Possibly useful relations: **(note: two sides!)**

$\vec{v}_{\text{avg}} = \Delta\vec{x}/\Delta t$

$x = x_0 + v_0 t + \frac{1}{2}at^2$

$v^2 = v_0^2 + 2a(x - x_0)$

$x = x_0 + v_{\text{av}} t$

$R = \frac{v_0^2}{g}\sin(2\theta)$

$\vec{F}_{\text{net}} = m\vec{a}$

$\vec{W} = m\vec{g}$

$0 \le f_s \le \mu_s N$

$W = Fd\cos\theta$

$W_{net} = \Delta\text{KE}$

$\text{PE}_s = \frac{1}{2}kx^2$

$E = \text{KE}_i + \text{PE}_i + W_{\text{nc}} = \text{KE}_f + \text{PE}_f$

$\text{Eff} = W_{\text{out}}/E_{\text{in}}$

$\vec{p} = m\vec{v}$

$\vec{p}_{\text{tot}} = \text{constant}$

$\theta = \frac{s}{r}$

$v = r\omega$

$f = 1/T$

$\frac{R^3}{T^2} = \frac{GM}{4\pi^2}$

$\vec{a}_{\text{avg}} = \Delta\vec{v}/\Delta t$

$v = v_0 + at$

$v_{\text{avg}} = \frac{v_0 + v}{2}$

$\vec{v}_{AB} = \vec{v}_{AC} + \vec{v}_{CB}$

$h = \frac{v_0^2}{2g}\sin^2\theta$

$\vec{F}_{AB} = -\vec{F}_{BA}$

$\Delta L = \frac{1}{\gamma}\frac{F}{A}L_0$

$f_k = \mu_K N$

$\text{KE} = \frac{1}{2}mv^2$

$\Delta\text{PE} = mgy$

$F_s = -kd$

$P = W/t$

$\vec{I} = \vec{F}_{\text{avg}}\Delta t$

$\vec{F}_{\text{net}} = \Delta\vec{p}/\Delta t$

$F_c = m\frac{v^2}{r} = mr\omega^2$

$\omega = \frac{\Delta\theta}{\Delta t}$

$a_c = \frac{v^2}{r} = r\omega^2$

$\omega = 2\pi f$

$F = \frac{GMm}{r^2}$

$\vec{r}_{\text{cm}} = (m_1\vec{r}_1 + m_2\vec{r}_2 + ...)/(m_1 + m_2 + ...)$

$\tau = rF\sin\theta$

$\tau_{\text{net}} = I\alpha$

$a_T = r\alpha$

$L = I\omega$

$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$

$\theta = \theta_0 + \overline{\omega}t$

$\tau_{\text{net}} = \frac{\Delta L}{\Delta t}$

$\tau = Fl$

$\text{KE}_{\text{rot}} = \frac{1}{2}I\omega^2$

$W = \tau\theta$

$L = L'$

$\omega = \omega_0 + \alpha t$

$\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$

$\rho = M/V$

$P = F/A$ $\quad$ $P = P_0 + \rho g h$

$P_{\text{gauge}} = P - P_{\text{atm}}$ $\quad$ $F_B = W_{\text{disp}}$

specific gravity $= \frac{\rho}{\rho_{\text{water}}}$ $\quad$ $\gamma = F/L$

$P = 4\gamma/r$ $\quad$ $h = \frac{2\gamma\cos(\theta)}{\rho g r}$

$\mathcal{F} = \frac{V}{t}$ $\quad$ $\mathcal{F} = A\overline{v} = \text{constant}$

$P + \frac{1}{2}\rho v^2 + \rho g h = \text{const}$ $\quad$ $\text{Power} = (P + \frac{1}{2}\rho v^2 + \rho g h)\mathcal{F}$

$\mathcal{F} = \frac{P_2 - P_1}{R}$ $\quad$ $R = \frac{8\eta l}{\pi r^4}$

$N_R = \frac{2\rho r v}{\eta}$

$f = \frac{1}{T}$ $\quad$ $T = 2\pi\sqrt{m/k}$

$x = A\cos(2\pi f t)$ $\quad$ $v = -v_{\max}\sin(2\pi f t)$

$v_{\max} = \sqrt{\frac{k}{m}}A$ $\quad$ $a = -\frac{kA}{m}\cos(2\pi f t)$

$T = 2\pi\sqrt{\frac{L}{g}}$ $\quad$ $E = \frac{1}{2}kA^2$

$E \propto A^2$ $\quad$ $E = \frac{1}{2}m\omega^2 A^2$

$T = 2\pi\sqrt{\frac{I}{MgD}}$ $\quad$ $x(t) = A\exp(\frac{-bt}{2m})\cos(2\pi f t)$

$f_{\text{resonance}} \simeq f_0$

$y = f(x - vt)$ $\quad$ $L = n\frac{\lambda}{2};\;\; n = 1, 2, 3...$

$v = \lambda f$ $\quad$ $f_B = |f_1 - f_2|$

$I = \frac{P}{A}$ $\quad$ $v_{\text{air}} = (331\frac{m}{s})\sqrt{\frac{T}{273}}$

$\beta = 10\log_{10}(\frac{I}{I_0})$ $\quad$ $I_0 = 10^{-12}\ \text{W/m}^2$

$f_n = n\frac{v}{4L};\;\; n = 1, 3, 5...$ $\quad$ $f_n = n\frac{v}{2L};\;\; n = 1, 2, 3...$

$f_{\text{obs}} = f_s(\frac{v}{v \pm v_s})$ $\quad$ $f_{\text{obs}} = f_s(\frac{v \pm v_{\text{obs}}}{v})$

$\cos\theta = \text{adjacent/hypotenuse}$ $\quad$ $\tan\theta = \sin\theta/\cos\theta$

$\sin\theta = \text{opposite/hypotenuse}$ $\quad$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$g = 9.8\ \text{m/s}^2$ downward $\quad$ $G = 6.67 \times 10^{-11}\ \text{Nm}^2/\text{kg}^2$

$4.186\ \text{J} = 1\ \text{cal}$ $\quad$ $1\ \text{Cal} = 1000\ \text{cal}$

$\rho_{\text{air}} = 1.29\ \text{kg/m}^3$ $\quad$ $\rho_{\text{water}} = 10^3\ \text{kg/m}^3$

one atm. $= 760$ mm Hg $= 10^5$ Pa $\quad$ $T_{(K)} = T_{(^\circ C)} + 273$