Useful Constants:

$$g = 9.8\,\mathrm{m/s^2} \qquad G = 6.67 \times 10^{-11}\,\frac{\mathrm{m^3}}{\mathrm{kg\,s^2}}$$
$$v_s = 343\,\mathrm{m/s} \qquad c = 3.00 \times 10^{8}\,\mathrm{m/s}$$
$$k = 8.99 \times 10^{9}\,\frac{\mathrm{N\,m^2}}{\mathrm{C^2}} \qquad \epsilon_0 = 8.85 \times 10^{-12}\,\frac{\mathrm{C^2}}{\mathrm{N\,m^2}}$$
$$e = 1.60 \times 10^{-19}\,\mathrm{C} \qquad \mu_0 = 4\pi \times 10^{-7}\,\frac{\mathrm{T\,m}}{\mathrm{A}}$$
$$h = 6.63 \times 10^{-34}\,\mathrm{J\,s}$$

Simple Harmonic Motion:

$$T = \frac{1}{f} \qquad x = A\cos(2\pi\, f\, t)$$
$$T = 2\pi\sqrt{\frac{m}{k}} \qquad T = 2\pi\sqrt{\frac{L}{g}}$$

Waves:

$$v = \lambda\, f$$
$$v_{\text{string}} = \sqrt{\frac{F}{\mu}} \qquad v_{\text{s}} \approx v_0\sqrt{\frac{T}{T_0}}$$

$$f_{\text{obs}} = f_{\text{src}}\left(\frac{v_{\text{sound}} \pm v_{\text{obs}}}{v_{\text{sound}} \mp v_{\text{src}}}\right)$$

$$f_{\text{beat}} = f_1 - f_2$$

$$L = \frac{n}{2}\lambda_n \qquad L = \frac{n}{4}\lambda_n \quad (\text{odd } n)$$

$$I = \frac{P}{A} \qquad \beta = (10\,\mathrm{dB})\,\log\left(\frac{I}{I_0}\right)$$

Electric Force, Field, & Potential:

$$F = k\,\frac{q_1\,q_2}{r^2} \qquad E_{\text{pt}} = k\frac{Q}{r^2}$$
$$\vec{F} = q\,\vec{E}$$

$$\Delta V = V_{\text{f}} - V_{\text{i}} = -\frac{W}{q} \qquad V_{\text{a}} = k\frac{Q}{r_{\text{a}}}$$
$$E_{\text{ave}} = -\frac{\Delta V}{\Delta x}$$

Capacitors:

$$q = C\,\Delta V \qquad \mathrm{PE}_{\text{cap}} = \tfrac{1}{2}C\,\Delta V^2$$

Electric Circuits:

$$I = \frac{\Delta q}{\Delta t} \qquad V = I\,R$$
$$P = I\,V$$
$$R_{\text{eq}} = \sum_{\text{ser}} R_i \qquad \frac{1}{R_{\text{eq}}} = \sum_{\text{par}} \frac{1}{R_i}$$
$$I_{\text{in}} = I_{\text{out}} \qquad \sum_{\text{loop}} V_i = 0$$

Magnetic Force & Field:

$$F = q\,v\,B_\perp \qquad r = \frac{m\,v}{q\,B}$$
$$F = I\,L\,B_\perp$$
$$B = \frac{\mu_0\,I}{2\pi\,r} \qquad B = N\frac{\mu_0\,I}{2\,R}$$

Induction:

$$\mathcal{E} = v\,L\,B_\perp \qquad \mathcal{E} = -N\frac{\Delta\Phi_{\text{B}}}{\Delta t}$$
$$\Phi_{\text{B}} = B_\perp\,A$$
$$\mathcal{E}(t) = \mathcal{E}_{\text{max}}\,\sin(\omega t) \qquad \mathcal{E}_{\text{max}} = NAB\,\omega$$

Electro-magnetic Waves:

$$c^2 = \frac{1}{\epsilon_0\,\mu_0} \qquad c = \lambda\, f$$
$$E = cB$$
$$I = \frac{P}{A} \qquad I_{\text{ave}} = \frac{c\epsilon_0}{2}E_{\text{max}}^2 = \frac{c}{2\mu_0}B_{\text{max}}^2$$

Motion:

$$\Delta\vec{x} = \vec{x}_f - \vec{x}_i$$

$$\vec{v} = \frac{\Delta\vec{x}}{\Delta t} \qquad \vec{a} = \frac{\Delta\vec{v}}{\Delta t}$$

$$\Delta x = v_i\,\Delta t + \frac{1}{2}a\,\Delta t^2 \qquad v_f = v_i + a\,\Delta t$$

$$\Delta x = \frac{1}{2}\left(v_f + v_i\right)\Delta t \qquad {v_f}^2 = {v_i}^2 + 2\,a\,\Delta x$$

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

Forces:

$$\vec{F}_{\text{net}} = \sum_i \vec{F}_i \qquad \vec{F}_{A,B} = -\vec{F}_{B,A}$$

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

$$f_k = \mu_k N \qquad W = mg$$

$$f_s \le \mu_s N \qquad F_g = G\,\frac{Mm}{r^2}$$

$$F_s = k\,\Delta s$$

Energy & Work:

$$E_i + W = E_f \qquad W = F_{||}\cdot\Delta x$$

$$\text{KE} = \tfrac{1}{2}\,m\,v^2 \qquad \text{PE}_g = m\,g\,\Delta y$$

$$\text{PE}_{\text{spring}} = \tfrac{1}{2}\,k\,\Delta s^2$$

$$P = \frac{W}{\Delta t}$$

Geometry:

$$C_{\text{circle}} = 2\pi\,r \qquad A_{\text{circle}} = \pi\,r^2$$

$$V_{\text{sphere}} = \tfrac{4}{3}\pi\,r^3 \qquad A_{\text{sphere}} = 4\pi\,r^2$$

Optics:

$$\theta_{\text{i}} = \theta_{\text{r}} \qquad n_1\,\sin\theta_1 = n_2\,\sin\theta_2$$

$$\theta_{\text{c}} = \sin^{-1}\left(\frac{n_2}{n_1}\right) \qquad n_i = \frac{c}{v_i}$$

$$\frac{1}{f} = \frac{1}{d_{\text{obj}}} + \frac{1}{d_{\text{im}}} \qquad P = \frac{1}{f}$$

$$m = \frac{h_{\text{im}}}{h_{\text{obj}}} = -\frac{d_{\text{im}}}{d_{\text{obj}}} \qquad f_{\text{mir}} = \pm\frac{R}{2}$$

Wave Optics & More:

$$\sin\theta_n = \frac{n\lambda}{d} \qquad \sin\theta_n = \frac{\left(n+\frac{1}{2}\right)\lambda}{d}$$

$$\sin\theta_n = \frac{n\lambda}{w}$$

$$\sin\theta_n \approx \frac{y_n}{D}$$

$$\Delta L_{\text{eff}} = 2t + \left\{\begin{matrix}0\\1\end{matrix}\right\}\frac{\lambda_{\text{film}}}{2} = m\,\lambda_{\text{film}}$$

$$\Delta L_{\text{eff}} = 2t + \left\{\begin{matrix}0\\1\end{matrix}\right\}\frac{\lambda_{\text{film}}}{2} = \left(m+\frac{1}{2}\right)\lambda_{\text{film}}$$

$$S_{\text{trans}} = \tfrac{1}{2}S_0 \qquad S_{\text{trans}} = S_0\,\cos^2\theta$$

$$E = hf = \frac{hc}{\lambda}$$

Trigonometry:

$$\sin\theta = \frac{A}{C} \qquad \cos\theta = \frac{B}{C} \qquad \tan\theta = \frac{A}{B}$$

$$C^2 = A^2 + B^2$$