EQUATIONS AND CONSTANTS

ANGLES:	$Sin\ 53^\circ = Cos\ 37^\circ = 0.8$	$Sin\ 37^\circ = Cos\ 53^\circ = 0.6$	
CONVERSIONS:	12 in = 1 ft = 0.305 m	1.00 lb = 4.448 N	
GEOMETRY:	$A_{sphere} = 4\pi r^2$	$V_{sphere} = \frac{4}{3}\pi r^3$	
GRAVITY:	$g = 9.8\ \mathrm{m/s^2}$ $F_G = mg$	$G = 6.67 \times 10^{-11}\ \mathrm{N{\cdot}m^2/kg^2}$ $g(r) = GM/r^2$	
KINEMATICS:	$\Delta x = v_{ix}(\Delta t) + \frac{1}{2}a_x(\Delta t)^2$	$v_{fx}^2 - v_{ix}^2 = 2a_x\Delta x$	$a_c = v^2/r$
ENERGY:	$\Sigma W = \Delta K$	$\Delta U_G = mg\Delta h$	
SYSTEMS OF PARTICLES:	$\underline{\mathbf{p}}_{sys} = M_{sys}\ \underline{\mathbf{v}}_{CM}$	$\Sigma\underline{\mathbf{F}}_{ext} = M_{sys}\ \underline{\mathbf{a}}_{CM}$	$\underline{\mathbf{I}} = \Delta\underline{\mathbf{p}}$
ROTATIONAL MOTION:	$v_t = r\omega$ $\Delta\theta = \omega_i(\Delta t) + \frac{1}{2}\alpha(\Delta t)^2$ $\Sigma\tau_{\mathrm{AF_{ext}}} = I_{\mathrm{A}}\alpha$ $K_{\mathrm{rot,A}} = \frac{1}{2}I_{\mathrm{A}}\omega^2$ $W_\tau = \tau\Delta\theta$ $L_{\mathrm{A}} = I_{\mathrm{A}}\omega$	$a_t = r\alpha$ $\omega_f^2 - \omega_i^2 = 2\alpha\Delta\theta$ $I_{\mathrm{A}} = I_{\mathrm{CM}} + MD^2$ $K_{\mathrm{sys}} = \frac{1}{2}Mv_{\mathrm{CM}}^2 + \frac{1}{2}I_{\mathrm{CM}}\omega^2$ $\Sigma\tau_{\mathrm{AF_{ext}}}\Delta t = \Delta L_{\mathrm{sys,A}}$	
ELASTICITY:	$U_S = \frac{1}{2}kx^2$	$\omega^2 = \frac{k}{m}$	$\omega^2 = \frac{MgD}{I}$
	$x(t) = A\cos(\omega t)$	$v_x(t) = -\omega A\sin(\omega t)$	$a_x(t) = -\omega^2 A\cos(\omega t)$
FLUIDS AND WAVES:	$\rho_{water} = 1000\ \mathrm{kg/m^3}$ $\Delta P = \rho g\Delta d$	1 atm = 101300 Pa = 760 mmHg $\Delta P + \rho g\Delta h + \frac{1}{2}\rho(v_f^2 - v_i^2) = 0$ $f_D = \left(\left(1 \pm \frac{v_D}{v_w}\right) / \left(1 \mp \frac{v_S}{v_w}\right)\right) f_S$	