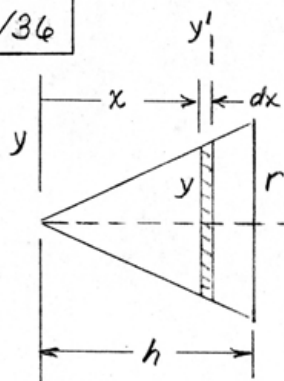


B/36



$$y = \frac{r}{h} x;$$

$$dI_{xx} = \frac{1}{2} dm (y^2) = \frac{1}{2} (\pi y^2 \rho dx) y^2$$

$$= \frac{\pi}{2} \rho \frac{r^4}{h^4} x^4 dx$$

$$I_{xx} = \frac{\pi}{2} \rho \frac{r^4}{h^4} \int_0^h x^4 dx$$

$$= \frac{\pi}{10} \rho \frac{r^4}{h^4} h^5 = \frac{\pi}{10} \rho h r^4$$

$$\text{But } m = \frac{1}{3} \pi r^2 h \text{ so } I_{xx} = \frac{3}{10} m r^2$$

$$dI_{yy} = dI_{y'y'} + x^2 dm = \frac{1}{4} dm y^2 + x^2 dm = \left( \frac{y^2}{4} + x^2 \right) dm$$

$$= \left( \frac{1}{4} \frac{r^2}{h^2} + 1 \right) x^2 \rho \pi y^2 dx = \left( \frac{r^2}{4h^2} + 1 \right) \rho \pi \frac{r^2}{h^2} x^4 dx$$

$$I_{yy} = \frac{\rho \pi r^2}{h^2} \left( \frac{r^2}{4h^2} + 1 \right) \int_0^h x^4 dx = \frac{\rho \pi r^2 h^3}{5} \left( \frac{r^2}{4h^2} + 1 \right)$$

$$I_{yy} = \frac{3}{5} m \left( \frac{r^2}{4} + h^2 \right)$$