

FORMULAE and CONSTANTS

$\Delta \bar{d} = \bar{d}_2 - \bar{d}_1$	$\bar{v}_{av} = \frac{\Delta \bar{d}}{\Delta t}$	$\bar{a}_{av} = \frac{\Delta \bar{v}}{\Delta t}$	$\Delta \bar{d} = \bar{v}_1 \Delta t + \frac{1}{2} \bar{a} \Delta t^2$
$\Delta \bar{d} = \frac{1}{2} (\bar{v}_1 + \bar{v}_2) \Delta t$	$v_2 = v_1 + a \Delta t$	$v_2^2 = v_1^2 + 2a \Delta d$	$\Delta \bar{d} = \bar{v}_2 \Delta t - \frac{1}{2} \bar{a} \Delta t^2$
$\Delta x = \frac{v_1^2}{g} \sin 2\theta$	$\bar{v}_{AC} = \bar{v}_{AB} + \bar{v}_{BC}$	$a_c = \frac{v^2}{r}$	$a_c = \frac{4\pi^2 r}{T^2}$
$a_c = 4\pi^2 r f^2$	$f = \frac{1}{T}$	$\Sigma \bar{F} = m \bar{a}$	$\bar{F}_g = m \bar{g}$
$F_G = \frac{G m_1 m_2}{r^2}$	$F_f = \mu F_N$	$F_c = m a_c$	$W = (F \cos \theta) \Delta d$
$E_g = mgh$	$E_K = \frac{1}{2} mv^2$	$W_{total} = \Delta E_k$	$E_e = \frac{1}{2} kx^2$
$F = kx$	$E_{th} = F_K \Delta d$	$T = 2\pi \sqrt{\frac{m}{k}}$	
$\bar{p} = m \bar{v}$	$\Sigma \bar{F} \Delta t = \Delta \bar{p}$	$p = \sqrt{2m E_K}$	
	$m_1 \bar{v}_1 + m_2 \bar{v}_2 = m_1 \bar{v}_1' + m_2 \bar{v}_2'$	$g = \frac{GM}{r^2}$	$v = \sqrt{\frac{GM}{r}}$
$v_{escape} = \sqrt{\frac{2GM}{r}}$	$m_1 v_1^2 + m_2 v_2^2 = m_1 v_1'^2 + m_2 v_2'^2$	$E_g = -\frac{GMm}{r}$	$F_E = \frac{kq_1 q_2}{r^2}$
$E_E = \frac{kq_1 q_2}{r}$	$\bar{\epsilon} = \frac{\bar{F}_E}{q}$	$\epsilon = \frac{kq_1}{r^2}$	$\epsilon = \frac{\Delta V}{r}$
$V = \frac{E_E}{q}$	$V = \frac{kq_1}{r}$	$\Delta V = kq_1 \left(\frac{1}{r_B} - \frac{1}{r_A} \right)$	$W = q \Delta V$
$q = Ne$	$F = ILB \sin \theta$	$F_M = qvB \sin \theta$	$v = f\lambda$
$n = \frac{c}{v} = \frac{\sin \theta_i}{\sin \theta_R}$	$\frac{n_2}{n_1} = \frac{\sin \theta_1}{\sin \theta_2} = \frac{\lambda_1}{\lambda_2} = \frac{v_1}{v_2}$	$n_1 \sin \theta_1 = n_2 \sin \theta_2$	$d \sin \theta_m = m\lambda$
$d \sin \theta_n = (n - \frac{1}{2})\lambda$	$ P_n S_1 - P_n S_2 = (n - \frac{1}{2})\lambda$	$\lambda = \frac{d \Delta x}{L}$	$\lambda = \frac{w \Delta y}{L}$
$X_m = \frac{m L \lambda}{d}$	$X_n = (n - \frac{1}{2}) \frac{L \lambda}{d}$	$(m + \frac{1}{2})\lambda = w \sin \theta_m$	$n\lambda = w \sin \theta_n$
$\Delta t_m = \frac{\Delta t_s}{\sqrt{1 - \frac{v^2}{c^2}}}$	$L_m = L_s \sqrt{1 - \frac{v^2}{c^2}}$	$p = \frac{mv}{\sqrt{1 - \frac{v^2}{c^2}}}$	$E_{total} = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$
$E_{rest} = mc^2$	$E = hf$	$E_K = hf - W$	$\lambda = \frac{h}{p}$
$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	$a^2 = b^2 + c^2 - 2bc \cos A$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	$B = \mu_o \left(\frac{I}{2\pi r} \right)$
$g = 9.8 \text{ m/s}^2$	$r_E = 6.38 \times 10^6 \text{ m}$	$M_E = 5.98 \times 10^{24} \text{ kg}$	$B = \mu_o \left(\frac{NI}{L} \right)$
$G = 6.67 \times 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{kg}^2}$	$m_e = 9.11 \times 10^{-31} \text{ kg}$	$e = 1.60 \times 10^{-19} \text{ C}$	
$k = 9.0 \times 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2}$	$c = 3.00 \times 10^8 \text{ m/s}$	$h = 6.63 \times 10^{-34} \text{ J} \cdot \text{s}$	$\mu_o = 4\pi \times 10^{-7} T \cdot \frac{m}{A}$