$$\mathbf{d} = \mathbf{d}_0 + \mathbf{v}_0 t + \frac{1}{2}\mathbf{a}t^2$$

$$x = x_0 + v_{0x}t + \frac{1}{2}a_x t^2$$

$$y = y_0 + v_{0y}t + \frac{1}{2}a_y t^2$$

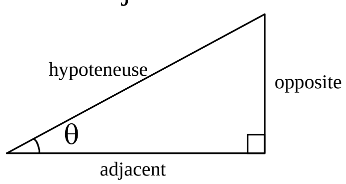
$$v^2 = v_0^2 + 2a\Delta x$$

$$\sum \mathbf{F} = m\mathbf{a}$$

opposite = hypoteneuse $\times \sin\theta$

adjacent= hypoteneuse $\times \cos\theta$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$



$$\frac{\sin a}{A} = \frac{\sin b}{B} = \frac{\sin c}{C}$$

$$C^2 = A^2 + B^2 - 2AB\cos c$$

A, B, C are lengths of sides

a, b, c are angles

$$F_{\parallel} = mg\sin\theta$$

$$F_{\perp} = mg\cos\theta$$

$$F_{\mathrm{f}} \le \mu_{\mathrm{s}} F_{\mathrm{N}}$$

$$F_{\mathrm{f}} = \mu_{\mathrm{k}} F_{\mathrm{N}}$$

$$\mathbf{F}t = \Delta(m\mathbf{v})$$

$$m_1\mathbf{v}_1 + m_2\mathbf{v}_2 = m_1\mathbf{V}_1 + m_2\mathbf{V}_2$$

$$\frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2 = \frac{1}{2}m_1V_1^2 + \frac{1}{2}m_2V_2^2$$

$$m_1\mathbf{v}_1 + m_2\mathbf{v}_2 = (m_1 + m_2)\mathbf{V}$$

$$(m_1 + m_2)\mathbf{v} = m_1\mathbf{V}_1 + m_2\mathbf{V}_2$$

$$W = \mathbf{F} \bullet \mathbf{d} = Fd\cos\theta$$

$$\Sigma W = \Delta K$$

$$KE = E_K = \tfrac{1}{2}mv^2$$

$$\mathbf{T} = \mathbf{d} \times \mathbf{F} = dF\sin\theta$$

$$I = \sum mr^2 = \int r^2 dm$$

$$v = f\lambda$$

$$y = A\cos(\omega t + \phi)$$

$$dB = 10 \times \log(I/I_0)$$

Open: $\lambda = 2L$

Closed: $\lambda = 4L$

Strings: $f_1 = \dfrac{v}{2L}$

$$v = 331 + 0.6C$$

$$f' = f\left(\frac{v \pm v_0}{v \mp v_s}\right)$$

$$F_c = \frac{mv^2}{r} \qquad \omega = 2\pi f$$

$$T = 1/f$$

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

$$F_g = G\frac{m_1 m_2}{R^2}$$

$$g_p = G\frac{m_p}{R_p^2}$$

$$U_g = G\frac{m_1 m_2}{R}$$

$$F = -kd$$

$$U = \tfrac{1}{2}kd^2$$

$U = mgh$ (near surface)

$$U = -\frac{GMm}{R}$$

$$v_e = \sqrt{\frac{2GM}{R}}$$

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

$$F = 32 + \tfrac{9}{5}C$$

$$C = \tfrac{5}{9}(F - 32)$$

$$K = C + 273.15$$

$$Q = cm(\Delta T)$$

$$Q = Lm$$

$$T = 2\pi\sqrt{\frac{m}{k}}$$

$$T = 2\pi\sqrt{\frac{l}{g}}$$

$$F = k\frac{Q_1 Q_2}{R^2}$$

$$C = \frac{Q}{V} = k\xi_0 \frac{A}{d} \quad \left(k \text{ is the dielectric constant}\right)$$

$$U \text{ (PE)} = \frac{1}{2}QV = \frac{1}{2}CV^2 = \frac{1}{2}\frac{Q^2}{C}$$

$$E = k\frac{q}{r^2}$$

$$U \text{ (PE)} = -qEd$$

$$\Delta V = -ED$$

$$V = IR$$

$$P = VI = I^2 R = V^2 / R$$

$$R_{\text{eq}} = \sum_{i=1}^{n} R_i \quad \text{(Series)}$$

$$R_{\text{eq}} = \frac{1}{\sum_{i=1}^{n} \frac{1}{R_i}} \quad \text{(Parallel)}$$

$$\mathbf{F}_M = q\mathbf{v} \times \mathbf{B} = qvB\sin\theta$$

$$B_s = \mu_0 nI$$

$$B = \frac{\mu_0}{2\pi}\frac{I}{r}$$

$$\mathbf{F} = l\mathbf{I} \times \mathbf{B} = IlB\sin\theta$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 = n_3 \sin\theta_3$$

$$n_m = \frac{c}{v_m}$$

$$c = f\lambda \qquad E = hf$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} \qquad f = \frac{R}{2}$$

$$P_1 + \rho g h_1 + \tfrac{1}{2}\rho v_1^2 = P_2 + \rho g h_2 + \tfrac{1}{2}\rho v_2^2$$