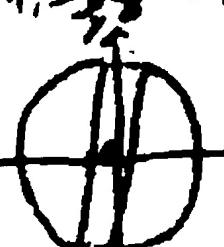
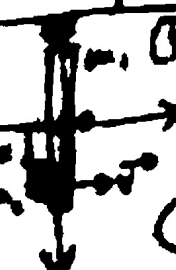



$M_1 = 3m$ $M_2 = 1.5m$ $\omega_1 = 4.5 \text{ rad/s}$
 Conservation of angular momentum
 $L = I\omega = \frac{1}{2}MR^2\omega = L_1 = \frac{1}{2}M_1R^2\omega_1 + M_2r^2\omega$
 $\frac{M_1R^2\omega_1}{2} = \frac{R^2}{2}\omega(M_1 + M_2)$ $\omega = \frac{M_1\omega_1}{M_1 + 2M_2} = \frac{3}{5} \cdot 4.5 = 2.7 \text{ rad/s}$



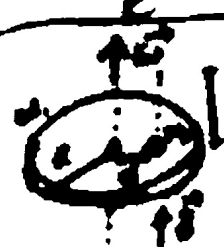
$m_1 v = (m_1 + m_2) V_{cm}$ $V_{cm} = \frac{m_1 v}{m_1 + m_2}$ $r_{cm} = \frac{m_2 R}{m_1 + m_2}$
 $(x - R)m_2 v = I\omega = (\frac{m_2 R^2}{12} + r_{cm}^2 m_2 + m_2 (x - r_{cm})^2) \omega$
 $\omega = \frac{12(x - R)v}{R^2 + 12(x - r_{cm})^2}$
 $J = \Delta p = m\omega r - m v$



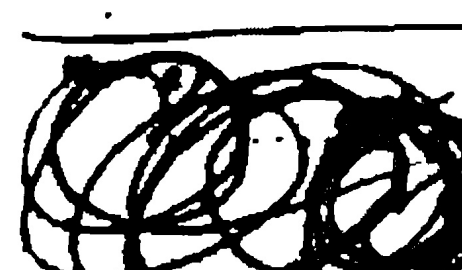
$J = \Delta p = -m_2 v$
 $I\omega = I\omega' + m_2 v R$ $\frac{m_2 R^2}{12} \omega = (\frac{m_2 R^2}{12} + m_2 R^2) \omega'$ $\omega' = \frac{m_2 \omega}{13}$
 $J_1 = \Delta p_1 = 8m_2 \omega \frac{R}{2}$ $J = \sqrt{J_1^2 + J_2^2}$ $\theta = \tan^{-1} \frac{J_2}{J_1}$



$L\omega = I\omega'$ $\frac{1}{2}m_1 R^2 \omega = (\frac{1}{2}m_1 R^2 + m_2 d^2) \omega'$ $\omega' = \frac{m_1 R^2 \omega}{m_1 R^2 + 2m_2 d^2}$
 $f = m_2 \sqrt{gh}$ $\ln \mu \ln \mu \ln \mu = 3 \ln$



$1: m, R, v, \omega$
 $2: m, R, v, \omega$
 $3: m, R, v, \omega$
 $L_1 = 0$ $L_2 = 0$ $L_3 = 0$ $L_4 = 0$ $L_5 = 0$ $L_6 = 0$ $L_7 = 0$ $L_8 = 0$ $L_9 = 0$ $L_{10} = 0$ $L_{11} = 0$ $L_{12} = 0$ $L_{13} = 0$ $L_{14} = 0$ $L_{15} = 0$ $L_{16} = 0$ $L_{17} = 0$ $L_{18} = 0$ $L_{19} = 0$ $L_{20} = 0$ $L_{21} = 0$ $L_{22} = 0$ $L_{23} = 0$ $L_{24} = 0$ $L_{25} = 0$ $L_{26} = 0$ $L_{27} = 0$ $L_{28} = 0$ $L_{29} = 0$ $L_{30} = 0$ $L_{31} = 0$ $L_{32} = 0$ $L_{33} = 0$ $L_{34} = 0$ $L_{35} = 0$ $L_{36} = 0$ $L_{37} = 0$ $L_{38} = 0$ $L_{39} = 0$ $L_{40} = 0$ $L_{41} = 0$ $L_{42} = 0$ $L_{43} = 0$ $L_{44} = 0$ $L_{45} = 0$ $L_{46} = 0$ $L_{47} = 0$ $L_{48} = 0$ $L_{49} = 0$ $L_{50} = 0$ $L_{51} = 0$ $L_{52} = 0$ $L_{53} = 0$ $L_{54} = 0$ $L_{55} = 0$ $L_{56} = 0$ $L_{57} = 0$ $L_{58} = 0$ $L_{59} = 0$ $L_{60} = 0$ $L_{61} = 0$ $L_{62} = 0$ $L_{63} = 0$ $L_{64} = 0$ $L_{65} = 0$ $L_{66} = 0$ $L_{67} = 0$ $L_{68} = 0$ $L_{69} = 0$ $L_{70} = 0$ $L_{71} = 0$ $L_{72} = 0$ $L_{73} = 0$ $L_{74} = 0$ $L_{75} = 0$ $L_{76} = 0$ $L_{77} = 0$ $L_{78} = 0$ $L_{79} = 0$ $L_{80} = 0$ $L_{81} = 0$ $L_{82} = 0$ $L_{83} = 0$ $L_{84} = 0$ $L_{85} = 0$ $L_{86} = 0$ $L_{87} = 0$ $L_{88} = 0$ $L_{89} = 0$ $L_{90} = 0$ $L_{91} = 0$ $L_{92} = 0$ $L_{93} = 0$ $L_{94} = 0$ $L_{95} = 0$ $L_{96} = 0$ $L_{97} = 0$ $L_{98} = 0$ $L_{99} = 0$ $L_{100} = 0$



$T = 2\pi \sqrt{\frac{L}{g}}$ $T' = 2\pi \sqrt{\frac{L'}{g}}$ $L = 1.8m$
 $\frac{L'}{L} = \frac{g}{g'} = \frac{9.8}{9.8}$ $L' = L = 1.8m$
 $T = 2\pi \sqrt{\frac{L}{g}}$

