos^2\beta)$$

$$dI_{ZZ} = r'^2\, dm = \rho r^3(\cos^2\theta \sin^2\beta + \cos^2\beta)\, dr\, d\beta$$

$$I_{ZZ} = \rho \frac{R^4}{4} \int_0^{\pi} (\cos^2\theta \sin^2\beta + \cos^2\beta)\, d\beta$$

$$= \rho \frac{R^4}{4} \left[\frac{\pi}{2}(1+\cos^2\theta)\right] \cdot \frac{m}{\rho \pi R^2/2}$$

$$= \underline{\frac{1}{4} mR^2 (1+\cos^2\theta)}$$