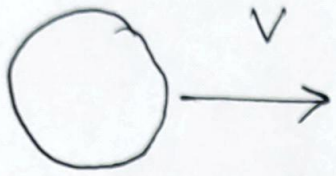
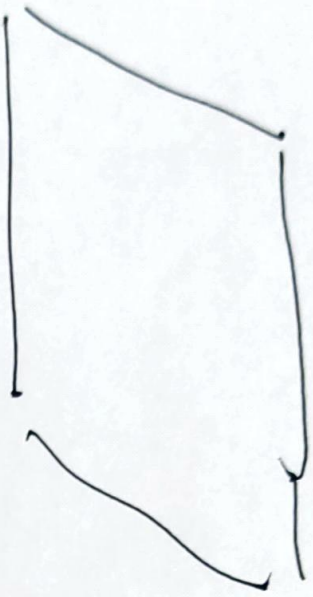
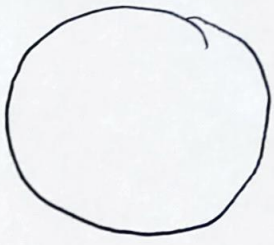




$\tau(v) - ?$



$$[E] = \frac{g\,cm}{sec^2}\,\frac{1}{cm^2} = \frac{g}{cm\,sec^2}$$

$$[\rho] = \frac{g}{cm^3}$$

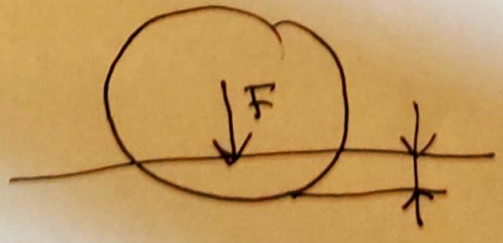
$$\left[E/\rho\right] = \frac{g}{cm\,sec^2}\cdot\frac{cm^3}{g} = \left(\frac{cm}{sec}\right)^2$$

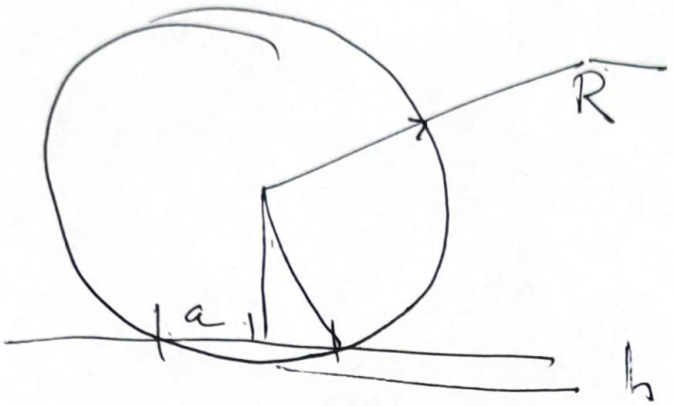
$$S \propto \sqrt{\frac{E}{\rho}}$$

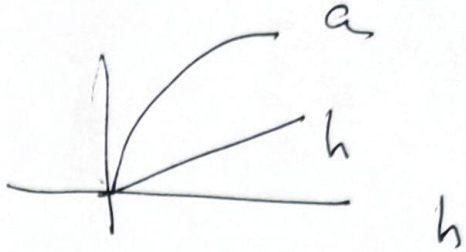
$S \sim 10^5 \frac{cm}{sec} =$

$= 10^3 \frac{m}{sec}$

$V \ll S$





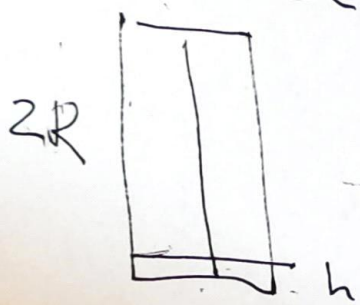


$h \ll R$

$a^2 = R^2 - (R-h)^2 = \cancel{R^2} - \cancel{R^2} + 2Rh - \cancel{h^2}$

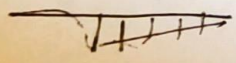
$a \propto \sqrt{Rh}$

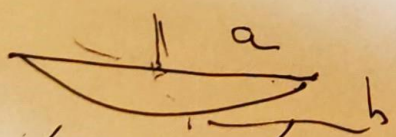
$\underline{a >> h}$



$\frac{h}{\cancel{2R}} \backsim \frac{F}{a^2 E} = \frac{F}{\cancel{2R}hE}$

$h \propto \sqrt{\frac{F}{E}}$





$\frac{\cancel{h}}{\cancel{R}} = \frac{\cancel{h}}{\cancel{\sqrt{Rh}}} = \frac{h}{a} = \frac{F}{Ea^2} = \frac{F}{E(Rh)^{1/2}}$

$h^{3/2} \backsim \frac{F}{ER^{1/2}} \frac{R^{3/2}}{R^{3/2}} =$

$R^{3/2} \frac{F}{ER^2}$

$$h = R\left(\frac{F}{ER^2}\right)^{2/3}$$

$$\mathcal{E}(h) = \int_0^h F(x)\,dx$$

$$\frac{h}{R} = \left(\frac{F}{ER^2}\right)^{2/3} \rightarrow \underline{F = ER^2\left(\frac{h}{R}\right)^{3/2}}$$

$$F(x) = ER^2\left(\frac{x}{R}\right)^{3/2}$$

$$\mathcal{E} = \frac{ER^2}{R^{3/2}} \int_0^h dx\, x^{3/2} =$$

$$= \frac{ER^2}{R^{3/2}} \cdot \frac{h^{5/2}}{R} R =$$

$$= ER^3\left(\frac{h}{R}\right)^{5/2}$$

$$\frac{M \cdot v^2}{2} = ER^3\left(\frac{h_v}{R}\right)^{5/2}$$

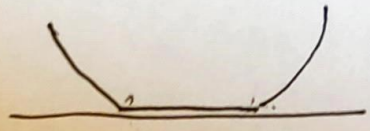
$$M = \frac{4\pi}{3} R^3 \rho \qquad R^3 \rho v^2 = ER^3\left(\frac{h_v}{R}\right)^{5/2}$$

$$\left(\frac{v}{s}\right)^2 \sim \left(\frac{h_v}{R}\right)^{5/2} \qquad \underline{h_v = R\left(\frac{v}{s}\right)^{4/5}}$$

$$\frac{h_v}{v} \sim \tau$$

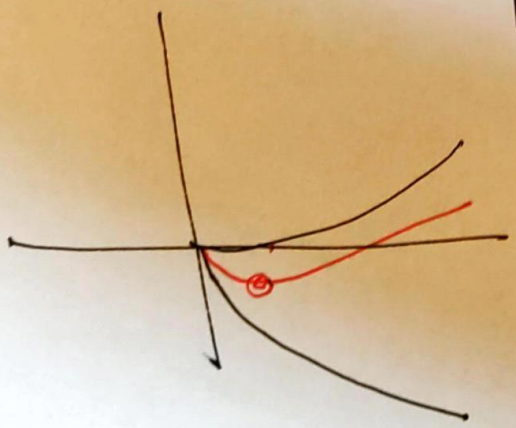
$$\tau \sim \frac{R}{v^{1/5} s^{4/5}} \sim \left(\frac{R}{s}\right)\left(\frac{s}{v}\right)^{1/5}$$

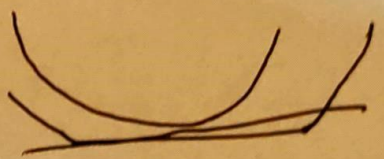
$$\boxed{T \sim \left(\frac{R}{s}\right)\left(\frac{s}{v}\right)^{1/5}}$$

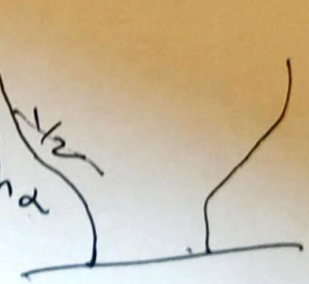


$$\mathcal{E} = ER^3\left(\frac{h}{R}\right)^{5/2} - \alpha a^2$$

$$ER^3\left(\frac{h}{R}\right)^{5/2} - \alpha(Rh)^{1/2}$$







$$\frac{ER^3}{R^{5/2}} h_a^{3/2} = \alpha R^{1/2} h_a^{1/2}$$

$$h_a^2 \frac{E}{\alpha} \sim 1$$

$$\boxed{h_a \sim \left(\frac{\alpha}{E}\right)^{1/2}}$$