

**Formulas**  
(you need very few of these!!)

$\vec{F} = \frac{k_0 q_1 q_2}{r^2} \hat{r}$	$\vec{E} = \frac{\vec{F}}{q_0}$	$\vec{F} = q\vec{E}$	$k_e = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2 / \text{C}^2$	
$E = \frac{k_0 q_1}{r^2}$	$\Delta V = \frac{\Delta PE}{q_0}$	$\Delta V = Ed$	$V = \frac{k_0 q}{r}$	$\Delta PE = q\Delta V$
$\sin = \frac{o}{h}$	$\cos = \frac{a}{h}$	$\tan = \frac{o}{a}$	$\tan 45^\circ = 1$	
$\sin 30^\circ = 0.5 = \cos 60^\circ, \cos 30^\circ = 0.866 = \sin 60^\circ$			$\sin 45^\circ = 0.707 = \cos 45^\circ$	
use $g = 10 \frac{m}{\text{sec}^2}$	1in = 2.5cm	$2\pi \text{ rad} = 360^\circ$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	
$C = \frac{Q}{V}$	$C = \frac{\epsilon_0 A}{d}$	$C_{eq} = \kappa C_{air}$	$C_{eq} = \sum_{j=1}^n C_j$	$\frac{1}{C_{eq}} = \sum_{j=1}^n \frac{1}{C_j}$
$V = IR$	$R = \frac{\rho L}{A}$		$P = IV = I^2 R = \frac{V^2}{R}$	
$R_{eq} = \sum_{j=1}^n R_j$	$\frac{1}{R_{eq}} = \sum_{j=1}^n \frac{1}{R_j}$			
$q = q_0 e^{-t/RC}$				
$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{N m}^2$				
$W = Fd \cos \theta$	$KE = \frac{1}{2} mv^2$		$F_g = \frac{GMm}{r^2}$	$U_g = mgh$



