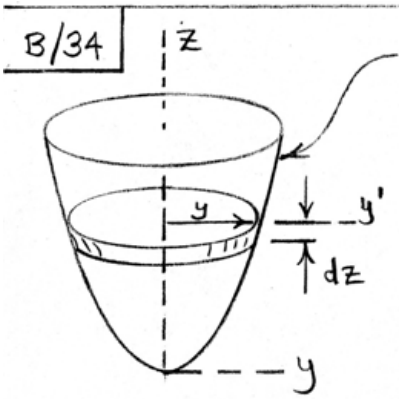
B/34



$$z = \frac{h}{r^2} y^2$$

$$dm = \rho \pi y^2 dz$$

$$dI_{yy} = dI_{y'y'} + dm z^2$$

$$= \frac{1}{4} dm y^2 + dm z^2$$

$$= dm \left(\frac{1}{4} \frac{r^2}{h} z + z^2 \right)$$

$$= \rho \pi \frac{r^2}{h} z \, dz \left(\frac{1}{4} \frac{r^2}{h} z + z^2 \right)$$

$$= \rho \pi \frac{r^2}{h} \left(\frac{1}{4} \frac{r^2}{h} z^2 + z^3 \right) dz$$

$$I_{yy} = \int dI_{yy} = \rho \pi \frac{r^2}{h} \int_0^h \left(\frac{1}{4} \frac{r^2}{h} z^2 + z^3 \right) dz$$

$$= \frac{\rho \pi r^2 h}{4} \left(\frac{r^2}{3} + h^2 \right)$$

From solution to Prob. B/33, $m = \frac{1}{2} \rho \pi r^2 h$

So $$I_{yy} = \frac{\rho \pi r^2 h}{4} \left(\frac{r^2}{3} + h^2 \right) \left(\frac{m}{\frac{1}{2} \rho \pi r^2 h} \right)$$

$$= \underline{\frac{1}{2} m \left(h^2 + \frac{r^2}{3} \right)}$$